THE REPORT

The Magazine of the International Institute of Marine Surveying

SEPTEMBER 2020
ISSUE 93

Cyber Security & Ships

What surveyors ought to know about fastenings - Part II

Who is liable for containership stack collapses?

The making of research vessel RV Kronprinz Haakon

What do remote surveys mean for the surveying profession?

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THE REPORT

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Editor's Letter

Welcome to another big edition of the Report Magazine.

I wanted to lead with the most significant news affecting IIMS. We have completed the purchase of Murrills House as the Institute's permanent new flagship headquarters. This provides a valuable new asset for members and underpins the future of the organisation. It is, I feel, a significant moment in our history as we approach our 30th birthday in 2021. You can read more about this project and the work we plan to undertake in Member News. And if you want to know more about the 500 year history of Murrills House, I would refer you back to the June 2019 edition of the Report Magazine. Due to renewed interest and enquiries from members, I have reopened the *Just Giving* page for those who wish to give a **'Buy a Brick'** donation to the renovation fund in exchange for a name plaque in the boardroom. For more details go to **https://bit.ly/2X4Cu9x**.

The other item of significance I would draw members' attention to is the long overdue review of surveyor specialisations. As a consequence, we have published two new lists of specialisations and I urge you to study them carefully. See page 26.

We have welcomed in new President, Geoff Waddington, since the last Report Magazine and said goodbye to Capt Zarir Irani, now Past President. My thanks to Zarir for his considerable efforts and good luck to Geoff who is already making his mark.

As our world continues in an unpredictable topsy turvy fashion and the COVID-19 pandemic shows little sign of disappearing anytime soon, we are all learning to live and work with it in our midst. There can be no doubt that alternative ways of working, using enhanced digital solutions, will be expedited as a result. With this in mind, I have become increasingly fascinated by remote surveys, their integrity and what this means for the marine surveying profession. Is it the next logical step for a surveyor or the end of the profession as we know it? Consequently, I have authored a lengthy article on this topic and am keen to stimulate a debate on the subject (page 34). Let me have your thoughts on this disruptive change.

This issue has quite a lot of Past President, Jeffrey Casciani-Wood in it. Fittingly, as he approaches his 90th birthday next month, I decided to make him the subject of *A Day in the Life of* (page 104) and went in search of information armed with a series of questions. It is a moving article. And the second part of Jeffrey's excellent and informative feature about fastenings concludes (see page 42).

Deputy Vice President, Capt Ruchin Dayal, has authored an insightful article entitled *Cyber Security & Ships*. The title is specific, and no further clues are required for cyber safety is becoming one of the most important aspects and scourge for modern day shipping (page 50).

I am grateful to David Pestridge for writing about sacrificial anodes and questioning their value, an article that all yacht and small craft surveyors should read on page 92.

Although not directly related to surveying, I have chosen to publish the story entitled *Search and Rescue Algorithm identifies hidden "traps" in ocean waters* (page 63) because it is of interest generally, but importantly because it demonstrates how technologies are being increasingly used to push boundaries and, ultimately, this can only be a good thing, although not all might agree!

Enjoy.
Stay safe and survey well.

Mike Schwarz, *Chief Executive Officer*

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The President's Column

Dear IIMS Member

On June 16th this year, I had the privilege of being handed the baton of presidency from my friend and fellow board member Captain Zarir Irani, who had been a very active President during his two years. He has also been a leading light for Regional Directors, not least in his own successful Middle East region and his involvement with the UAE branch. For this and his other hard work on behalf of the Institute, I would like to offer my own thanks and I am sure the thanks of the entire membership too.

This leaves me and the management board the unenviable task of keeping the momentum going; fortunately we have Mike at the helm and he is sure to keep steering us in the right direction.

In June this year, the IIMS became a leading force in helping to bring about change to the Australia Maritime Safety Authority's (AMSA) attitude to Commercial Craft Regulations. The issues raised by our CEO, Mike Schwarz, in a formal submission to the hearing, helped hugely with significant contributions from Past President, Adam Brancher, was instrumental in bringing a system bogged down by bureaucracy to the attention of an Australian Senate Enquiry. Pleasing to see that our Institute is able to effect changes in the global surveying community.

Although we are all getting a little weary of the constant media coverage and regular government policy changes due to the global COVID 19 pandemic, it would be remiss of me not to mention how it has affected areas of the IIMS and the activities of surveyors around the world. The effects are far reaching and may also be long lasting. Yesterday I flew back to the UK and looked down on seven empty cruise ships at anchor in Weymouth Bay and three more in Bournemouth Bay. Following an on line meeting at the beginning of the week, our Vice President Peter Broad spoke of fifteen vehicle carriers at anchor off Busan in South Korea. Peter also spoke of the problems moving ships' crews around the world. As surveyors we are of course exempt from the quarantine regulations under section 256 of the Merchant Shipping Act 1995, which has enabled those who were confident

to travel and continue working to do so, although not immune of course. Between March and June the lock down effectively brought a halt to many surveying activities leaving surveyors such as myself with no income and no government assistance. Our head office had to close, but fortunately our office team continued to work from home, returning when the restrictions were eased. The result of their efforts was that the IIMS continued to perform its many functions effectively. Membership and Professional Qualifications applications actually increased noticeably during this period and surveyors, both members maintaining their CPD and non-members, improving their knowledge. Many took the opportunity to log into the IIMS on-line training seminar program arranged by Camella Robertson, the IIMS office manager, all of which has brought in valuable income to help keep the Institute afloat and ahead of budget.

The continued success of the Institute's financial status and the generosity of those who have donated funds has allowed us to also progress with the most exciting development of this year, which is, of course, the purchase of Murrills House. As I write this column we are poised to complete and by the time that this is published we will be the proud owners of our own office building. Murrills House is a quite imposing structure of grand design in what is without doubt a perfect location for a marine business. The work now starts in restoring this Grade II listed historic building back to its former glory.

Currently, the IIMS is the only UK organisation permitted by contract by the Maritime & Coastguard Agency (MCA) to train Tonnage Surveyors. The Institute has approached the MCA with a proposal to produce an on-line and remote training programme for tonnage surveyors, which would be an extension to our current contract agreement. The MCA has responded favourably and Mike is preparing a detailed proposal to roll out an on-line tonnage training and assessment for acceptance by the MCA, prior to implementation. This is in addition to our present involvement, chairing the professional standards committee which will eventually implement and set the standards for MCA coding examiners.

This leads me on to the subject of the Marine Surveyor Accreditation scheme, which we are developing under the branding of the Accredited Marine Surveying Practitioner. We are taking our time to get the scheme right before launch. This is something which is very close to my heart, especially when I become involved in insurance claims and litigation involving small craft surveyors. It is clear many simply do not have the skills and knowledge to conduct a satisfactory survey and produce a suitably detailed technical report of survey on completion. Unless the IIMS can achieve a recognised and consistent standard for surveyors the industry will continue to be plagued by unqualified, often retired people conducting surveys to boost their pension. In some instances I have heard treating a small craft survey as a family outing.

As I have mentioned in my opening paragraph I have inherited my predecessor's initiatives for greater effort in Internationalizing the IIMS with twice yearly on line meetings with Regional Directors. To this end myself and the Vice President, Peter Broad, and Deputy Vice President, Capt Ruchin Dayal, have agreed meetings every quarter in an effort to discuss the various and potentially diverse issues in our industry from around the world.

Given that you will be reading this in the September issue of the Report Magazine, I am hopeful there may be a glimmer of light at the end on the tunnel with regards to the current pandemic and that it's not just an oncoming, never-ending train.

My very best wishes to you all.

Geoff W.

Geoff Waddington

I.Eng; IMarEng.M.I.Mar.EST; F.I.I.M.S.
(President IIMS)

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IIMS ADVOCACY ACKNOWLEDGED BY AUSTRALIAN SENATE AS PERFORMANCE OF THE AUSTRALIAN MARITIME SAFETY AUTHORITY REPORT IS PUBLISHED

The International Institute of Marine Surveying's (IIMS) submission to the Australian Senate, raising members concerns as to the direction and delivery of AMSA's services for domestic commercial vessels, has been widely agreed with and extensively quoted in the Rural and Regional Affairs committee's recently published report entitled Performance of the Australian Maritime Safety Authority.

IIMS expressed concerns over the new system's excessive red tape, inappropriate and unsafe survey standards being applied and a lack of government concentration on safety management system development and implementation. These and other matters were highlighted by the IIMS and other submissions to the Senate Committee.

The committee made four recommendations with the first three relating to legislative changes to better allow authorities to prosecute breaches of the law.

The fourth recommendation sets out for the Australian Government to commission an independent review of the National Law and associated instruments to consider if it remains fit for purpose and if the instruments improve marine safety without being overly burdensome or complex. Based on multiple responses to our member questionnaire on the subject before the hearing, IIMS members certainly view this to be the situation with the current system.

IIMS welcomes the committee's recommendations and findings. As the region and world's premier professional body for marine surveying, (and the only surveyor's association to make a submission to the committee), IIMS calls on the Australian Government to act on the report.

IIMS will continue to remain closely engaged with the process and will consult with local members and input into future consultation to better improve this important regulatory reform.

Read how ABC News broke the story about IIMS' submission at **https://ab.co/2ZLsa7W**.

Read the report in full at **https://bit.ly/3dBENq9**.

The Senate

Rural and Regional Affairs and Transport Legislation Committee

Performance of the Australian Maritime Safety Authority

SINGAPORE REMAINS THE WORLD'S MOST IMPORTANT SHIPPING HUB

Singapore has maintained its position as the most important shipping hub in the Asia-Pacific region, ranking first for seven consecutive years, a new index shows. The 2020 Xinhua-Baltic International Shipping Centre Development (ISCD) Index has been published by the Baltic Exchange, in collaboration with Xinhua, the Chinese state news agency.

Based on objective factors including port throughput and infrastructure; depth and breadth of professional maritime support services; as well as the general business environment, the latest report shows that the top five international shipping centres remain the same as in 2019, although with some movement. Singapore tops the list for the seventh consecutive year followed by London, Shanghai, Hong Kong and Dubai.

London, with advantages accruing from providing high-end shipping finance, insurance, and legal services, has climbed back to the second place after dropping to third place in 2018 and 2019. London and Dubai are the only top 5 international shipping centres outside Asia.

In addition, the index showed a continued rise in Middle East and Mediterranean locations with Dubai, as the pre-eminent shipping hub in the Middle East, retaining fifth place while Athens rose to eighth place.

"Whilst this report reflects a pre-COVID 19 world, those locations which continue to build on their strengths, are able to communicate a clear vision for the future and diversify beyond the physical port hub will be the ones who are able to succeed in the future," Mark Jackson, Baltic Exchange Chief Executive, said.

NORTH SAILS LAUNCHES 3DI OCEAN 3703D MOULDED SAILS DEDICATED TO CRUISING

North Sails' new product, moulded sails, is built on the success of the company's 3Di NORDAC polyester for smaller boats and its OCEAN 700 superyacht cruising sail. 3Di OCEAN 370 sits between those two products to meet the needs of cruising boats in the 35-60ft range for both monohulls and multihulls. The moulded sails use patented sail technology shaped on three-dimensional moulds that were originally developed for racing.

"Our company culture is driven by an innate desire to continually develop sail technologies that allow sailors to have a more enjoyable experience," said North Sails president Ken Read. "Cruising offers an outlet to escape life on land and the North Sails commitment to the cruising community is stronger than ever.

The 3Di concept was taken into the superyacht arena in 2018 with 3Di OCEAN 700 for larger yachts whose owners were looking for improved handling and long-lasting sails. The 3Di moulded sails technology produces sails reduce heel in a breeze and add power in light air and the sails are seamless.

MAIB PUBLISHES ITS 2019 ANNUAL REPORT

The MAIB has published its Annual Report for last year with details about its activities and safety investigation work undertaken. In an extract from his Foreword, Capt Andrew Moll, Chief Inspector of Accidents at MAIB, said, "I am pleased to introduce MAIB's annual report 2019. It was a busy and successful year for the Branch improving safety at sea by our sustained output of safety investigation reports, safety digests, safety bulletins, and wider industry engagement. The Branch raised 1222 reports of marine accidents and incidents and commenced 22 investigations in 2019, compared with 1227 reports and 23 investigations started in 2018. Tragically, 13 investigations involved loss of life.

Recommendations
In 2019 the Branch made 24 recommendations, of which 20 were promptly and fully accepted, indicating that the Branch continues to make targeted, proportionate recommendations. The MCA has continued its efforts to complete the actions required to enable recommendations to be closed. Many longstanding recommendations made to the Agency have finally been actioned, including a number aimed at reducing the fatality rate in the fishing industry.

Change and consolidation
While the UK will continue to report marine casualties to the European Union (EU) until the end of the transition period, preparations have been underway to operate independently of EMSA. This has involved repatriating the UK's historical accident data, some 42,000 cases, into a new database, which has been more time consuming and complicated than anticipated. During this transition, the Branch has had a limited ability to support external requests for data, and the decision has been taken to delay publication of the 2019 accident data until early in the autumn.

In order to assure that safety investigations are independent of marine regulation, agreement has been reached that the MAIB will carry out investigations into Very Serious Marine Casualties for the Red Ensign Group (REG) Category 1 registers of Bermuda, Cayman Islands, Gibraltar and the Isle of Man. This is an exciting development that will benefit the wider REG family, and the Branch has taken on two additional inspectors to undertake this important work.

A number of retirements and departures have occurred over the year that, alongside the uplift for REG investigations, have created opportunities for internal promotion and recruitment. In total, six new inspectors have joined the Branch since September. These include two nautical inspectors, two engineer inspectors (all experienced mariners), a naval architect inspector and a human factors inspector.

Read the report in full at **https://bit.ly/2YIER32**.

OVER 100 FLAG STATE DETENTIONS ACCORDING TO THE USCG 2019 ANNUAL REPORT

The USCG has published its 2019 Flag State Control Domestic Annual Report, summarizing statistics regarding inspections and enforcement of regulations on US-flagged vessels. In comparison to 2018, the number of vessel inspections increased by 1,423 and the average number of deficiencies identified per inspection has increased from 1.26 to 1.48. The report also found that there were over 100 Flag State detentions.

As a result, the overall US Flag fleet inspection total increased in 2019 by 7%. Additionally, the number of deficiencies issued increased by 25% from the 2018 calendar year report.

Key findings 2019

– USCG Marine Inspectors conducted 21,471 inspections in total.
– The Coast Guard's fleet of responsibility contained 20,064 vessels subject to inspection.
– There were 2,095 reportable marine casualty investigations in 2019 involving 2,561 inspected vessels.
– In 2019 there were 111 Flag State detentions, an increase of 64% from 2018.

This can be attributed in part to the new towing vessel fleet, increased oversight inspections and post casualty inspection campaign conducted on small passenger vessels. The compliance date for implementation of towing vessels, the newest members of the US Flag fleet, was July 20, 2018.

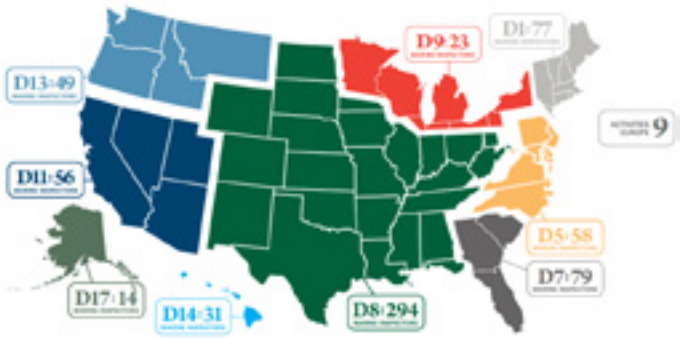
Marine casualties

There were 2,095 reportable marine casualties reported in 2019 involving 2,561 inspected vessels.

Flag state detentions

In 2019, there were 111 Flag State Detentions. Action code "30 – Ship Detained" is a control action that may be imposed on any inspected vessel type, including Small Passenger Vessels and Barges, and is selected when technical or operational-related deficiencies exist that individually or collectively indicate a serious failure, or lack of effectiveness, of the implementation of the Safety Management System (SMS).

Read the report in full at **https://bit.ly/2CA68MD**.



THE WORLD'S LARGEST ALUMINIUM SAILING YACHT SEA EAGLE II HANDED TO OWNERS

The truly breathtaking three-masted Royal Huisman schooner SEA EAGLE II is the largest superyacht to emerge from the company's facility in Vollenhove.

Earlier this year, SEA EAGLE II, designed by Dykstra Naval Architects and Mark Whiteley, was transferred from the shipyard's headquarters in Vollenhove and launched in Amsterdam. Her three carbon Rondal masts and booms were installed and tuned at Royal Huisman's Amsterdam facility. The 81m or 266ft contemporary schooner was perfectly on schedule for her delivery date, but Covid-19 restrictions in the Netherlands prevented the finishing touch from being completed.

Nearly all board systems, such as gensets, air conditioning, waste water treatment and electronics, were thoroughly tested in the year prior to launch to avoid any surprises during the commissioning stage. Strict Covid-19 regulations and detailed protocols introduced in Spring eventually allowed the team to safely "pick up where they left off" in these extraordinary times.

Spectacular speeds over 21 knots can be achieved by the world's largest aluminium sailing yacht by powering up SEA EAGLE II's Rondal rig, which can carry over 3500 square meters of sail area evenly distributed over her carbon Panamax masts. The full sail area is controlled by 34 winches from sailing system integrator Rondal. The largest winches for the world's largest aluminium sailing yacht – for the yankee, staysail sheets and mizzen sheet runners – are capable of a tremendous 18 tons (18000 kg) pulling load.

"It may look like a contemporary modern sailing yacht now but in 50 years' time it will be a classic," said Dykstra Naval Architects, which was responsible for the naval architecture, as well as working with Mark Whiteley Design on the exterior styling.

BIOFOULING INDUSTRY PARTNERSHIP LAUNCHED BY IMO

The UN-led GloFouling partnership has launched a new alliance with a group of fouling control companies to accelerate the development of hull fouling solutions. Four companies have become the founding members of the new biofouling initiative: hull cleaning service providers CleanSubSea, ECOsubsea and HullWiper and sonic antifouling system manufacturer Sonihull. IMO expects that more companies will join the program.

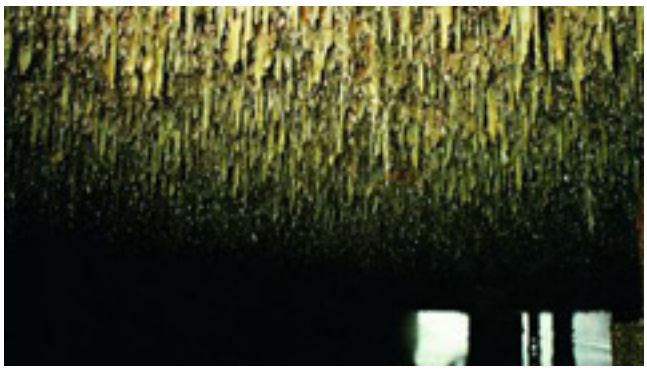
The four firms in the new Global Industry Alliance for Marine Biosafety (GIA) will work with the GloFouling Partnerships Project – a joint initiative between the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and IMO – in order to promote biofouling control solutions.

"This alliance is about the collective pioneering efforts by all maritime industries in undertaking the fight against invasive species and all the creativity and innovations that are being brought to the table to develop technological solutions. Forging such an alliance among the current four founding partners lays the foundations of a potentially very large global partnership among maritime industry players," said Jose Matheickal, head of IMO's Department for Partnerships and Projects.

"Under this new initiative, these industry champions, from different sectors, are coming together to address common challenges and move towards a more sustainable use of ocean resources," said IMO Secretary-General Kitack Lim.

The cause is important: biofouling can lead to the introduction of potentially invasive species to new environments, where they may threaten native species. Once established in a new ecosystem, invasive species are extremely difficult – if not impossible – to eradicate, and they often result in significant economic harm to fisheries and shoreside industries.

Biofouling also increases slip, forcing ships to burn more fuel to maintain speed. The new global alliance will promote solutions that would contribute to a significant reduction in the carbon footprint of the shipping industry.



The Marshall Islands Registry
www.register-iri.com

MARSHALL ISLANDS YACHT CODE SET FOR REVISION IN 2021

An initiative to update and amend the Republic of the Marshall Islands Yacht Code is currently in progress with the launch of the new revised edition anticipated for the second half of 2021. The revision work is taking input from across the Registry's global specialist teams, as well as external experts.

"We hope that these amendments to the Code will make it more practical than ever before for owners and yards to choose the Marshall Islands as a building standard," says Marc Verburg, fleet operations manager yachts for International Registries Inc (IRI) and its affiliates, who is leading the Code revision.

The newly formed Yacht Technical Working Group (YTWG), which includes representatives from classification societies, yacht managers, naval architects, surveyors, maritime safety consultants, and aviation experts from around the world, is focused on updating the Marshall Islands Yacht Code to reflect changes in today's yacht market, such as helicopter landing areas, structural fire protection measures for yachts under 500 GT, and lifesaving appliances.

The growing trend for helidecks on larger yachts means that the approach to firefighting systems needs to be reviewed. Currently, the rules are based on the UK Civil Aviation Authority's CAP 437 guidance, which is aimed at offshore platforms. This is not always a practical solution for yachts, and so a goal-based standard is being reviewed.

The Marshall Islands Yacht Code has long been designed to address the practical issues faced by builders, managers, and owners alike; it last had a major update in 2015. For many builders of large yachts, the appeal of the RMI lies in the differentiation in the standards for yachts capable of carrying more than 12 guests.

UNACCEPTABLE LEVELS OF BARNACLE FOULING FOUND IN OVER 40% OF SHIPS REVEALS I-TECH WHITEPAPER

More than 40% of vessels were suffering from over 10% hard fouling coverage on the hull even before the idling of fleets caused by COVID-19. This is one of the key findings of hull fouling collection data in a study commissioned by I-Tech AB, the results of which are set out in a white paper entitled 'Quantifying the scale of the barnacle fouling problem on the global shipping fleet'.

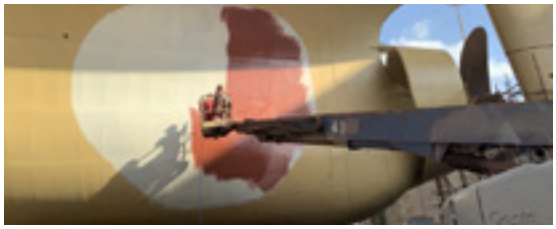
I-Tech contracted independent marine coating consultants, Safinah Group, to analyse underwater hull barnacle fouling conditions on a sample of 249 ships which drydocked over a four-year period between 2015-2019. The sample included all major ship types covering a range of trading activity and it transpired that nearly every vessel surveyed had some degree of underwater hull hard barnacle fouling.

On 44% of vessels surveyed, over 10% of the underwater hull surface was covered with hard fouling. According to experts, anything more than 10% coverage is deemed to cause an 'unacceptable' impact on vessel performance. On many of the vessels surveyed, fouling levels were even worse; approximately 15% of vessels had between 10-20% of hard fouling coverage on the hull, 10% of vessels had 20-30% of hard fouling coverage and the remaining 10% of vessels had between 40-80% of hard fouling coverage.

Barnacle fouling can only occur when a vessel is static for a few weeks in coastal waters. Since this data analysis was carried out before the COVID-19 pandemic, I-Tech believes it is inevitable that in recent months, the extent of barnacle fouling coverage across the global fleet will have increased significantly.

"With up to 5% of underwater hull fouling coverage being seen as good and up to 10% being considered acceptable, the findings that 44% of vessels having more than 10% hull fouling is troubling, even more so when we consider the impact of long idle periods," Markus Hoffmann, Technical Director of I-Tech AB said.

Read the whitepaper at **https://bit.ly/2WJIPXA**.



SCRUBBER COATINGS AS IMPORTANT AS QUALITY MATERIAL OF SCRUBBER COMPONENTS TO PREVENT CORROSION

Corrosion has emerged as the arch-enemy of the exhaust gas cleaning systems as the uptake of the technology rose with the entrance into force of the IMO 2020 sulphur cap. Like with any new technology, scrubber maintenance and operation has been a learning curve for ship owners and operators, especially in the context of preventing failures of the technology and reducing downtime.

"Corrosion mainly happens on the overboard pipes, the last piece from GRE piping and connection to shell plating of the hull, especially near the connections and welding seams, and the area on the external hull around the overboard pipe outlet," said Manuel Hof, Sales & Production Executive, NACE Coating Inspector Level 2 at Subsea Industries.

"These areas will need to be protected against acid-containing water (highly corrosive sulphuric acid) coming from the exhaust gas cleaning system. Traditional coatings applied inside the overboard pipes and on scrubber outlet areas are in most cases not chemically resistant. In that case, the coating will degrade, the steel will be affected and corrode. This can result in water ingress in the engine room, ballast tanks and cargo holds."

"Scrubbers that are scheduled to be installed will still need to be completed. Now we see quite a lot of issues from scrubbers installed last year with corrosion and leakage problems. Protection systems are failing after a few months in service. We have been involved in repairs where it was required to replace overboard pipes of the vessel while still in the water," he added.

"Material selection is also important. That is why scrubbers are made of special materials and most of the piping made of GRE/GRP. The last part of the overboard pipe and area of the hull will be in steel. Protection on those areas is very important, if not vital. To apply the correct coating system is essential and should not be tampered with," he added.

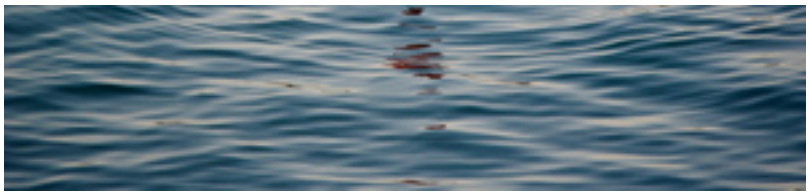
DECLINING TREND IN THE NUMBER OF CONTAINERS LOST AT SEA REVEALS WORLD SHIPPING COUNCIL SURVEY

The global container shipping industry continues to see a declining trend in the number of containers lost at sea each year. The World Shipping Council has published its latest survey giving its best estimate on the number of actual containers lost at sea.

World Shipping Council undertook the first survey of its member companies in 2011 with subsequent updates published in 2014 and 2017. Having reviewed the evidence over the twelve-year period surveyed, the survey shows an estimate that there were on average a total of 1,382 containers lost each year.

The conclusion after twelve years is that more than half of all containers lost can be attributed to the limited number of high profile disasters, including MOL Comfort (4,293 lost), SS El Faro (517 containers lost) and MV Rena (900 lost). For the three year period ending in 2019, the average number of containers lost annually fell to 779.

"The industry is encouraged by the declining trend line indicated in the latest report and continues to work on solutions that will bring the number of containers lost each year to as close to zero as possible," said John Butler, World Shipping Council President and CEO.



UNDERWATER EXAMINATION AND SURVEY KEY REQUIREMENTS OUTLINED BY RMI SHIP REGISTRY

The Marshall Islands Ship Registry has issued a revised marine notice to outline the procedures and circumstances by which the underwater examination/survey of a passenger ship's hull by divers in lieu of drydocking may be permitted.

Underwater Examination (UWE) is the inspection of the outside of the ship's bottom while afloat as part of the Passenger Ship Safety Renewal survey while Underwater Survey (UWS) is the inspection of the outside of the ship's bottom while afloat in lieu of a dry-docking, including measurements of shaft and rudder bearing clearances, as applicable.

The Harmonized System of Survey and Certification (HSSC) Guidelines Resolution A.1140(31) specifies that a passenger ship's bottom inspection as required by SOLAS regulation I/7 should be carried out annually, with two inspections in dry-dock in any five-year period. However, this minimum number of inspections in dry-dock on the outside of the bottom of a passenger ship may be reduced from two to one by allowing an in-water survey in lieu of bottom inspection in dry-dock. International Maritime Organization (IMO) Circular MSC.1/Circ.1348 has guidelines for performing an in-water survey in lieu of a dry-dock examination.

General Procedures
The operator of the ship must make the request to perform an underwater examination in lieu of drydocking directly to the Recognized Organization (RO) issuing the Passenger Ship Safety certificate on behalf of the Administrator.

The request must contain, as a minimum:
- the proposed schedule and location when the ship will be available for inspection;
- a statement in writing from the Master confirming that the ship has not sustained any grounding or contact damage since the previous bottom inspection; and
- proof of implementation of a comprehensive maintenance regime based upon a five year cycle in accordance with MSC.1/Circ.1348, Guidelines for the Assessment of Technical Provisions for the Performance of an In-Water Survey in Lieu of Bottom Inspection in Dry Dock.

What applies to all passenger ships
The Administrator recognizes the examination of passenger ships in dry-dock at least twice during any five (5) year period, to coincide with the survey guidelines provided in IMO Resolution A.1140(31). Underwater examinations are to be requested for the three remaining passenger ship safety renewal surveys in accordance with the procedures outlined above.

The interval between the dry-dock surveys must not exceed three years. Therefore, the first bottom survey in dry-dock during any five year period must be scheduled during the second or third year of the five year cycle.

WHITE PAPER BY NATIONAL CARGO BUREAU CALLS FOR A NEW APPROACH TO ADDRESS CONTAINER FIRES

A white paper published by the National Cargo Bureau calls for urgent reform to stem the increasing number of container related incidents caused by poorly stowed, undeclared or misdeclared dangerous cargoes. This follows a recent inspection initiative that revealed an alarming number of containers with misdeclared dangerous cargoes that represent a serious safety risk.

Consequently, the National Cargo Bureau, the US inspection body for Dangerous Goods regulations, is calling for industry to adopt a comprehensive, holistic and coordinated approach to address this worrying trend. The inspection initiative also showed that 55% of containers were non-compliant with 43% failing to secure dangerous goods correctly within the container itself. Approximately 6.5% of containers carrying dangerous cargoes had been misdeclared.

It has been reported that, on average, a containership suffers a major fire every 60 days. However, in 2019, there were nine major containership fires, suggesting that the frequency of incidents is increasing. With more containers being carried and containerships getting bigger, risks are increasing in number, value and concentration.

Reasons may include:
- the difficulty of supply chain stakeholders complying with a myriad of regulations;
- a poor understanding of what constitutes a dangerous cargo and what is required to transport it;
- the increasing complexity of multi-modal supply chains; carriers and ports restricting or refusing to move or receive certain dangerous cargoes;
- varied internal company challenges; and
- the continuing threat of bad actors.

Hence, the National Cargo Bureau white paper specifically details 12 recommendations to ensure a safety culture for dangerous goods. These can be read in full in the white paper pdf at **https://bit.ly/3faUpm2**.

NATIONAL CARGO BUREAU

GEO THERM LTD PICKS UP LR AND ABS ACCREDITATION

Throughout the Covid-19 pandemic lockdown the team behind Geo Therm Ltd has actively sought to gain the coveted Lloyds Register (LR) and American Bureau of Shipping (ABS) approved service supplier status, bolstering its existing ISO 9001:2015, FPAL and Safe Contractor accreditations.

With the team was in lockdown, audit allocation and rechecking was undertaken online, ensuring all systems documents were current, fit for purpose and error free, while the actual LR and ABS audits being undertaken at Geo Therm Ltd's premises in Reydon, Suffolk and the external auditors assessing equipment, certification, ISO quality document, procedures, training documentation, including equipment demonstrations much to the delight of their host company MD Tony Dale, (an IIMS Full member), extolling the virtues of each system albeit at a two metre distance.

With the successful LR service approval occurring in late February and the ABS recognised specialist accreditation occurring in late June, Geo Therm Ltd is now able to employ its latest raft of non-invasive inspection technologies to identify vessel deficiencies that, if left unchecked, can lead to electrical breakdowns, engine room fires and watertight integrity loss at hatch and door enclosures.

With LR and ABS approval, Geo Therm Ltd management confirms its continual professional service commitment in supporting its clients offshore drilling rigs, service operation vessels (SOV) and wind turbine jack-up barges, whenever and wherever commissioning, warranty or preventative maintenance needs are required, including Class approval.

ALLIANZ SAFETY AND SHIPPING REVIEW 2020 PUBLISHED

The 2020 Allianz Safety and Shipping Review has been published and reveals an improving picture. Given the global shipping industry is responsible for transporting as much as 90% of world trade, the safety of its vessels is critical. The sector saw the number of reported total shipping losses of over 100GT decline again during 2019 to 41 – the lowest total this century and a close to 70% fall over 10 years. Improved ship design and technology, stepped-up regulation and risk management advances such as more robust safety management systems and procedures on vessels are some of the factors behind the long-term improvement in losses.

The Review reveals losses declined by almost a quarter year-on-year from 53 in 2018, although late reported losses may increase the 2019 total further in future. Bad weather was reported as a factor in one in five losses. The 2019 loss year represents a significant improvement on the rolling 10-year average of 95 – down by over 50%.

The South China, Indochina, Indonesia and Philippines maritime region remains the main loss hotspot, accounting for almost 30% of losses over the past year with 12 vessels. These waters are also the major loss location of the past 10 years, driven by factors including high levels of local and international trade, congested ports and busy shipping lanes, older fleets, exposure to typhoons and ongoing safety problems on some domestic ferry routes. However, the number of losses in this region has declined for the second successive year. The Gulf of Mexico (4) and the West African Coast (3) – neither of which featured in the top 10 loss regions last year – rank as the second and third most frequent loss locations.

Cargo vessels (15) accounted for more than a third of all total losses during 2019 with the majority occurring in South East Asian waters. The number of losses involving ro-ro vessels (3) increased year-on-year. Foundering is the most frequent cause of loss of all vessels, accounting for three in four during 2019. Contributing factors included bad weather, flooding and water ingress, engine trouble and vessels capsizing. Fire/explosion continues to be a significant problem on board vessels, resulting in five total losses during 2019.

While total losses declined significantly over the past year, the number of reported shipping casualties or incidents actually increased by 5% to 2,815. There were over 1,000 cases of machinery damage/failure (1,044) – already the top cause of shipping incidents over the past decade – accounting for more than one third of all incidents reported in 2019. Incidents on passenger vessels and ro-ros increased. The British Isles, North Sea, English Channel and Bay of Biscay maritime region replaced the East Mediterranean to become the main incident hotspot for the first time since 2011, accounting for one in five incidents (605).

Read the Reviews at **https://bit.ly/2BqCyZG**.

MAIB TO CARRY OUT INVESTIGATIONS FOR VERY SERIOUS MARINE CASUALTIES FOR SHIPS REGISTERED WITH THE REG CATEGORY 1 REGISTRIES

The Memorandum of Understanding (MOU) is established between the MAIB and, collectively, the Category 1 REG Marine Administrations of Bermuda, the Cayman Islands, the Isle of Man and Gibraltar.

In order to discharge obligations under the Casualty Investigation Code (set out by the International Maritime Organization, adopted under resolution MSC.255(84)), MAIB has agreed that it will carry out investigations for Very Serious Marine Casualties involving ships registered with the Category 1 REG Marine Administrations. These investigations will be carried out on behalf of the Category 1 REG Marine Administration, and so the procedure for investigations set out in the legislation in force in the REG Marine Administration's territory will apply. This MOU assumes that all parties' operations will be co-operative and in full compliance with the Code.

REPORT bites

An initiative to update and amend the Republic of the Marshall Islands Yacht Code (RMIYC) is currently in progress with the launch of the new revised edition anticipated for the second half of 2021.

The Ports, Customs and Free Zone Corporation in cooperation with Dubai Maritime City Authority have launched the Marine Agency to oversee wooden dhow ships and regulate all their activities while they are in Dubai waters.

Cockwells Modern & Classic Boatbuilding has restored a historic WWII vessel which helped rescue more than 336,000 allied soldiers trapped in France.

A Belfast consortium led by Artemis Technologies, a spin-off from the America's Cup sailing team, Artemis Racing, has won a £33m UK government grant to develop zero emissions ferries.

Corrosion has emerged as the arch-enemy of the exhaust gas cleaning systems as the uptake of the technology rose with the entrance into force of the IMO 2020 sulphur cap.

Maritime technology startups are set to benefit from a SGD50m fund via SEEDS Capital, the investment arm of Enterprise Singapore, and six co-investment partners. This latest initiative by SEEDS Capital aims to drive the growth of the maritime sector through technology and innovation.

The 2019 USCG Flag State Control Domestic Annual Report shows that compared to 2018 the number of vessel inspections increased by 1,423 and the average number of deficiencies identified per inspection increased from 1.26 to 1.48.

The COVID-19 crisis has painfully demonstrated the heterogeneous landscape that currently exists across ports worldwide.

Safety Briefings

DUTCH SAFETY BOARD REPORT: LESSONS LEARNED AFTER LOSS OF CONTAINERS FROM MSC ZOE

The Dutch Safety Board has published an investigation report into the loss of containers from the MSC Zoe in 2019, sharing valuable lessons learned on the shipping routes that pass the Wadden Islands to the north of the Netherlands. The report stressed that minimizing the risks of container loss in the area requires an integrated approach by the container shipping sector, the IMO and the Dutch government.

Probable causes

The extreme forces acting on the ship, the containers and the lashing systems as a result of specific conditions on this shipping route were the primary cause of the loss of containers.

Findings on shipping routes

Above the Wadden Islands there are two internationally designated shipping routes, a northern and a southern route. The investigation by the Dutch Safety Board has revealed that a combination of a number of phenomena means that on both the southern and northern shipping routes, there is a risk of loss of containers.

In storm-force northwesterly wind, vessels are confronted with high athwartships waves. As a consequence, large, wide container ships make extreme rolling movements. On the relatively shallow southern shipping route, there is also a risk of seabed contact (grounding) due to the combination of vertical and horizontal ship movements. Waves can slam against the ship, and seawater travelling at high speed along the side of the ship can be forced upwards against the containers. These phenomena, individually and in combination, cause extreme forces to act on the ship, the containers and the lashing systems used to retain the containers. As a consequence, containers can break free and be washed overboard.

Conclusions

- For container ships, no specific guidelines or requirements are imposed on the choice of northern or southern shipping route above the Wadden Islands. Managing the risks of loss of containers on the shipping routes above the Wadden Islands currently depends on the situational decision-making on the ship if risks actually arise. This is a vulnerable situation, given that the crew has no insight in the forces and accelerations acting on containers. Also information on wave periods and wave direction is lacking in NAVTEX-messages, which is essential information for the purpose of assessing risks as a result of roll motion.
- In managing the risks on the shipping routes above the Wadden Islands, the shipping sector has not yet established any link between the undesirability of damage to nature values (in particular the Wadden area) and the polluting consequences of the loss of containers.
- The development of ever larger container ships is leading to a greater risk of loss of containers both in terms of probability and scale of the effects of such an incident. The economies of scale towards ever larger container ships have not resulted in a revised inventory or evaluation of the risks of loss of containers from these ships.

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

NVENTORY OF HAZARDOUS MATERIALS COMPLIANCE - NEW GUIDE PUBLISHED BY UK P&I CLUB

The UK P&I Club has published a guide for ship-owners to ensure compliance with the Inventory of Hazardous Materials legislation. The guide addresses the technical aspects, important concepts, processes and requirements of the Inventory of Hazardous Materials, aiming to assist Members in ensuring compliance with the existing regulations and reduce the likelihood of reputational risks.

Over the last decade international and regional ship recycling legislation has been adopted, some of which is already in force. The IMO Hong Kong Convention and the European Union Ship Recycling Regulation are two key pieces of such legislation. A cornerstone in both the Hong Kong Convention and the EU Ship Recycling Regulation is the Inventory of Hazardous Materials. The code is an important tool when the vessel has reached the end of its useful life and the recycling operation is being planned. It is used when a ship recycling plan is compiled, to ensure minimal environmental impact and safe working conditions in the recycling or scrapping yard.

Stuart Edmonston, Loss Prevention Director at UK P&I Club, says: "This guide is a valuable asset for ship-owners and is designed to inform and raise awareness of the critical issues around the current ship recycling legislation. It's vital to comply with the Inventory of Hazardous Materials, and failure to do so can lead to costly litigation, both from a financial and reputational perspective for all involved."

Read the guide in full at **https://bit.ly/3f8FQ2e**.

SMS NOT ADHERED TO – INVESTIGATION OF CAPSIZED TUG FINDS

The Transportation Safety Board of Canada has published an investigation report into the capsizing of a tug, revealing that the vessel did not operate under a Safety Management System (SMS), and the crew did not have procedures for identifying or mitigating hazards.

On October 1, 2019, Seaspan ULC deployed the tug Sheena M to tow the loaded wood-chip barge Seaspan 566 from Terminal Forest Products' facility in Langdale, BC, to Howe Sound Pulp and Paper Mills in Port Mellon, BC. At approximately 1237, the tug along with the barge departed the Terminal Forest Products facility at a speed of approximately 2 knots and proceeded about 180 m into the channel. Soon after exiting through the terminal's safety gate, which consisted of 2 can buoys, the master made a port turn to head north towards Port Mellon. However, the barge did not respond to the course alteration and the tug began to be girded by the barge and heeled to starboard. The master slowed the speed of the tug, and the tug righted itself.

Some moments later, the tug heeled to starboard again, further this time, and water was observed on the starboard aft deck. The deckhand, who was wearing a personal flotation device, was with the master in the wheelhouse. The tug continued heeling to starboard, and water began entering the wheelhouse rapidly through the starboard-side door, which was secured open with a hook.

The Safety Board highlights that:
The principal objective of an SMS on board a vessel is to ensure safety at sea, prevent human injury or loss of life, and avoid damage to property and the environment.

It is stated that the Sheena M did not operate under an SMS, nor was it required to by regulation. However, procedures for the safe operation of the vessel and for dealing with emergencies (such as girding) were still required by the Canada Shipping Act, 2001Footnote5 and relevant regulations and guidelines were applicable to the Sheena M as well.

In addition, the crew of the Sheena M did not have procedures for identifying or mitigating hazards such as girding. An SMS would assist owners and masters involved in towing operations to identify and manage risks such as girding through education, training, and the implementation of procedures.

Read the report in full at **https://bit.ly/2AHzp7q**.

REPORT bites

A new German-US company, Voltaire Electric Yachts, has announced its official start of operations with the launch of its first-ever model, a 9.9m all-electric power catamaran.

The world's biggest container ship, HMM Algeciras, which is around the same size as four football pitches, arrived in the UK in June via Germany and the Netherlands for the first time. The vessel is so large that its arrival had to be modelled on a simulator to ensure it could be carried out safely.

The 23,964 TEU containership HMM Algeciras is the largest ever built, recently launched for South Korean shipping company HMM at the Daewoo Shipbuilding and Marine Engineering shipyard in Geoje, Korea.

Trinidad &Tobago (TT) is preparing for a "surge" of superyachts, causing its Attorney General (AG) to amend local legislation aimed at easing entry while protecting the island nation.

The New Zealand Marine & Composites Industry Training Organisation has announced the establishment of a new training academy to ensure that the NZ workforce is prepared for an expected surge in demand from the country's boatbuilders.

International non-governmental organisation, IMRF has recently launched a forum to gather information on post traumatic stress disorder (PTSD) which it believes is too often unrecognised among maritime SAR professionals.

European Union maritime policy expert Vassilios Demetriades, has become Cyprus' new cabinet member in charge of shipping, after a government reshuffle.

The UK's Fairline Yachts has announced that the RiverRock European Opportunities Fund II has acquired a majority stake in the business.

Safety Briefings

NTSB INVESTIGATION IDENTIFIES LACK OF A TOWING SAFETY MANAGEMENT SYSTEM

The National Transportation Safety Board has published an investigation report into an incident when a crane barge U1510, pushed by the towing vessel Goose Creek, made contact with overhead powerlines on the Elizabeth River in June 2019. The report has highlighted poor company oversight and the lack of a towing safety management system.

Probable cause

The National Transportation Safety Board determines that the probable cause of the contact of the towing vessel Goose Creek's tow, crane barge U1510, with the overhead powerlines was the tow's captain not identifying the risk of raising the boom as the tow approached the powerlines due to the lack of company oversight, demonstrated by the company not implementing a towing safety management system or hiring a properly qualified mariner to operate the vessel.

The company did not have any written procedures or policies regarding voyage planning or the consideration of the tow's maximum air draft in conjunction with the vertical clearance of overhead obstacles. Planning and preparation before a tow commences is critically important, including the identification of charted vertical clearance along the route and adherence to operational limits.

In addition, although the company did not have voyage planning procedures or policies, the captain stated that he held a pre-transit discussion. However, this discussion proved to be ineffective, since the captain, superintendent, and crane operator were aware of the powerlines but did not take appropriate steps to prevent encroachment, including setting a maximum vertical height for the crane when passing under the powerlines prior to the voyage with all involved personnel.

Had the company established a towing safety management system that included voyage planning with requirements for calculating a tow's air draft and identifying all operational restrictions along the route, the crew would have been less likely to raise the boom while transiting. Under 46 CFR Subchapter M, the movement of a towing vessel and its tow must be under the direction and control of a properly qualified captain, mate, or pilot at all times.

Read the full report at **https://bit.ly/38xeJvi**.

USCG SAFETY ALERT TO ADDRESS ELECTRICAL INSTALLATIONS KNOWLEDGE GAP ISSUED

The United States Coast Guard (USCG) has issued a Safety Alert to emphasize the importance of properly installed and maintained listed or certified safe electrical equipment in hazardous areas in order to reduce the risk of fire or explosion onboard vessels. Publication follows an increasing number of instances by the Coast Guard where there was a lack of knowledge regarding the installation, training, maintenance and inspection of these certified systems.

PSC Officers (PSCOs) have found certified safe equipment improperly installed or identified missing components, which compromises the certification of the system and nullifies this critical protection in a flammable environment. In other cases, PSCOs found degraded components and evidence of equipment not being maintained or inspected. Additionally, USCG personnel nationwide have discovered instances where individuals responsible for the installation, maintenance, and oversight of this equipment onboard foreign and domestic vessels were unfamiliar with the appropriate standards to follow.

While hazardous area design standards are included in 46 CFR Subchapter J, the requirements for proper training, inspection and maintenance are not explicitly provided. Furthermore, requirements for these operational aspects of ensuring hazardous area electrical safety and system integrity are more robustly covered in the IEC standards than they are in some of the corresponding national standards.

USCG strongly recommends that owners, operators, shipboard personnel, marine surveyors and service providers:

– Familiarize themselves with additional IEC standards that are called out by IEC 60092- 502:1999 and in particular IEC 60079-14, 60079-17, and IEC 60079-19 as it relates to the proper training, inspection, maintenance, and documentation of electrical equipment installed in hazardous areas to ensure that no potential ignition source is present in hazardous areas aboard tank vessels, gas carriers and vessels using gases or other low flashpoint fuels.

– Ensure proper training for operators and persons with executive functions conducted to a standard not inferior to the IEC at all appropriate levels.

– Implement an appropriate periodic inspection and maintenance program by competent personnel.

– Ensure that any repairs should be made by a competent technician or repair facility. When in doubt, a representative of the equipment manufacturer should be consulted. Any modifications to existing systems must be discussed with and approved by the appropriate regulatory authority (i.e., USCG, flag administration, or vessel classification society).

LOSS OF CARGO CONTAINERS OVERBOARD FROM CONTAINER SHIP EVER SMART REPORT PUBLISHED BY MAIB

On 30 October 2017, the UK registered container ship Ever Smart suffered a container stow collapse while on passage between Taipei, Taiwan and Los Angeles, USA. The master had changed the ship's passage plan to avoid severe weather caused by a developing depression east of Japan. The ship continued in heavy seas; rolling and pitching heavily with frequent bow flare slamming. Once the weather had abated, the crew discovered that the container stacks on the aft most bay had collapsed and toppled to port. Of the 151 containers in the stow, 42 were lost overboard and 34 were damaged. Superficial damage was caused to the ship.

Safety issues

- the loss of the containers most likely occurred during a period of heavy pitching and hull vibration in the early morning of 30 October;
- combination of factors resulted in a loss of integrity for the whole deck cargo bay; in particular, the containers were not stowed or secured in accordance with the cargo securing manual;
- the container lashings might not have been secured correctly

Safety recommendations

Recommendations (2020/125, 2020/126 and 2020/127) have been made to Evergreen Marine Corp. (Taiwan) Ltd to improve standards of stowage plans produced ashore, knowledge of the dangers of bow flare slamming and lashing gear maintenance management.

Read the report and annexes in full at **https://bit.ly/30Aar2v**.

REPORT bites

The port of Rotterdam was able to celebrate a first recently: the aerial delivery by drone of a parts consignment to Allseas' 'Pioneering Spirit', the biggest vessel in the world.

It has been reported that, on average, a containership suffers a major fire every 60 days. However, in 2019, there were nine major containership fires, suggesting that the frequency of incidents is increasing.

In 2019, the international liner shipping industry transported approximately 226 million containers, with cargo transported valued at more than $4 trillion.

The pace of uptake for remote maritime surveys may be challenged by a lack of industry standardisation and awareness, and Singapore is looking to address this challenge by launching an open call for a Joint Industry Project.

"Our outboard engines business has been greatly impacted by COVID-19, obliging us to discontinue production of Evinrude outboard motors immediately," said José Boisjoli, President and CEO of BRP.

Two of the world's largest cruise operators insist their ships are no more vulnerable to the spread of COVID-19 than other public places. No, I don't believe" that, said Frank Del Rio, the CEO of Norwegian. Richard Fain, head of Royal Caribbean said, "I think done correctly a cruise ship can be among the safest places on Earth."

New Zealand based Southern Spars has joined forces with Magma Structures in the UK to deliver a new generation of DynaRigs. This is a new chapter for the innovative rig solution and aims at making the efficient, safe, and high-performance rig more accessible.

At its 2020 Annual Meeting, the Nautical Institute elected Jillian Carson-Jackson as its new President, succeeding Capt. Nick Nash.

Safety Briefings

CINS
Cargo Incident Notification System

SEED CAKE CARRIAGE IN CONTAINERS – UPDATED GUIDELINES PUBLISHED

The International Group of P&I Clubs and CINS, the Cargo Incident Notification System, has jointly published guidelines for the carriage of seed cake in containers.

The carriage of these cargoes continues to cause confusion and the potential for mis-declaration remains high with the consequent risk of fire on board container ships. Seed cake is the term used for pulp, cake, pellets, expellers or other cargo where oil has been removed from oil-bearing seeds, cereals or commodities with similar properties, including all such types of seed meal. It is principally used as an ingredient in animal feeds.

The guidelines provide advice about container selection, packing and stowage on board ship.

For seed cake carried in packaged form, the packaging of cargo within the container should be in accordance with the requirements of Chapter 4.1 of the IMDG Code.

It should be noted that there is some confusion between 'bulk shipments' and shipments that use 'bulk containers'. In case of shipment of seed cake carried in bulk in closed bulk containers, the IMDG Code applies on the basis that such are packaged goods, BK2, under Chapter 4.3. The IMSBC Code is not applicable to such shipments.

Under Special Packing Provision PP20, any sift-proof, tear-proof receptacle may be used for seed cake UN 1386 and UN 2217. For seed cake UN 1386 or UN 2217 carried in bulk in closed bulk containers, the containers should be suitably lined to prevent spillage.

Inspection of containers prior to carriage
It is recommended that, prior to carriage, carriers satisfy themselves by means of a photo story or container inspection, for example, that the cargo has been packed and secured with a method that allows proper ventilation and safe transportation.

Ship loading
It shall be transported in compliance with the stowage and segregation requirements set out in the IMDG Code. These requirements vary in detail for seed cake presented for shipment under UN 1386(a), UN 1386(b) or UN 2217. In all cases containers of such cargo should be protected from sources of heat and kept dry.

These guidelines recommend to stow containers of seed cake on deck only where they are accessible to allow fire fighting procedures to be carried out.

Read the guidelines in full at **https://bit.ly/2Z5JZya**.

APL ENGLAND LOST 40 CONTAINERS IN ROUGH SEAS – INITIAL INSPECTION REVEALS SERIOUS DEFECTS

A preliminary inspection of cargo ship APL England, which lost 40 containers in rough seas, has discovered a major defect and serious concerns with how the load was secured. Australia Maritime Safety Authority (AMSA) inspectors found lashing arrangements were inadequate and securing points on the deck of the ship were heavily corroded.

ASMA general manager of operations, Allan Schwartz, says the inspection is continuing but the findings so far are in breach of maritime safety regulations. He says the ship has been detained at the Port of Brisbane.

"The detention will not be lifted until these serious deficiencies are rectified. That is now a matter for the ship's owner, American President Lines (APL), and operator to rectify," he says. "These findings will form part of AMSA's ongoing investigation and, while we do not want to pre-empt the outcomes of that investigation, it is already clear that the risk of this container loss occurring could have been reduced."

Schwartz said the ship's owner and its insurer, Steamship Mutual, should take responsibility for remediating any impacts of this incident.

Some 40 containers went overboard when the ship struck rough seas, while about 70 other containers were displaced, forcing the vessel, which was en route from China to Melbourne, to dock in Brisbane.

ANL, the operator of APL England, says it is cooperating with all investigators while a clean-up operation is underway and none of the containers that fell into the ocean contained dangerous cargo.

REPORT ISSUED BY MAIB INTO THE FATAL CAPSIZE OF FISHING VESSEL ANNA-MARIE II

At about 1550 on 23 September 2019, the 6.2m fishing vessel, Anna-Marie II, capsized as it entered the mouth of the Brora river while returning from its fishing grounds. The vessel broached and was capsized in unusually high waves, resulting in both its skipper and crewman entering the water. Neither was wearing a personal flotation device; the crewman managed to swim ashore but unfortunately the skipper drowned.

Our investigation determined that the skipper struck his head during the capsize, which may have affected his ability to swim. Had the skipper been wearing a lifejacket it would have helped keep his head out of the water and might have increased his likelihood of survival.

Read the report in full at **https://bit.ly/2X0tOkD**.

SWEDISH CLUB REPORTS A RESCUE BOAT DRILL ENDING WITH INJURIES DUE TO A LACK OF SMS MANUAL

The Swedish Club has highlighted an incident in its safety bulletin about the bizarre case of a vessel that conducted a rescue boat drill resulting in an incident as the company had no specific instructions in the training manual, SMS, PMS as to how the rescue boat should be launched.

The vessel concerned was in port and the Master wanted to conduct a rescue boat drill as none had been completed since the vessel was delivered a month earlier. According to the report, the weather was favourable and the harbour authority had given the vessel clearance to launch and maneuver the rescue boat in the harbour.

Those involved in conducting the drill were the chief officer, bosun, oiler and third engineer. The chief officer was in charge of organising the drill. He had joined the vessel in the shipyard about two months before delivery. During that time he had watched the shipyard complete a rescue boat drill but had not been involved himself.

Read the article in full at **https://bit.ly/2O1Smoh**.

REPORT bites

The target of 50% of all bills of lading to be electronic within the next decade has been set by the Digital Container Shipping Association.

Yanmar Holdings and its subsidiary Yanmar Power Technology are to develop a hydrogen fuel cell system for marine applications based on vehicle fuel cell technology.

UK waterways charity Canal & River Trust is calling on people across England & Wales to help stop half a million pieces of plastic reaching the ocean by taking its Plastics Challenge.

"Autonomous ships combined with port automation is the one of the keys to our future waterborne transport systems", said Ørnulf Jan Rødseth, Secretary, International Network for Autonomous Ships.

A drone has successfully inspected a 19.4 meter high oil tank on board a Floating Production, Storage and Offloading vessel. The video shot by the drone was interpreted in real-time by an algorithm to detect cracks in the structure.

USCG has issued a Safety Alert to emphasize the importance of properly installed and maintained certified safe electrical equipment in hazardous areas due to evidence emerging of a lack of knowledge regarding the installation, training, maintenance and inspection of such systems.

"Our mission is to be the world leader in innovative maritime sensor products that enhance the safety and security of shipping and all manner of offshore activity," says Ladar Ltd (LDR) principal Sverre Dokken.

Researchers have purified salt water into drinkable water using a combination of metal compounds and sunlight, a breakthrough that could hold significant implications for the provision of safe water for millions of people.

Safety Briefings

TAIC INVESTIGATION REPORT RELEASED INTO CREW FATALLY STRUCK WHILE SECURING LOGS

New Zealand's Transport Accident Investigation Committee (TAIC) has published an investigation report on the crew fatality during cargo-securing operations onboard the bulk log carrier Coresky OL, while at Eastland Port, Gisborne, in April 2019.

The chief officer was operating a crane, which was being used to tension the wiggle wire. Both able-bodied seamen were standing close to the wire to monitor its tension, when the boatswain signalled to the chief officer to stop heaving on the crane's lifting wire.

As the heaving stopped, a wire parted and caused the securing equipment to recoil towards the able-bodied seamen. One of the able-bodied seamen was struck by part of the securing equipment and later died.

Probable causes

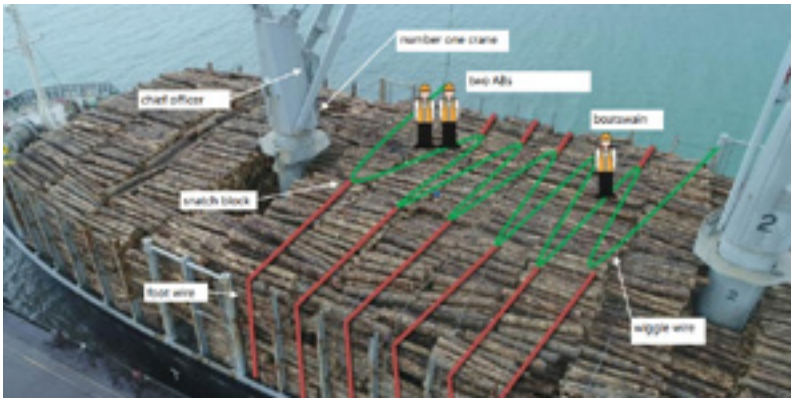
- The crew did not identify the hazards associated with wires under tension and had not implemented mitigation measures prior to undertaking the operation.
- Additionally, the load being applied by the crane, combined with the configuration of the blocks used to tension the securing wires, was sufficient to part the foot wire.
- Turnbuckles were not rigged between the wiggle wire and foot wires, which meant that the crane was used to tension the wiggle wire. This required both able-bodied seamen, whose role it was to monitor the tension being applied, to be in a hazardous area close to a wire under tension.

Meanwhile, the operator's safety management system did not include a safety assessment of cargo-securing operations. As a result, no information on the hazards associated with wires under tension was available to the crew, and the cargo securing manual did not provide guidance on a safe system of work for cargo-securing operations on the vessel.

Recommendations

As a result of the investigation, TAIC recommended that Shih Wei Navigation Company Limited (Taiwan) carry out a comprehensive safety assessment of vessels engaged in carrying and securing deck log cargo. The assessment should result in appropriate procedures and guidance being contained in the safety management system and ensure that a safe system of work is established.

Read the report in full at **https://bit.ly/38xfch5**.



RECENT NEW IIMS MEMBERS

Full members

Shirodkar Shankar	*MIIMS*	India
Lorenzo Timpanaro	*MIIMS*	Italy
Ian Weaver	*MIIMS*	Australia
Davide Lucignano	*MIIMS*	Italy
Kumar Paritosh	*MIIMS*	India
Nicolas Goh Shang Lian	*MIIMS*	Singapore
Elbert Francke	*MIIMS*	Netherlands
Atul Mathur	*MIIMS*	USA
Sajith Marakkar	*MIIMS*	UAE

Technician members

Darin Kennedy	*TechIIMS*	Canada
Bruce Bambrick	*TechIIMS*	Singapore

Corporate Supporting members

RDS Distributors	*CorpSuppIIMS*

Associate members

Neil Batcheler	*AssocIIMS*	Grenada
Chris Sutton	*AssocIIMS*	South Africa
Don Marshall	*AssocIIMS*	Croatia
Scott Armstrong	*AssocIIMS*	USA
Valeria Ribaldi	*AssocIIMS*	Italy

Affiliate members

Vadimo Jurcuks	*AffiliIIMS*	UK
Mitesh Gulati	*AffiliIIMS*	India
Andrea Pawlotzki	*AffiliIIMS*	France
Hakim Rchaibi	*AffiliIIMS*	Morocco
Adrian Priestman	*AffiliIIMS*	UK
Fergus O'Kelly	*AffiliIIMS*	Ireland
Om Prakash	*AffiliIIMS*	Kuwait
Alain Gilbert	*AffiliIIMS*	Canada
Martin Willis	*AffiliIIMS*	UK
Matthew Green	*AffiliIIMS*	UK
Clifford Blaylock	*AffiliIIMS*	UK
Philippe Grelon	*AffiliIIMS*	Hong Kong

Supporting members

Dennis Burgess	*SupplIMS*	Canada
Sam Cottrell	*SupplIMS*	UK

Graduate members

Tony Tufft	*GradIIMS*	UK
Roman Tkachenko	*GradIIMS*	Ukraine
Rutger Hofma	*GradIIMS*	Spain

IIMS congratulates the students who have completed their studies:

IIMS Professional Qualification in Commercial Ship Marine Surveying
Tony Tufft
Roman Tkachenko

IIMS Professional Qualification in Yacht and Small Craft Marine Surveying
Rutger Hofma

ARE YOU INTERESTED IN REPRESENTING IIMS ON THE BSI COMMITTEE?

For many years, IIMS was represented on the SME/32 'Ships and Marine Technology' BSI (British Standards Institute) committee by Peter Morgan, who has now retired. Are you interested in taking up this unpaid role, representing IIMS and getting involved in the vitally important work? It is described as 'heavy committee' work, so if this is not your skill set, move on.

About BSI
'Our purpose is to inspire trust for a more resilient world. Our solutions and services improve performance and support the United Nations Sustainable Development Goals. At BSI, our mission is to share knowledge, innovation and best practice to help people and organizations make excellence a habit. This is underpinned by our role as the national standards body and through our prestigious Royal Charter'.

What are standards?
Standards define best practice in many different areas. They are put together by groups of experts and come in a number of different kinds, from a set of definitions to a series of strict rules.

Standards are agreed ways of doing something, written down as a set of precise criteria so they can be used as rules, guidelines or definitions.

This is the situation the BSI committee wants to avoid:
'What bloody idiot wrote that? There is no way I can survey that as intended'.

And this is the desired outcome:
'This is a meaningful standard that helps manufacturers meet the regulations and is easy to survey and certificate during build and operation so that the owner can be confident in its performance'.

Members of the BSI committee attend and mirror regulatory developments at IMO in real time and horizon scanning. As new regulations develop the committee assists ISO in developing the implementation tools that provide the link between the regulation and the operation. The BSI committee does most of the items that Class Societies do not do and, ultimately this can assist with keeping IIMS members up to date and understanding how new developments may influence them in the future.

ISO mainly develops manufacturing standards, but also systems and inspection standards. The ability to understand how a product can be built to be surveyed, from a life raft to a yacht to an oil tanker, is a very important perspective during the development of standards. And of course, if that element is not represented during standards development, the end result is an item that cannot effectively be surveyed during manufacture and operation.

The BSI Committee aims to meet two or three times a year and alternates between London and Southampton to facilitate MCA attendance. One presumes this is all online currently.

This is not a paid role, but IIMS understands any out of pocket expenses incurred in performing the role will be met.

To express your interest in representing IIMS on the BSI committee, please email IIMS CEO, Mike Schwarz, at **info@iims.org.uk**.

THERE'S PLENTY OF BUILDING WORK TO DO AT MURRILLS HOUSE NOW THE INSTITUTE OWNS THE PROPERTY

As the Institute has finally taken ownership in recent weeks of Murrills House as its new flagship headquarters, the work to restore this magnificent Grade II listed, 500-year-old building to its former glory will begin shortly. Completion on the deal took far longer than was anticipated, but the outcome marks something of a triumph for the Institute. IIMS is soon to make a significant financial investment in essential maintenance and repair work which will only add to the value of this new asset.

Discussions have taken place with a local construction firm and the scope of work has been drawn up and agreed. The building survey threw up some key maintenance work that needs to be done with a degree of urgency, but nothing that was a major surprise to the team. Because the property is a Grade II listed building, it means for some items, such as replacement of the old wooden windows which are rotten, we need to apply for planning permission from the local borough council. Currently IIMS is in discussion with the conservation planning officer at Fareham Council to seek the necessary permissions.

The scope of proposed renovation works and repairs to be undertaken at Murrills House is, in brief, as follows:

- *Re-bed all hips and ridges on the east sides slated roof and inspect all valleys for damage.*
- *Any slipped and broken slates will be made good, replace all cracked and slipped clay tiles on the rear extension and repoint the ridge.*
- *Re connect the rear down pipe to run down the roof and into the guttering.*
- *Repair the cracks in the render on the front rounded elevation of the property.*
- *Supply and fit an ACCO drainage system to the east elevation along the tarmac footpath to take any surface water away from the building.*
- *Repair cracked soffit where soffit brackets are fixed, supply and fit 3 new vents to the extension soffits.*
- *Supply and fit a 200mm layer of quilted loft insulation to the 100mm of existing insulation. Spray all timbers in the loft with a wood boring insect treatment and rot treatment, supply and fit 4x vented roof tiles.*
- *Box Sash windows to be manufactured in joinery grade softwood timber with Sapele hardwood sill sections. All windows to match identical appearance and design as originals 4mm clear toughened glass face puttied into frames.*

West side elevation

To supply and fit 7 no. box sash windows: 1600h x 1000w

South entrance elevation

To supply and fit 2 box sash windows to the first floor: 1600h x 1200w

To supply and fit 2 box sash windows to the ground floor: 2100h x 2100w

East side elevation

To supply and fit 1box sash window to the ground floor: 1400h x 900w

To supply and fit 1 bay window to the ground floor bay window: 2400h x 2400w x 600d

- *Main entrance doors. Reuse original existing doors, but supply and fit new frame and make good internal damage around door.*

Over the last year, as part of the Institute's 'Buy a Brick' campaign to raise funds, a number of members have made donations towards the cost of the Murrills House renovations. A small plaque of recognition for each of those members will be placed on the Board Room wall and work is underway with that project. The Institute is incredibly grateful to those who have been generous. Since that campaign ended, a number of members have asked if they can still donate. So, IIMS has reopened a JustGiving page at **https://bit.ly/2X4Cu9x** which will remain open until the end of December 2020. IIMS is most grateful for any additional donations, no matter how small or large.

As part of the deal to acquire Murrills House, in a role reversal, our ex landlord, Casson Beckmann, has become our new tenant. So IIMS is adjusting to life as not only a property owner, but also a responsible landlord. This brings additional responsibilities in several areas, for example fire marshalling responsibility for the building and all its staff, health and safety for the site and keeping the extensive grounds manicured and tidy!

Commenting on the completion of the purchase, Mike Schwarz said, "To secure Murrills House as the long-term head office for the Institute feels like a dream come true and is one of my proudest achievements. It underpins the future of the organisation and provides a valuable asset for its members. Knowing that we are the next guardians of a building with a history going back 500 years is a great responsibility, but one that my colleagues and I will rise to as we look to return this well-known local landmark to its former glory."

A potted history and guide to Murrills House

What we do know is that Murrills House started life as a tenant farm, part of a much larger estate in the area. Its origins can be traced back centuries and the oldest part (beneath the current Accounts Office), is believed to date from the 1500s when cattle routinely lived in the house. Once it was purchased from the Southwick estate, Murrills House owned in the region of 200 acres with land running down to the water and a large working pig farm. Looking around at the urban sprawl today, that seems almost impossible to imagine. Censuses have been viewed going back to the early 1800s, not long after the census first began in the UK in 1801. Various families are named as having lived at Murrills House, many of them large in number due to the size of the original property which boasted seven bedrooms.

The Curtis family were prominent owners of the building from the late 1800s until just after the second world war. At that time Murrills was clearly well known as the local manor house of the area. The Curtis family, it seemed, enjoyed an enviable and halcyon lifestyle – the house was often thrown open and tennis was a much enjoyed sport on the grass court set within the gardens (sadly a car park now) in what must have been splendidly manicured gardens too.

Interestingly, Murrills House has a fascinating connection with the maritime world. In 1952, Associated British Combustion Ltd acquired the property as their head office and built a factory unit in what was the back garden. Their two most prestigious contracts, both with a Royal connection, were to provide and install the oil-fired heating system at Windsor Castle and to provide the boilers on board the iconic H.M Royal Yacht "Britannia". How ironic that more than half a century on, IIMS should be set to pick up and continue that nautical mantle once more.

IIMS ANNOUNCES THE RESULTS OF A REVIEW AND MAJOR OVERHAUL OF SURVEYOR SPECIALISATIONS

The Institute's Professional Assessment Committee (PAC) is made up of a group of the most senior and experienced surveyors from all walks of the profession and is drawn from the IIMS membership worldwide. It is the role of the PAC to maintain standards of membership at the highest possible level and to ensure that IIMS applicants are granted levels of membership and website listings that reflect their actual marine surveying experience.

However, IIMS has a legacy issue that it needs to face up to. Some members have had the same specialisations attached to their profile for many years, in several cases for nearly 30 years. To say an individual's specialisations are long overdue for a review would be something of an understatement, which could also be said for the list of specialisations themselves too!

The PAC met recently to review the existing lists of surveyor specialisations with a view to expanding the list to reflect the actual types of surveys carried out by marine surveyors. An example of the changes made is that the original three basic areas of cargo surveying - Breakbulk, Dry Bulk and Bulk Oil/Chemicals - have now been expanded to cover eleven specialisations that will give a more accurate description of a surveyor's experience.

Standards for entry are more precise now than they were many years ago and this has brought into question some of the current IIMS website listings held by existing members. This process of review can only be a good thing and adds further credibility to IIMS as an international organisation. New membership applicants need to show objective evidence and details of experience relevant to their specialisation if they are to satisfy the PAC these days. Of course, new specialisations have emerged over recent times and IIMS is keen to reflect this with an expanded list.

LARGE YACHT & SMALL CRAFT SURVEYOR SPECIALISATIONS

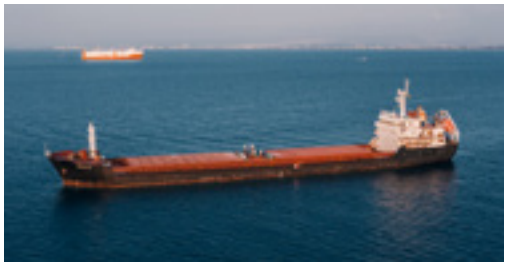
Categories	Sub Categories
Additional Surveying Services	Compass Adjusting
Additional Surveying Services	Heritage or Pre 1940's Vessels
Additional Surveying Services	Salvage
Additional Surveying Services	Towage
Casualty Investigation	
IIMS Certifying Authority	MCA Coding Examiner
IIMS Certifying Authority	MLC 2006 Inspections
IIMS Certifying Authority	Tonnage Measurement Surveys
IIMS Certifying Authority	Workboats < 24m <500GT
Large Yachts & Superyacht Surveys > 24 mtrs	Aluminium
Large Yachts & Superyacht Surveys > 24 mtrs	Coatings Inspections
Large Yachts & Superyacht Surveys > 24 mtrs	Electronic Engineering
Large Yachts & Superyacht Surveys > 24 mtrs	Electrical
Large Yachts & Superyacht Surveys > 24 mtrs	Flag State Inspections
Large Yachts & Superyacht Surveys > 24 mtrs	FRP & GRP
Large Yachts & Superyacht Surveys > 24 mtrs	ISM Audit
Large Yachts & Superyacht Surveys > 24 mtrs	Marine Warranty Surveys
Large Yachts & Superyacht Surveys > 24 mtrs	Non-destructive testing: Infrared Thermology
Large Yachts & Superyacht Surveys > 24 mtrs	Non-destructive testing: Osmosis
Large Yachts & Superyacht Surveys > 24 mtrs	Non-destructive testing: Ultrasonic
Large Yachts & Superyacht Surveys > 24 mtrs	Steel & Alloy
Large Yachts & Superyacht Surveys > 24 mtrs	Superintendency
Large Yachts & Superyacht Surveys > 24 mtrs	Wood
Machinery Surveys	Condition & Damage
Marine Insurance & Finance	Condition Surveys
Marine Insurance & Finance	Hull Surveys
Marine Insurance & Finance	Machinery Surveys
Marine Insurance & Finance	Valuation Surveys
Small Craft Surveys < 24 mtrs: Pre-purchase Surveys	GRP/FRP
Small Craft Surveys < 24 mtrs: Pre-purchase Surveys	Steel
Small Craft Surveys < 24 mtrs: Pre-purchase Surveys	Aluminium
Small Craft Surveys < 24 mtrs: Pre-purchase Surveys	Wood
Small Craft Surveys < 24 mtrs: Pre-purchase Surveys	Alloy
Small Craft Surveys < 24 mtrs:	Insurance & Finance
Small Craft Surveys < 24 mtrs:	Valuation Surveys
Small Craft Surveys < 24 mtrs: Damage Surveys	GRP/FRP
Small Craft Surveys < 24 mtrs: Damage Surveys	Steel
Small Craft Surveys < 24 mtrs: Damage Surveys	Aluminium
Small Craft Surveys < 24 mtrs: Damage Surveys	Wood
Small Craft Surveys < 24 mtrs: Damage Surveys	Alloy
Small Craft Surveys < 24 mtrs: Inland Waterway Surveys	GRP/FRP
Small Craft Surveys < 24 mtrs: Inland Waterway Surveys	Steel
Small Craft Surveys < 24 mtrs: Inland Waterway Surveys	Aluminium
Small Craft Surveys < 24 mtrs: Inland Waterway Surveys	Wood
Small Craft Surveys < 24 mtrs: Inland Waterway Surveys	Alloy
Electrical or Electronic Engineering	
Workboats < 24 mtrs <500GT	GRP/FRP
Workboats < 24 mtrs <500GT	Steel
Workboats < 24 mtrs <500GT	Aluminium
Workboats < 24 mtrs <500GT	Wood
Workboats < 24 mtrs <500GT	Alloy

CARGO & COMMERCIAL SURVEYOR SPECIALISATIONS

Categories	Sub Categories
Additional Surveying Services	Compass Adjusting
Additional Surveying Services	Fishing Vessels
Additional Surveying Services	Guard Vessels
Additional Surveying Services	Hydrographic Surveys
Additional Surveying Services	Specialist Surveys
Additional Surveying Services	Superintendency
Auditing	eCMID Inspections
Auditing	ISM
Auditing	ISO (Relevant to Marine Operations)
Auditing	OVID Inspections
Auditing	SIRE (Ship Inspection Report)
Auditing	Navigation Assessor
Cargo Surveys	Breakbulk Cargoes
Cargo Surveys	Bulk Cargoes
Cargo Surveys	Bulk Oil Cargo Measurement & Bunker Surveys
Cargo Surveys	Container Damage & Suitability
Cargo Surveys	Containerised Cargoes
Cargo Surveys	Draught Surveys
Cargo Surveys	Heavy Lift & Project Cargoes
Cargo Surveys	LPG & LNG Cargoes
Cargo Surveys	Oil & Chemical Cargoes
Cargo Surveys	Refrigerated Cargoes
Cargo Surveys	Ro-Ro Cargoes
Casualty Investigation	
Classification Society Surveys	
Commercial Hull Survey	
Commercial Hull Survey	On / Off Hire Surveys
Electrical or Electronic Engineering	
Machinery Surveys	Condition & Damage
Marine Insurance Representation	Cargo
Marine Insurance Representation	Hull
Marine Insurance Representation	Machinery
Marine Insurance Representation	Marine Warranty Surveys
Offshore	Dynamic Positioning
Offshore	Heavy Lift
Offshore	Jackup
Offshore	Marine Warranty
Offshore	Pipe & Cable Laying
Offshore	Seismic
P&I Club Surveys	Cargo
P&I Club Surveys	Condition & Entry Surveys
P&I Club Surveys	Machinery
Salvage	
State or Government Surveys	Flag state
State or Government Surveys	Port state
Towage	
Workboats	

What has certainly become apparent and pointed out is that there are a number of commercial ship surveyors claiming to have a range of skills enabling them to also survey a small 10 metre yacht and vice versa. Whilst a few such people do exist, they are rare and surely we all know that too?

Having reviewed the list of specialisations at their recent meeting in some detail, the PAC has agreed two new lists (one for commercial ship and the other for yacht and small craft surveyors) that are printed here and which will come into force imminently.



Chief Executive Officer, Mike Schwarz, commented, "The review of members' surveying experience listings is long overdue and is a large, yet essential project likely to take many months to complete. I am delighted to see some new specialisations on the list, such as MCA coding examiner and guard vessels to name but two. We plan to work with each and every member in the coming period to ensure their specialisations are up to date and accurate."

Where it is obvious, IIMS will transfer a member's existing specialisation to one of the new ones, (if necessary). It is a fact that members who joined years' ago may well no longer perform the functions they did and were approved to do then but will have developed new skills not showing on their profiles. Please check your listing and make sure it actively reflects the work you do and the marine surveying activities you are competent to undertake. There is no cost for amending your listing, but evidence will be required if you want to add new ones.

PAC Chairman, Capt Chris Kelly, summed it up very well when he said, "Ultimately, it is about the IIMS accurately reflecting the substantiated marine surveying experience of the membership and promoting this experience to the wider marine world through the IIMS website and the Marine Surveyor search App."

GEOFF WADDINGTON TAKES OVER AS IIMS PRESIDENT AT AGM

At the Annual General Meeting of the International Institute of Marine Surveying held at Murrills House, Portchester on 16th June 2020, Geoff Waddington took up the position of President of the Institute, a position he will hold for the next two years. Geoff replaces Dubai based Capt Zarir Irani who has held the position since 2018.

In normal times, a short ceremony would have taken place as the President's medal was formally handed from the outgoing to the incoming President, but this year, for obvious reasons, the Annual General Meeting was held in an online only capacity. However, a short video had been pre-recorded showing Capt Zarir Irani seeming to hand the medal through a Zoom screen to Geoff Waddington who appeared to take delivery of it. The wonders of modern technology and a fun gesture not lost on the large online audience.

As he accepted the President's medal from Capt Zarir Irani, Geoff took the opportunity to thank him for his two years of unequivocal service to the Institute. Geoff went on to say how keen he was to see the membership entry level to Institute membership being maintained and spoke passionately about the need to raise standards throughout the marine surveying profession. He also made a point of thanking the IIMS head office staff for their dedication during what has been the most challenging of times in recent months.

With Geoff's elevation to the post of President, Peter Broad has moved up to Vice President, and Capt Ruchin Dayal was elected by the membership to the vacant role of Deputy Vice President.

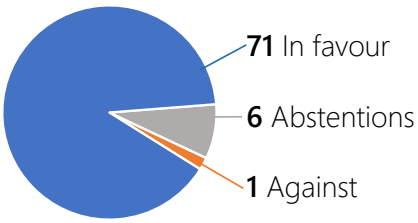
Geoff Waddington will be known to many IIMS members. For a number of years, he was Chairman of the IIMS Education Committee and instrumental in developing and shaping the distance learning Diploma programme.

Having started his career as a junior marine engineer fifty years ago on ex-second world war steamships, Geoff was trained to be an engineering technician (artificer) and later a shipwright. Being a shipwright involved surveying ships' structures for the Royal Navy and also smaller vessels for the Royal Marines, but his other job was small craft surveying. Having retired from the Royal Navy Geoff took up a career as a ship repair manager in a Southampton shipyard. He then took to small craft surveying which led to small craft shipping, which in turn led to breakbulk cargo, out of gauge cargo and dangerous goods.

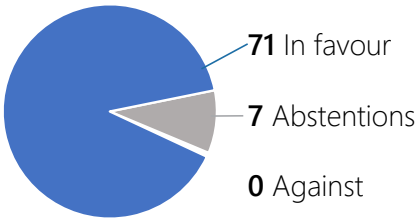
Geoff said, "In never ceases to amaze me that there was no qualification to be a marine surveyor and this has been my goal ever since. I look forward to working with the IIMS CEO as we move towards implementation of a formal accreditation scheme which recognizes marine surveyors worldwide for their specialisations".

Votes had been pre-cast prior to the AGM using an secure online voting mechanism and were as follows:

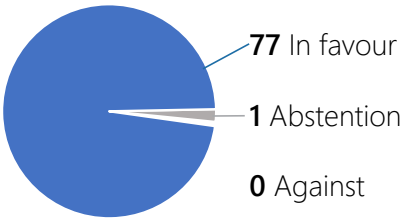
Election of the IIMS Management Board en-bloc



Election of Capt Ruchin Dayal to the post of Deputy Vice President



The IIMS Management Board recommends keeping the 2021 fees at the same level as this year



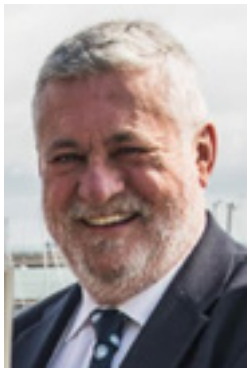
2020 IIMS ROLL OF HONOUR

At the recent Annual General Meeting broadcast live from the Institute's Head Office in Portchester, several honours were announced by the Management Board. On this occasion, none could be present to have the honour personally bestowed upon them, but certificates to recognise their achievements have been sent to the recipients.

Those recognised for their work were as follows:

John Excell
has been awarded an Honorary Fellowship.
John has been a stalwart of the Institute for a number of years and is recognised for his contribution as Chairman of Large Yacht & Small Craft Marine Surveying as well as his contribution to the Institute's management board and Certifying Authority committee.

Omprakash Marayil
has been awarded an Honorary Membership.
At the end of 2019 following the 10th Branch Anniversary, Omprakash completed his two-year term as Chairman of the UAE Branch. IIMS wanted to recognise his work as leader of the Branch locally over that period.



Capt Eugene Curry
has been awarded an Honorary Fellowship.
As he retires from active surveying life, IIMS wanted to acknowledge the work Eugene has put in behind the scenes over a long period. A familiar face at Institute UK Conferences over the years, Eugene has been a long-standing member of the Professional Assessment Committee, responsible for assessing the merits of new applications.

Karen Brain
has been awarded an Honorary Membership.
Known to many members, Karen runs Matrix Insurance, one of the IIMS insurance scheme providers for yacht and small craft surveyors.
Karen is a familiar face and pops up to run incisive seminars and is a regular contributor to the Report Magazine for the benefit of surveyors worldwide.

Uday Moorthi
has been awarded an Honorary Fellowship.
Upon recommendation from the IIMS UAE Branch, Uday Moorthi has been recognised for his work over many years with the Branch, including a previous two-year term as Chairman. He remains influential in Branch affairs to this day.

Elliott Berry
has been awarded a Fellowship.
Over the years, Elliott's career has developed significantly, and the Institute is keen to acknowledge his progress. In addition, he has authored three IIMS self-help handy guides.

SURVEYORS UPSKILL AND LEARN COURTESY OF THE IIMS SERIES OF ONLINE SEMINARS

Once it became clear earlier in the year that many marine surveyors were facing an enforced career break due to the pandemic that hit many parts of the world hard, IIMS acted swiftly and organised a series of what turned out to be outstanding online seminars. The presentations covered a variety of key surveying topics, each delivered by an expert in their field. Hundreds have taken advantage joining the seminars live, whilst others chose to purchase the video content for viewing at a later date due to unavailability or time zone differences. Eleven seminars were delivered between April and August producing about 20 hours of video run time in total.

IIMS would like to thank all those who have supported these broadcasts and is delighted that so many decided to use the downtime to upskill, refresh and learn new skills.

Here is a review and showcase of what the Institute has delivered with a short overview of each one. These videos are pay per view and are not freely available. They are available for direct download at a modest cost from the IIMS website archive. View the collection at **https://bit.ly/2Ssv6Td**.

How to Conduct a Complete Mast & Rigging Survey broadcast on 2 April by Kim Skov-Nielsen

Kim kicked the series off attracting over 100 delegates for what turned out to be something of a masterclass on mast and rig surveying using a series of photos to illustrate his presentation. He spoke about how to include the findings and recommendations in the report as well as caveats to include. Kim touched on all types of rigging from rope to galvanised steel wire to carbon, as well as looking at different types of masts too, whilst reminding surveyors to keep a clear focus on their personal safety.

Video run time: 2 hours and 26 minutes

Available to purchase for download at **https://bit.ly/2DRKXGb**.

Introduction to Yacht Coatings broadcast on 16 April by Tim Bannister

Tim Bannister, Technical Support Specialist with AkzoNobel, gave the most comprehensive presentation on yacht coatings. A qualified Registered Marine Coatings Inspector, he showed off his extensive knowledge of the subject. Through his presentation, Tim have general surveyors more knowledge in the area specifically of paint coatings for yachts by explaining both the theory and process as well as giving some practical tips on the most common paint faults to look for.

Video run time: 1 hour 40 minutes

Available to purchase for download at **https://bit.ly/3eP59Fn**.

Business Compendium broadcast on 18 April by Mike Schwarz

The IIMS CEO brought his 40 years' of business management experience and knowledge to the screen in this long session with a short presentation on each of the following topics: Basic marketing tips | How to give good customer care | Preparing a simple budget | Managing cashflow | Looking good on the web | Preparing a strategy plan | Preparing a Twitter strategy | An introduction to search engine optimisation.

Video run time: 2 hours and 7 minutes

Available to purchase for download at **https://bit.ly/2CQuly6**.

Inspecting Critical Equipment on Crew Transfer Vessels broadcast on 22 April by Mike Proudlove

Mike Proudlove has enjoyed a long career as a marine surveyor; however, these days he is firmly on the other side of the tracks operating and managing a fleet of crew transfer vessels for Offshore Turbine Services, based in South Devon. In his informative presentation, Mike gave a detailed overview on some of the key areas of concern that anyone surveying a crew transfer vessel should look for and be aware of.

Video run time: 1 hour and 41 minutes

Available to purchase for download at **https://bit.ly/2ZJRivW**.

Introduction to Yacht Coating Failures & Paint Defects broadcast on 27 April by Matthew Potts

After Tim Bannister's popular seminar on coatings there were requests from surveyors to go deeper into this subject. At short notice, Matthew Potts, Technical Support Specialist with AkzoNobel, stepped up to give this in-depth overview of a complex subject. In his presentation he covered: Above waterline paint defects and failures | Below waterline paint defects

and failures | Brightwork/Varnish defects and failures | Paint testing equipment.

Video run time: 2 hours and 3 minutes

Available to purchase for download at **https://bit.ly/2ZIWgca**.

Gathering Evidence broadcast on 6 May by Capt John Noble

Capt John Noble spent about 40 years in the marine surveying business and developed a specialism having attended over 60 major casualties including BRAER, SEA EMPRESS and ERIKA. His involvement in these casualties often lead him to deal with matters of causation and gathering evidence. Additionally, John acted as an expert witness on about 70 cases in a number of jurisdictions all of which made him the perfect choice to deliver this important seminar.

Video run time: 55 minutes

Available to purchase for download at **https://bit.ly/2ZJztNt**.

Giving Expert Witness broadcast on 14 May by Karen Brain

Giving expert witness was presented by Karen Brain, Matrix Insurance, a long-standing advisor to the Institute. As she explained in detail the key function of an expert witness is to express an independent expert opinion based on the information that is provided. Karen gave examples of the special report formats that an expert witness is expected to provide and highlighted the pitfalls to avoid!

Video run time: 1 hour 23 minutes

Available to purchase for download at **https://bit.ly/32zr5Su**.

Report Writing (for Yacht & Small Craft Marine Surveyors) broadcast on 18 June by Mike Schwarz and Paul Homer

Your hosts and presenters for this important seminar were Paul Homer, Chairman of Standards and Mike Schwarz, IIMS CEO. This three-hour seminar brought the art of report writing bang up to date by providing the essential information that a yacht and small craft surveyor needs to consider when gathering the information and then compiling his/her report. Suggested clauses for use in the report to protect against possible litigation were shared and advice on contracts and terms of business given too.

Video run time: 3 hours 12 minutes

Available to purchase for download at **https://bit.ly/3hbWC0W**.

Moisture Meters, New Tramex Gauge & Osmosis broadcast on 29 June by Nigel Clegg

Nigel Clegg is an undisputed expert in his field and he delivered the most comprehensive seminar covering the use of moisture meters, the challenges of spotting and dealing with the age old problem of osmosis and gave a and short overview and glimpse of the next smart generation meter, the new Tramex.

Video run time: 2 hours 19 minutes

Available to purchase for download at **https://bit.ly/3hbVV7Q**.

Multiple Echo Thickness Measurement broadcast on 21 July by Jon Sharland

Jon is something an expert with Tritex gauges as one would expect given that he works for them! But his depth of knowledge of how the science works is second to none and in this valuable seminar, he gave surveyors a 'chapter and verse' review of how the technology works and the essentials that a surveyor needs to know, including how to mitigate against getting false readings.

Video run time: 1 hour 3 minutes

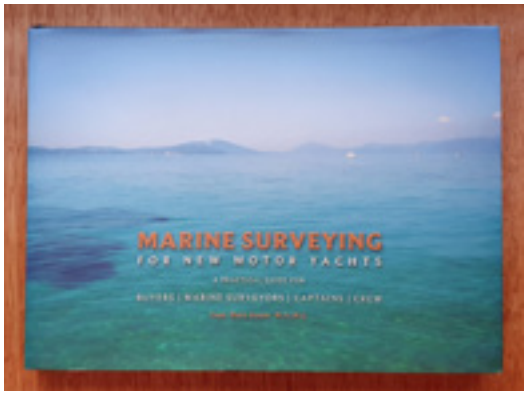
Available to purchase for download at **https://bit.ly/3hntB2m**.

Surveying & Inspecting Small Craft Engines broadcast on 4 August by Geoff Waddington

Current IIMS President, Geoff Waddington, really understands small craft engines, having been involved with them over many years. He knows what makes them tick and the reasons why they develop faults and fail. This seminar gave surveyors a real insight into what is an area that many are frightened or unsure to cover in depth in their surveys and reports due to a lack of understanding of modern small craft marine engines.

Video run time: 2 hours 49 minutes

Available to purchase for download at **https://bit.ly/30FA9nF**.



If you would like to reserve and purchase a copy of this book, please email Holly Trinder at **info@iims.org.uk** and we will email you an invoice or call her on **+44 23 9238 5223**. On receipt of your payment we will despatch this handsome book.

MARINE SURVEYING FOR NEW MOTOR YACHTS BY CAPT MARK SOUTER

IIMS has nearly 30 copies of this beautifully produced large format hardback book written by Mark Souter which weighs in at almost 2 kilos! Running to 370 pages, the book was originally sold for over £100 when first published, but IIMS is pleased to offer members the publication at just £39.50 including post and packaging to any worldwide location.

John Kilhams reviewed the book when it was first published. He said, "This is an interesting book and approaches the subject of marine surveying from a new angle. Marine surveyors are generally surveying used or second-hand boats. But it is my opinion that this book would be of great assistance to a client intending to instruct on the construction of a new build vessel. There is information on the responsibilities of all parties with details on check lists and contracts. The book would be extremely useful in the training of surveyors as it covers almost all the issues a surveyor is likely to become involved in. There have been many books written on marine surveying, but this is different and would be an asset in any surveyor's library".

About the author

Capt Mark Souter MIIMS was born in Australia where he qualified as an A grade electrician. He came to the UK and bought his first yacht 'Gipsy Moth', previously owned by Sir Francis Chichester. Since then Mark has qualified as a Master of Yachts (MCA) at Warsash Maritime Centre. He received a diploma in marine surveying with accreditation in superyachts and also gained a certificate in Naval Architecture.

For over 30 years Mark has worked as a professional Captain aboard superyachts. In between his Captain's duties he has project managed and surveyed new build yachts in the USA, Italy and Greece.

PRINT OF 'LIVELY LADY' DONATED TO THE INSTITUTE

Elly Bryant, a long-standing member of the IIMS team working in the finance department, was handed a print of Lively Lady by her parents following a house clear out and they decided to donate it to IIMS. The picture is now hanging in pride of place on the stairway up to the office and we are grateful to Elly and her family for this kind donation.

'Lively Lady' was painted by Laurence Bagley (1922 – 1983), an artist born locally in Southampton, United Kingdom. He was best known for his marine and aviation paintings, but he was also a writer and illustrator. This print proved to be his most financially successful work during his career.

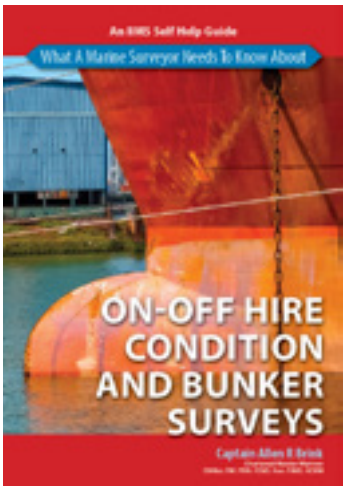
Throughout the 1970's Laurence painted dozens of impressions of Vosper Thornycroft warships, hovercraft and weapon systems which were widely reproduced in the company's sales literature.

It is said that he had been a keen yachtsman, sailing mainly with an old friend who owned an 8-ton McGruer sloop. He spent many a sailing weekend away, sometimes crossing the channel to Cherbourg. Rumour has it though, that he was not an ideal crew as he was always grabbing for his sketchbook! Eventually Laurence bought his own yacht, a 6-ton Hillyard "Fjord" which he kept on the River Hamble.

IIMS PUBLISHES TWO NEW HANDY GUIDES IN PAPERBACK AND DOWNLOADABLE PDF FORMATS

In recent weeks, the twenty third and twenty fourth handy guides in the IIMS series, 'What a marine surveyor needs to know about', have been published in paperback and downloadable pdf formats.

The 23rd handy guide is entitled *'What a Marine Surveyor Needs to Know About On-Off Hire Condition and Bunker Surveys'* and the 24th is *'What s Marine Surveyor Needs to Know About Corrosion, Electrolysis, Galvanism, Anodes & MIC'.*

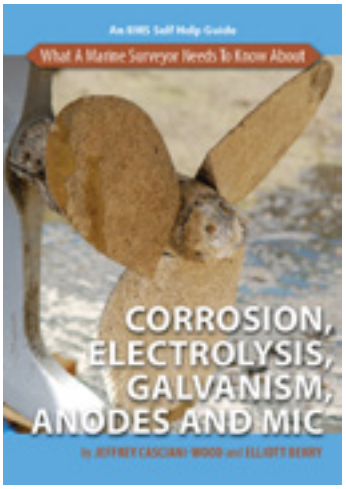


What a Marine Surveyor Needs to Know About On-Off Hire Condition and Bunker Surveys is authored by experienced Capt Allen Brink. On-Off hire condition bunker surveys are a requirement for the commercial trade of vessels in that vessels are hired from their Owners by Charterers who trade the cargo internationally. The survey of the vessel is undertaken either before the vessel is delivered into a Charter, or re-delivered from a Charter. The reports should include a detailed description of the vessel itself, the structural condition of the cargo spaces and main deck areas surrounding the various cargo compartments and hatches, the ship's hatch covers, the cargo gear and space. Additionally, you will inspect and report on paint coating and cleanliness, the quantity of bunkers remaining on board, verification of the validity with respect to the vessel's certification, portable equipment and securing materials, container securing equipment and so on.

Author Capt Allen Brink brings his many years' experience into play. At an impressive 244 pages, the publication contains examples of a number of templated reports which the surveyor can adapt for his/her use. There are photos to assist, diagrams and examples of the certification the surveyor needs to inspect and report too. The handy guide also contains a detailed appendix with a selection of marine terms, to assist the marine surveyor when conducting inspections of ships for charter purposes.

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

What a Marine Surveyor Needs to Know About On-Off Hire Condition and Bunker Surveys is available in paperback at £30 plus post and packaging or as a downloadable pdf for just £28. Click for details at **https://bit.ly/36EOsKw**.



What a Marine Surveyor Needs to Know About Corrosion, Electrolysis, Galvanism, Anodes & MIC by Jeffery Casciani-Wood and Elliott Berry. Practising marine surveyor, Elliott Berry FIIMS, and veteran, retired surveyor, Jeffrey Casciani-Wood HonFIIMS, have combined to produce this authoritative 120 page handy guide.

The guide presents some detailed equations to help to explain the science along with plenty of practical tips to help the marine surveyor to understand this essential, yet complex subject as they try to debunk some of the long held myths.

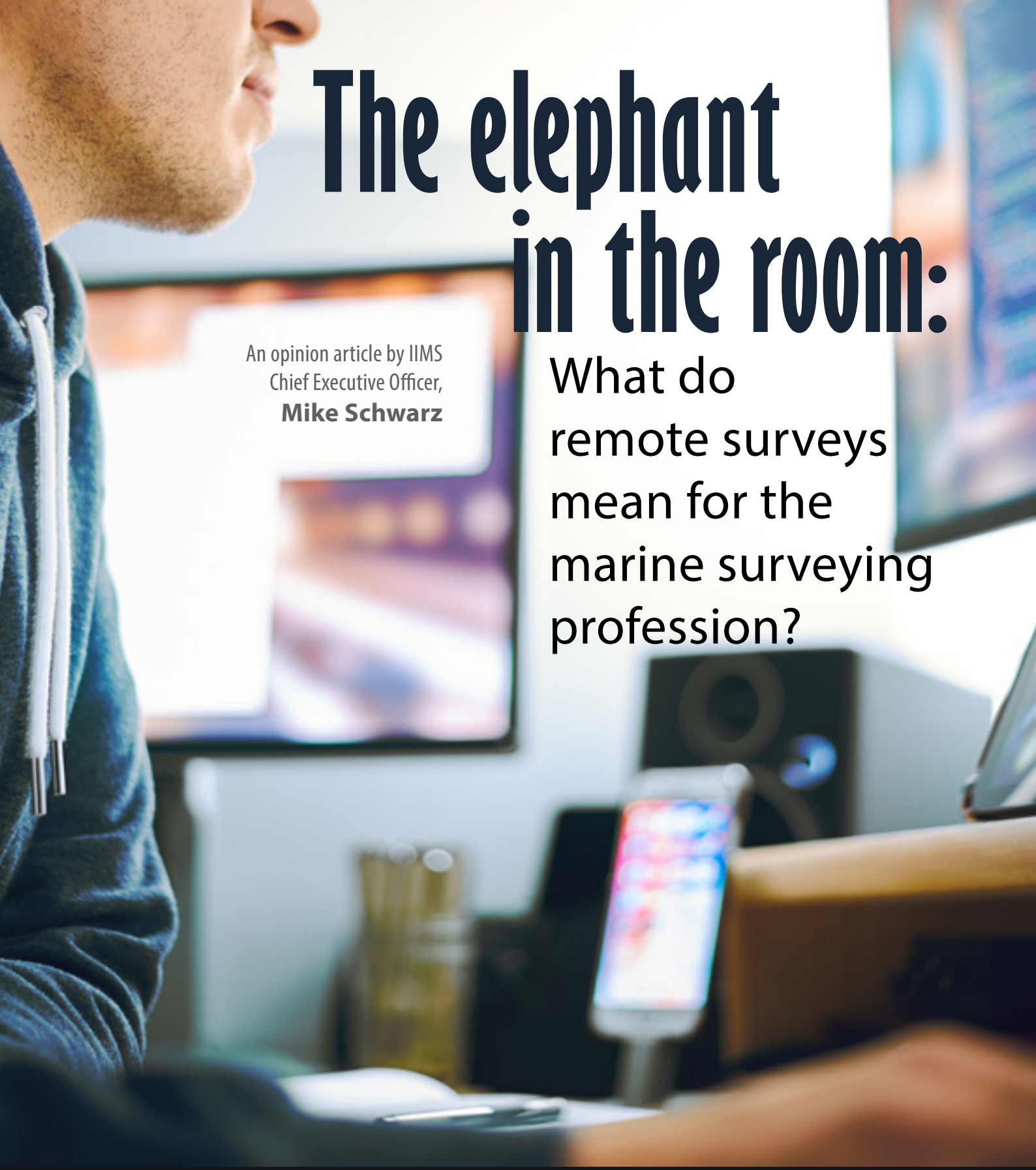
In Part 1 the authors consider the many and varied types of corrosion and their causes, including the often-misunderstood microbial corrosion. The opening definition 'Corrosion is the degradation of a material by its environment' gives little clue to the depth of valuable information that follows. Part 2 introduces the surveyor to the various cathodic protection systems that exist, including a lot of information about the correct use of anodes. Part 3 is an excellent glossary with descriptions of cathodic protection terms that any surveyor should be familiar with.

What a Marine Surveyor Needs to Know About Corrosion, Electrolysis, Galvanism, Anodes & MIC is available in paperback at £25 plus post and packaging or as a downloadable pdf for just £22. Click for details at **https://bit.ly/3hVwjxf**.

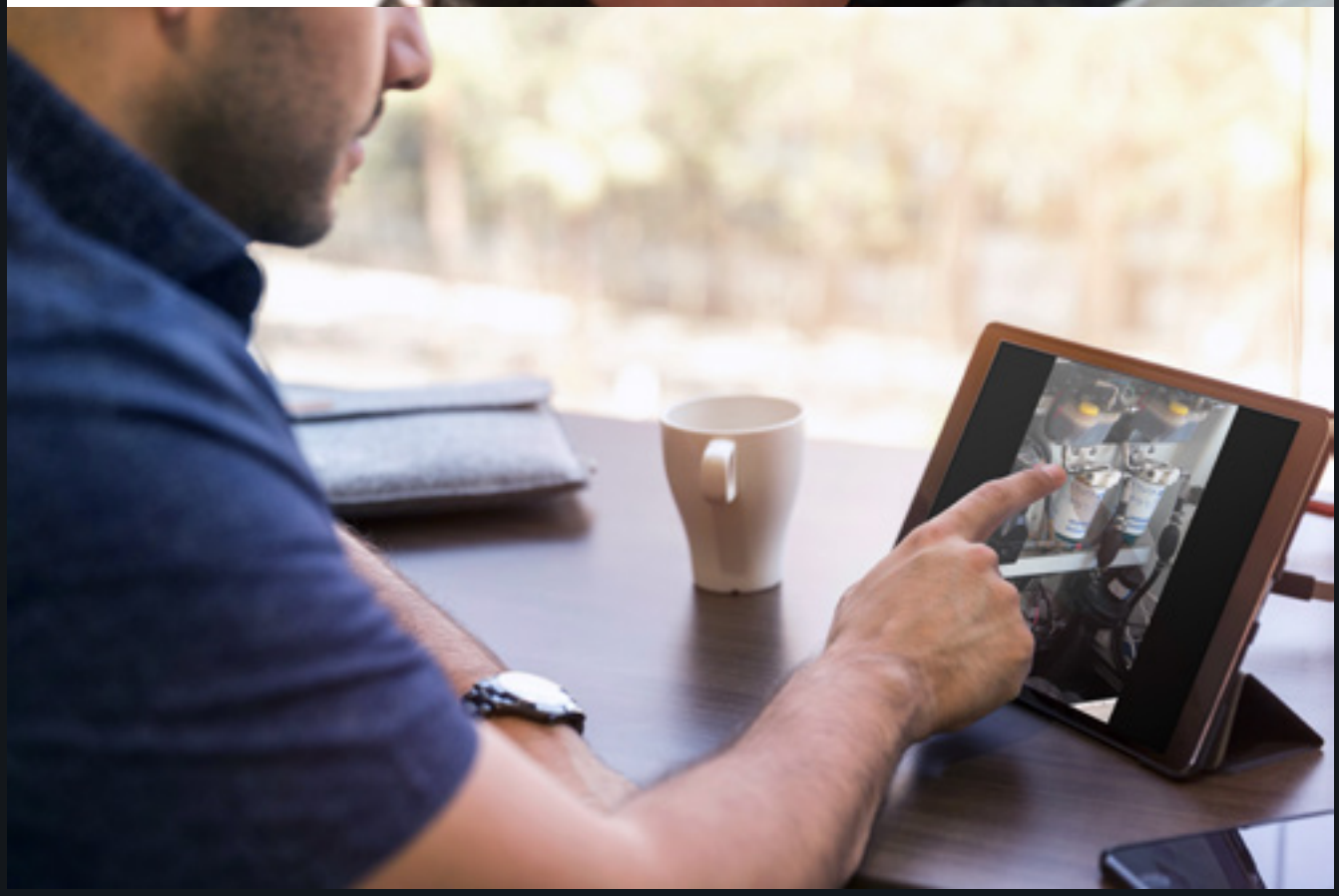
The elephant in the room:

What do remote surveys mean for the marine surveying profession?

An opinion article by IIMS Chief Executive Officer, **Mike Schwarz**



"So, let's be clear right from the start. As I am always keen to point out, I am neither a technical man, nor am I a marine surveyor. However, I am very much engaged with finding digital solutions to old ways of working and love to embrace technology. So, I totally understand the logic behind remote marine surveys and respect those who are driving this agenda and the developers who are defining the extraordinary digital solutions to make it happen. I know, however, from dialogue with surveyors around the world, that this is a challenging concept for some to grasp. I personally remain unsure which side of the fence I am on.



I am keen to stimulate debate amongst IIMS members and the wider marine surveying community about the merits (or otherwise) of conducting remote surveys. In this article I have given my personal opinions and have collated as much detail, evidence and opinion from industry leaders involved in these activities as I could find from other sources, most notably Classification Societies who are leading the charge in this area."

Many things have changed in the past few months and not all of them good as we have learnt to cope with tragedy and a new way of living courtesy of the pandemic. COVID-19 certainly has a lot to answer for, but out of the situation that was forced upon the profession, a new way of surveying is fast emerging, particularly in the area of commercial ships and offshore assets. I refer to remote surveying, actually not new, but probably unimaginable to most of us just a few years ago; and a shock to the system of more traditional surveyors and those sceptics amongst us too undoubtedly. They are suddenly fashionable - the talk of the town it appears - and the pandemic has fuelled the latent demand for remote surveys.

Can a vessel really be successfully surveyed remotely? The answer is of course yes, but how detailed is a remote survey and what depth of information does it reveal to the surveyor who is watching on a laptop or tablet? I do not have the experience personally to be able to answer those rhetorical questions, but I know there will be members who can and who will fall on both sides of the debate. It would make for an interesting discussion. Whilst I can see the possibilities for commercial ship surveys, I remain more sceptical as to the surveying of yachts and small craft remotely. However, the fact that some of the 'majors' are seeing merit in remote surveying of larger vessels makes me think we must keep an open mind and take onboard their learnings and experience.

DNV GL reported back in March that they had completed over 15,000 remote surveys already. Obviously, they see the merit in working this way and the pandemic has driven their agenda. Further proof, if it were needed, can be found in four news articles published recently on the IIMS web site:

- Bureau Veritas completes a remote marine survey on LNG dual fuel harbour tug PSA Aspen
- RINA (Classification society) performs statutory and class surveys remotely
- DNV GL's remote surveys surge
- Lloyd's Register makes the case for remote surveys

So, do remote surveys mean the end of the marine surveyor? In my opinion, certainly not and far from it. But we are dealing with change on a major scale, the like of which has not been seen in the profession before. The role of the remote surveyor to look and interpret the data, to report and make recommendations on what he or she sees is unchanged. But for many I am certain being denied the opportunity to work in the open air and to get their hands dirty, surely some of the appeal of the job, will be sorely missed. Surely this outdoor freedom would disappear if the lot of a surveyor is to be sat endlessly at their electronic device observing remotely and then reporting? That has to be a game changer. Perhaps it will encourage people from a different background to seek opportunities in the world of hi-tech remote marine surveying? Ultimately though, the surveyor must still understand what he or she is looking at or being shown through a smartphone screen. There can be no difference in that sense in terms of the required knowledge and experience. This means that the education of the next generation of marine surveyors remains the same, or does it? Those coming into the profession will need to learn new skills, apart from the 'old fashioned' technical ones, such as how to become an IT wizard, for that will become an essential part of the role. They will also need to understand the limitations of remote surveying, if indeed there are any.

The Classification Societies have reported a massive uplift in the demand for remote surveys. This flies in the face of the fact that the industry has been relatively slow in adopting new digital technologies and to its detriment.

To spell it out simply, conducting remote surveys and inspections means that marine surveyors do not have to be physically present on board a vessel or marine asset. This dovetails perfectly, of course, with the social distancing requirements brought about by COVID-19. Instantly one can see the health benefits by not putting the surveyor, or indeed the crew, in a potentially harmful situation. Instead, by using an online connection or video streaming link, the remote surveyor can provide support to vessels anywhere in the world with documentation, images, video and input provided by clients and crewmembers.

It is anticipated that remote inspection devices are likely to become commonplace in the future, even post pandemic, replacing or assisting the physical attendance of surveyors. As previously stated, what we are dealing with is a seismic change that may well challenge those who are half way through their careers, but which will become second nature to new entrants into the profession. They call it progress. Let's now review what is going on amongst some of the Classification Societies as far as remote surveying is concerned.

Here is Lloyd's Register's (LR) current thinking on remote surveying.

The Classification Society has now undertaken hundreds of remote surveys, says LR Chief Surveyor, Iain Wilson, in a bold opening statement, with the "people who understand the technology pushing for it and using it."

At present, a remote survey, which LR defines as a process without physical surveyor attendance, can be used for smaller tasks such as verifying a repair has been undertaken or ensuring minor damage has been rectified.

Wilson explains and accepts that while remote surveys aren't always the answer to everything, they can ensure that there are fewer attendances on a vessel and a reduction in the number of interventions that may be required through the year. This is a huge advantage for owners and operators and has significant benefits for LR's surveyors, he says.

A surveyor's skill is rooted in analysing the collected data. Undertaking an inspection can be time consuming and remote surveying techniques can facilitate a more efficient collection of data while allowing surveyors to focus their energies on the interpretation of the evidence, he explains.

Remote surveys can also spare a surveyor from the rigours of travel, eliminating the scheduling and safety risks from flying, driving, or a boat transfer that may be involved in getting an expert to the right location. Removing these travel uncertainties means that a 30-minute surveying job can be completed much more efficiently for all parties.

According to Wilson, a wide range of surveys can be managed through video and picture evidence using everyday technologies and he believes that the scope of remote surveys will continue to increase as the capabilities of the technologies increase and its cost effectiveness is improved.

A remote survey may be appropriate when:

- The vessel is at sea when damage is sustained
- The vessel is at a port, terminal or location where the services of a surveyor are not available
- The location is remote, and no other surveys are due
- A minor statutory finding relates to the verification of documentation or the replacement of spare parts
- A Condition of Class (COC) relates to the verification of documentation or the replacement of spare parts
- The outstanding documentation can be readily verified using electronic communication

Surveys undertaken remotely are still viewed with caution by some, but experts at LR believe that reticence over new survey methods, which make the most of digital technology, is misplaced. James Forsdyke, LR's Head of Product Management, and Sean van der Post, LR's Global Offshore Business Manager, explain some of the reasons why the interaction between hardware, software and human expertise offers an unbeatable formula.

Restrictions on travel amid the COVID-19 pandemic are forcing unprecedented change on some

of shipping's age-old procedures as access to ships in ports, and oil and gas assets in offshore waters, is barred. Yet ships continue to fulfil a vital role in the global supply chain and energy facilities can't easily be switched off. Both must continue to operate efficiently and safely whether surveys are due or not.

Nick Brown, LR's Marine & Offshore Director, believes that the dramatic uptake of remote services and support is a trend that will inevitably continue, and likely gather pace, long after the virus. His sentiment is borne out by LR's frontline experts - James Forsdyke, Head of Product Management, and Sean van der Post, Global Offshore Business Manager. Both experts agree wholeheartedly with Brown's thinking. They highlight LR's recent focus on remote services, notably its team of Remote Survey Champions located in no fewer than 16 of the world's key shipping and offshore hubs. These experts can be linked digitally to their clients whenever necessary, and LR's systems are 'technologically agnostic', meaning that connectivity can be based on Microsoft Teams, Skype or WhatsApp.

The team are interconnected by digital communications, real-time data transfer, live streaming and all of the other technologies that have been developed recently, but which the virus has now made essential. The remote survey champions are a hub of excellence who support and guide LR's frontline colleagues and clients alike with remote surveys, ensuring consistent practices and safety at all times. Furthermore, Forsdyke believes that LR's remote inspection techniques, combined with digital data transfer and the expertise of top specialists, can provide an equivalent service to physical attendance.

In times past, a traditional survey would involve a surveyor travelling to a location, going onboard a ship, meeting key personnel and then heading to the master's office to check on the validity of certificates and other documents. It's a process that could take a significant proportion of the available time. Then the surveyor would undertake the actual survey. Forsdyke compares this to modern banking applications, where you still need a whole range of valid documents before you can proceed, but now you upload all your documents in advance, for pre-validation, making the process infinitely more efficient. And he asks, 'why can't classification be the same?'

Far from reducing the role of the human being, Forsdyke says that latest techniques enhance it. LR's experts in a particular field are instantly available to pass opinion on a specific issue, live-streamed and on the scene. The client is receiving dramatically more added value from this service, he says, which is faster, more accurate, more incisive and no longer the result of one person's physical attendance, often limited to a few hours.

Van der Post points to one recent development, forced on organisations like LR by COVID-19, which amounts to a sea change. Previously, he says, no new procedure could be undertaken without detailed preparations, risk assessments and meticulous rules, written and prepared in advance. Safe working practices are, of course, essential, he says, but now the approach is "why can't we do this remotely?" rather than "we must send someone as soon as possible".

Both recognise the continued hesitance in the industry; as industry stakeholders collectively gain more experience of using remote techniques and demonstrate the capability, Forsdyke and Van der Post believe there will be continued acceleration of adoption and LR is poised to lead that sea change.

Moving on to RINA. Their website says that nowadays, one of the biggest economic challenges in every market is to avoid expensive travel when it is not necessary. For some identified occasional surveys, RINA now provides a digital service for crediting such inspections remotely ensuring an equivalent reliability without the burden of time, money and resources. That sounds hugely compelling. So what types of remote surveys will RINA offer their clients?

The RINA web site is revealing. Currently, it says, the following surveys can be managed with remote survey techniques:

- Three months tail shaft survey extension
- Continuous Machinery Survey items
- Documentary verification
- Management of minor deficiencies
- Bottom inspection with ship afloat
- Radio Survey
- Survey for change of name
- Lay-up surveys
- Survey for change of load line
- ISM SMC-DOC audits
- ISPS ISSC audits

As further proof of acceptance, The Liberian International Ship & Corporate Registry has approved the use of RINA's remote technology for inspections of Liberian-flagged vessels. It is anticipated that the decision by the Liberian Registry could shortly be followed by other flag administrations.

"The shipping industry is currently facing an unprecedented challenge and shoulders the responsibility of maintaining the flow of international trade during this crisis," said Alfonso Castillero, COO of The Liberian International Ship & Corporate Registry.

"To ensure operational continuity, it is vital that we remain flexible and adjust our procedures in a way that protects personnel from exposure to the virus, while also increasing efficiency. RINA's remote inspection technology facilitates the normal operation of our fleet by making vessel inspection completely accessible during a time when surveyor travel is near impossible."

The American Bureau of Shipping (ABS), another Classification Society, has expanded and extended its remote survey options and has seen rising demand for these survey services. The company decided to expand its remote survey options for vessel owners and extend its remote survey and

audit services for equipment and materials manufacturers and other key service provider firms.

"As organizations rely more heavily on remote and virtual operations, ABS is making it easier for vessel owners and equipment manufacturers to leverage digital applications by offering even more remote surveys and audit options," Christopher J. Wiernicki, ABS Chairman, President and Chief Executive Officer, said.

ABS has expanded its remote offerings to include drydocking extensions and radio renewals and will offer additional remote services in the near future. Additionally, it has extended its remote survey and audit services to existing equipment manufacturing and external specialist clients enrolled in ABS programs in the United States, South America and Europe. According to ABS, access to remote surveys and audits allows for business continuity, particularly during challenging times that may create scheduling conflicts, personnel or logistical issues such as the current COVID-19 period.

The Indian Register of Shipping (IRClass) has turned to remote surveys to maintain the validity of ships' certificates and to support global trade, while ensuring the wellbeing and safety of staff. All of its office based staff are now working remotely from their homes and the company has also provided specific guidelines to its surveyors to follow precautions and country specific advisories when planning surveys.

IRClass says that due to COVID-19, some ships may experience operational challenges such as non-availability of drydocks, spares, or technicians. In addition, surveys and audits may, in some cases, not be conducted because surveyors are unable to attend the ships due to travel restrictions or quarantine.

IRClass is working closely with its clients and may also consider the postponement of non-critical work, where appropriate. However, where possible and with flag approval, IRClass is increasingly turning to the use of remote surveys and inspections. These are based on self-checks by the master/ chief engineer of the vessel using the IRClass survey checklist and remote assessment of supporting documentation, photographs/ videography by an IRClass surveyor. Facilities for video conferencing including live video streaming for viewing specific sections of the ship or equipment for cross verification, are also proving to be invaluable tools for IRClass' surveyors.

The International Register of Shipping states that for remote surveys and inspections, the surveyors do not have to be physically present on board a vessel. As a result, they say, a remote survey can be conducted anywhere in the world without the surveyor's physical presence. This also enhances survey flexibility and the efficiency of survey. Going on, they say a survey without attendance has benefits for both their customers and surveyors; however, safety must always be and remains their ultimate consideration and target. However, remote surveys will be permitted only for ships maintaining class with INTLREG.

The following surveys, which may be permitted using remote surveys techniques by the International Register of Shipping (INTLREG), are shown below. Such surveys could be subject to prior approval from the flag administration:

- Classification Surveys (annual)
- Condition of Class Surveys
- Minor damage and repair surveys for hull and machinery.
- Extension of Surveys (Class conditions, Propeller shaft, Boiler etc.)
- Continuous Surveys Machinery (CSM)
- Change of Owner, Change of vessel name / flag.
- A case by case approval

Suresh Sinha, Managing Director of IRClass said, "Our remote survey system is working very well indeed and is a practical and innovative way for our surveyors to carry out the emergency safety assessment of a ship around the various restrictions in place. Our surveyors can now deal with surveys, audits and inspections from the safety of their own homes subject to flag approval."

"I can see remote inspections continuing to revolutionise classification services long after the COVID-19 outbreak using digital technology and real time, risk based, data driven decision making process - in not too distant a future," he continued.

Bureau Veritas (BV) seems to have really caught the remote surveying bug and is running with it fast. In early February BV performed an engine test conducted jointly between Paris and a facility in China with multiple stakeholders witnessing the test process. A BV machinery expert located in Paris, the BV network office in Germany and an equipment maker in Europe were able to witness testing in a facility in China where BV surveyors were present.

Laurent Leblanc, Senior Vice President, Technical & Operations, BV, says, "This capability is really just starting to make an impact for our clients and stakeholders but we are well advanced in developing the necessary evolution to our rules, our procedures and connecting the remote survey technology with our digital platforms and tools."

"Remote service delivery will become a part of everyday life for us. The capability does not replace our surveyors but allows speed of access and connectivity between teams and stakeholders to enable decisions to be made quickly and with confidence."

Bureau Veritas Marine & Offshore has opened its first remote survey centre, located in the major maritime hub of Rotterdam. The centre is focused on supporting remote service delivery capability and is part of BV's North European Zone head office and BV's Zone Marine Operations Centre.

Laurent Leblanc again says, "This is a new and important milestone in the Bureau Veritas global strategy of Digital Classification using digital technologies to transform the operating model of classification for the benefits of its clients."

BV has conducted a full program of tests and proof of concepts confirming that the relevant technologies are now mature enough to enable remote surveys. Technologies used include optimised live-streaming solutions; connected devices (smart phones, tablets, Go-Pro cameras, smart glasses, augmented reality); and connectivity on board – with improvements from 4G networks and 5G yet to be realised.

Significant benefits to clients include speed of response and no travel or waiting time; optimisation in the decision-making process thanks to live-streaming solutions; continuous improvement in the quality of service; and cost control through overall reductions in travel time and arrangements.

Herman Spilker, vice president of the North Europe Zone for BV, commented: "The remote service delivery is led by a team of experienced surveyors and follows eight years of development experience. In 2012 we started developing the procedures allowing administrative verifications to be conducted remotely, Bureau Veritas is now able to offer a comprehensive range of survey items which can be performed remotely. The applicable survey items include classification surveys and specific statutory items which can be agreed by flag administrations."

DNV GL reports it has seen a surge in remote surveys as vessel owners leverage the greater flexibility and efficiency they provide and the impact of the global COVID-19 crisis has reinforced the value of remote survey services. Remote surveys are not new for DNV GL with some 15,000 surveys and inspections undertaken since the launch in October 2018.

DNV GL stresses the importance to their customers to continue to operate and deliver without disruptions to class services, and at the same time without compromising the safety of crews and surveyors. Remote surveys have provided the flexibility customers need, with global round the clock coverage, and improved efficiency through reduced travel times and increased availability.

"In these challenging times we are seeing the benefits of the full scope of digitalization initiatives that we have been building up over the past few years," says Knut Ørbeck-Nilssen, CEO, DNV GL – Maritime. "The use of remote surveys has meant that we have been able to limit disruption to customer operations resulting from travel bans or quarantines involving our surveyors. Ship operators are able to receive immediately updated and verified electronic certificates, which make their business dealing with class, authorities and vendors much more efficient. This has all been backed by expert teams in the regions and through our DATE hubs, which cover technical and survey requests around the globe 24/7 and have solved 500,000 cases since the launch of the service five years ago."

Remote surveys were first rolled out by DNV GL in October of 2018 and have been gaining in popularity ever since. In 2019, for some survey types, up to 25% of all surveys were conducted remotely, with more than one third of customers having utilised the service at least once.

DNV GL says that with its new remote approach to machinery planned maintenance, Machinery Maintenance Connect (MMC), instead of requiring surveyors to travel to each individual vessel and go onboard, machinery data can be processed via algorithms and presented to customers on a digital dashboard. This enables the survey of a complete fleet in one process, while unlocking new insights into vessel and fleet performance.

"Once we have the verified data, to get going with MMC we sit down with management for an initial company audit that also functions as their annual survey," says Rolf Petter Hancke, Surveyor and Principal Engineer at DNV GL. "This reduces the time required significantly, in one case we completed surveys on 49 vessels in roughly four hours, something that would normally take 50 separate onboard surveyor visits. And the data is all right there – easily and directly accessible by management in real time."

So there you have it. Irrefutable evidence it would seem and like it or not, remote surveys are happening and are here to stay. A giant step for the marine surveying profession or fool's gold? Let's discuss and debate!

All you need to know about surveying, and more, in just 24 hours

Marine Surveying International FEST 2020

III

Monday 30th November & Wednesday 2nd December

WHAT SURVEYORS OUGHT TO KNOW ABOUT FASTENINGS

PART II

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

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

Wire Nails

Ordinary steel wire nails are never used in the boat's structure as they rust very quickly but they may be found in the interior joinery work or under the sole through the bearers. Although steel nails are the most commonly used, nails are also made of aluminium, stainless steel, copper, brass, bronze and plastic. Aluminium, copper, brass, bronze, stainless steel and plastic nails are rust proof but bright steel nails will rust so they should not be used where rusting would cause discoloration or staining. The thickness of the materials to be nailed determine the length of the nail required but the amount of stress or weight the materials will bear should also be considered. Nails are typically sold by length in Britain but in America by their so-called penny weight size indicated by the symbol d and, in a throwback to Colonial days, meant the number of pennies they cost per hundred nails. Many head styles are available and each offers advantages for certain applications. The flat head is a general purpose head that is the most popular and the most economical. A flat countersunk head leaves a smooth surface as it levels out with the top of the surface driven into. Nails come in many point types. Each point has certain advantages for certain applications but the diamond point is a general purpose point for wood use. It is the most common, least expensive and is easy to start. Oval nails are oval in section – see Figure 12 and 16. Selection of the correct nail head depends upon the hardness of the wood, the chance of the head working through and the type of work to be done. A finishing nail, for example, must have good holding power yet be inconspicuous. The various common types of nail that the marine surveyor may come across are discussed (in alphabetical order):

1. The Annular or Ring Nail

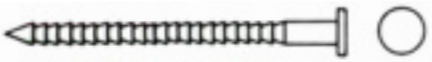


Figure 5 The Annular or Ring Nail

This type of nail which hole is sometimes called a gripfast nail found is found in various forms and in all of them the shank has a unique either annular or screw thread. When the nail is driven, the grooves on the shank turn the wood fibres into small wedges which grip the shank tightly and add to the withdrawal resistance. The teeth of the nail hold it in place firmly and such nails are often used for fixing plywood and similar materials. The annular and spiral threaded nails can be distinguished from a knurled nail by the smooth shank between the head and the beginning of the thread. Annular threaded nails (sometimes called ring shank nails) offer the maximum holding power in a number of specific applications. They are best used with softwoods and plywood but have many other applications. When driven, the threads like those of the gripfast type separate the wood fibres, which then lock into the rings, thus resisting removal. Spiral threaded nails (called screw or drive nails) turn when they are driven, much like wood screws and actually form a thread in the wood fibres. They offer good holding power. Spiral threaded nails are specifically designed for use with hardwoods and dense materials. Ring shank nails, sometimes called deformed shank nails, are nails with ridges or grooves along the shank and are similar to screws in that they have a specially designed head which allows them to be hammered below the timber's surface. They have a much better holding power than nails with a smooth shank because the rings act as wedges to keep the nail firmly in place. The pattern of ridges along the shank of the nail can vary depending on the manufacturer and the intended use of the nail. Some brands have very shallow rings that provide a small amount of extra grip, while others have much larger ridges. Some have spiralling grooves, while others have a neat set of ridged rings. This type of nail is better suited for the harder timbers and areas where more securing strength is required. All of the above nail types need suitably sized pilot holes as they are hard to drive.

2. The Clout Nail and Tack

Figure 6 The Clout Nail

The clout nail is a short usually galvanized round headed wire nail used to fasten fabric to a wooden structure such as felt to a wooden

hull prior to sheathing the hull with copper. The tack may be of steel or copper and is used for light wood work such as the manufacture of the wooden template used for marking off a shell plate. It is sometimes also used to hold the nibbed end of a scarph in wooden boat planking.

3. The Corrugated Fastener

Figure 7 The Corrugated Fastener

This is, strictly, not a nail but will sometimes be found in joints in poor quality joinery working holding the corners of wooden frames firmly together. They are generally of mild steel and rust leaving bad stains.

4. The French or Round Head Wire Nail

Figure 8 The French or Round Headed Wire Nail

This is the nail commonly used for general work. It is unattractive in shape and can split wood when hammered into position. The risk of splitting the wood can be much reduced if the point is blunted by placing the head on a hard surface and striking the point with a hammer before using the nail so that, when driven, the nail tears a guide hole in the wood. The term French is used as the nails were first produced in France. The nail is sometimes used for outside use and is often galvanized to prevent rusting and staining. Its head is countersunk in a similar manner to that of a screw so that it holds well when hammered into timber.

5. The Flat Head Nail

Figure 9 The Flat Headed Nail

The flat head nail is similar to the French wire nail and is also very common and is most likely to be seen on softwoods and thin timber. The flat head makes it easier to hammer the nail in straight and the head has more surface area to give it increased accuracy when hammering.

6. The Hardboard Pin

Figure 10 The Hardboard Pin

This is a diamond shape headed pin rather than a nail and is often hidden when used on certain materials such as hardboard.

7. The Lost Head or Bullet Head Nail

Figure 11 The Lost Head or Bullet Head Nail

The lost head or bullet head nail as it is called in America is one of the most versatile and common types used in outfitting woodwork. It is a general purpose nail that comes in a range of sizes and the head allows it to be punched below the timber's surface to conceal it.

8. The Oval Wire Nail

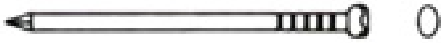


Figure 12 The Oval Wire Nail

This is a long nail and care must be taken when it is hammered into the wood. If the long axis of the oval is aligned with the wood's grain, it is likely to split the wood.

9. The Panel Pin

Figure 13 The Panel Pin

This pin is commonly used in interior joinery when attaching sheets of plywood to a timber frame. It is also used when forming glued joints to hold the pieces together until the glue has set. They should always be treated with suspicion as they rust and break.

10. The Sprig

Figure 14 The Sprig

This nail has no head and is generally only used for securely fixing window glass into wooden frames prior to dressing with putty.

Hot dipped, zinc coated nails have good rust protection. This method is considered the best way to coat nails as they are submerged in hot, molten zinc. Nails can be double dipped for heavier plating. Galvanized nails are coated through a tumbling process. The coating is applied by sprinkling zinc chips on steel nails in a barrel and rotating the barrel in a furnace to melt the zinc and coat the nails. While the nails may look the same as hot dipped, they may not be evenly coated and threads may fill up. Electroplated nails have the coating applied with high voltage electric current. Mechanical plating involves rotating cold nails in a barrel with zinc dust. Glass pellets in the barrel hammer the zinc dust onto the nails. The nails are then immersed in a chromate rinse that gives them a gold or green colour. This process leaves the threads relatively clean but the coating can be thin. Electroplating occurs when nails are immersed in an electrolytic solution that deposits a thick film of zinc on the nails when an electric current is run through the solution. Although the finish is shiny, it is also prone to rust because the thin plating oxidizes away. These nails are best used in interior applications. Aluminium nails have the advantage of being rustproof but must be made thicker than galvanized steel nails to prevent bending. This thicker diameter may cause wood to split but they are suitable for exterior uses. Bright finished nails have a bright, uncoated steel finish for use where corrosion resistance is not required. They are slightly shorter than the same d size common nail.

Pop or Blind Rivets

Although bolting is probably the most common form of fastening in the marine world, the method is somewhat restricted because of the need to screw a nut over a washer on one – usually the hidden – end for the bolt. There are many marine applications where the back to the work cannot be accessed and, in such cases, it is common poractice to use pop rivets. The fastenings are also-called blind rivets and are so-called because there is no necessity to reach the blind or hidden part of the work. The use of pop rivets is fairly common in non-marine or motor industry work and is fairly widely spread in fibre reinforced plastic boats as well. Its chief advantage is that it can be done by one man by inserting the rivet into a pre-drilled hole through both items to be joined and pulling the rivet tight with a special hand tool till the headed wire stem, pin or mandrel snaps or pops. The method is fairly typically found in securing aluminium strip rubbing strakes to the deck edges of frp boats. The use of such fastenings should be confined to areas above the water as the rivets cannot be made watertight.

The use of blind rivets in most applications has proven to be superior and cost effective when compared to other fastening methods. Welding, sheet metal screws, nuts and bolts and solid rivets are all comparitively most labour intensive. The three main reasons for using blind or pop rivets are:

1. The unit cost of pop rivets is much lower than other forms of fastening and up to fifteen rivets a minute can be installed without specialised labour.

2. Pop rivets are available in many different types, sizes and materials to meet the demands of any particular application.

3. The materials to be joined are permanently clamped and, provided that the correct rivet is used, can withstand both severe environmental conditions and vibration.

However, the marine surveyor should be aware that pop rivets have a limited individual strength and should only be used for fastening together light gauge materials and they should also be confined to joining together parts with a combined thickness or grip of not more than 12 mm (½") as, above that thickness, they tend to work and lose their hold.

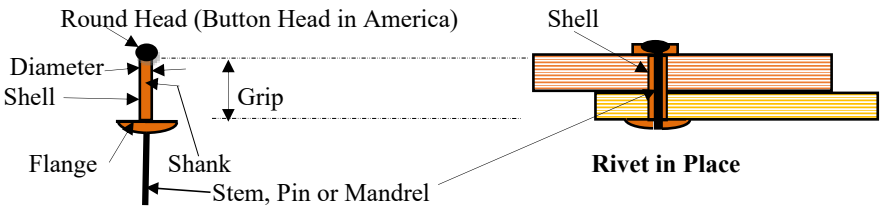


Figure 15 Pop or Blind Rivets

Pop rivets are a two part item consisting of a shell and a headed stem also-called a pin or madrel. They are assembled such that the shell can be pushed into a pre-drilled hole in the items to be joined. The rivet is set by pulling the pin through the shell with a special tool oiperated by hand, pneumatics or electricty causing the latter to deform and so clamping the items to be joined tightly together. After the the pieces are clamped tightly, the excess of the pin snaps off and is discarded. A small length of the pin remains inside the shell to ensure that the clamping forced is retained by the shell.

The force necessary to snap off the pin is governed by the amount of shell deformation required and a groove cut to a specific diameter just below the head. The rivet is designed to prevent too much force being developed so damaging the two pieces of material being fastened bearing in mind that too little force may fail to secure the joint. The rivet develops a clamping force to secure the joint and it is essential that the pin does not break at a load lower than the claping force as, if that occurs, the integrity of the joint may be compromised.

Pop rivets are designed to clamp together specific thicknesses of material and the amount of deformation in the shell when setting depends upon that so-called grip range. If the grip range is less than it should be, the rivet is too long and excessive material will be left on the blind side of the joint and more pulls will be needed to break the pin. If, on the other hand, the grip range is too large, the rivet is too short and insufficient material may be left on the blind side to adequately secure the joint.

Pop rivets are regularly manufactured in different materials which, in a marine environment, makes them particularly vulnerable to galvanic corrosion. Table 4 shows which matals may or should not be used together.

Table 4
Compatible Pop Rivet Materials

	Metal Being Joined					
Shell Material	**Aluminium**	**Al/Zn coated Steel**	**Zinc coated Steel**	**Stainless Steel**	**Copper**	**Brass**
Aluminium	Yes	Yes	?	No	No	No
Steel Z/P	No	Yes	Yes	No	No	No
Nickle Copper	No	No	No	Yes	Yes	Yes
Stainless Steel	?	?	?	Yes	Yes	Yes
Copper	No	No	No	Yes	Yes	Yes

Yes Compatible.
No Incompatible. These metals must not be used with each other.

? Some corrosion may occur in marine environments but can be minimised by the judiscious use of paints or anodising.

The shell may be of stainless steel or an aluminium alloy and the pin or mandrel is made from a copper alloy wire. The flanges come in two sizes, the smaller size is satisfactory for metal but for wood or frp the larger diameter flange is necessary to spread the load.

Cut Nails

Occasionally the marine surveyor will come across so-called cut nails. These are stamped out of 2 mm or 3 mm thick mild steel plate and are sometimes used in securing deck planking as hidden fastenings. They rust badly, disintegrate and are not at all suitable for the marine environment. Cut nails are sometimes used in conversions and new construction to fasten down interior cabin sole boards but are, nevertheless, rare in boat building and should be avoided.

Designation of Fastenings

Boat nails and spikes are designated by their length and dumps and coach screws by their length and diameter. Coach bolts are designated by their length and diameter. Wire and cut nails are usually designated by their length in the United Kingdom but, in a practice dating back to Colonial times, in the United States they are as noted above rather curiously designated by the number of pennies by which they used to be purchased. In the days when the author was serving his time all bolts had Whitworth threads but these days they are more likely to have metric threads.

Fastening Withdrawal Resistance

One point that has to be considered is the security of the fastening i.e., its withdrawal resistance. Wire nails driven into green oak or hemlock are almost impossible to pull once the timber has seasoned and dried whereas the same nails driven into woods with low tannin content become progressively easier to pull as the wood dries. Corrosion of the metal of the nail can temporarily improve the resistance to withdrawal but it is often accompanied by hydrolysis of the wood (nail sickness) which negates any increase in withdrawal resistance due to that cause. The primary factors that control the resistance of a nail to withdrawal are the density or hardness of the wood, the nail diameter and depth of penetration. Other factors which have a lesser effect are the nail point shape, type of shank (smooth or ring shank), the presence and type of surface coatings and the length of time the nail has remained in the timber. Nails driven into end grain have a considerably lower resistance to withdrawal than those driven across the grain. Differences also exist depending upon whether the timber is plain or quarter (rift) sawn. Some timbers, particularly cedar, split more easily radially than tangentially and cedar used for planking is probably best quarter sawn to prevent the ends of the plank splitting when fastening off. Pine, larch and oak on the other hand, from the author's experience are best plain sawn for the same reason. The resistance of the nail can be improved by using coatings. Cement, for example, does increase resistance in soft woods but not hard wood as the coating is usually lost in driving the nail. The use of Chinese or Swedish galvanizing also improves resistance to withdrawal.

Zinc galvanizing, if smooth,can improve the resistance but if rough, as is more common, can have the opposite effect. A nail with a sharp tapering point can penetrate the wood more easily and does less damage. It results in a more strongly bound nail but, because they tend to have a wedge effect, such nails tend to make the wood split.

The holding power of a nail is determined by its length, diameter and the shape of the shank whether round, grooved, square or threaded. Smooth shank nails give the least holding power. The common smooth shank nail as used in general carpentry and wood framing is often, in Britain, called a French wire nail. Threaded nails are used in wood construction because of their superior performance but relatively few tests have been conducted on nails larger than three inches (12d.). Experience has suggested that threaded nail withdrawal design values are too conservative although the average withdrawal strength of threaded nails has proven to be greater than that of smooth shank nails of the same diameter. In comparison of experimental withdrawal strength to existing design procedures for assigning allowable withdrawal strength design values, annular shank nails show the greatest difference. Threaded nails - annular, spiral and knurled - provide the best holding power and performance. Barbed nails which have horizontal or herringbone indentations in the shank hold better than smooth nails but far less than threaded nails of equal size. Nails with twisted or fluted shanks equal or exceed the barbed nail in holding power but provide less hold than nails with rolled on threads.

SURVEYING TIP:
When driving French wire nails, it is good practice to turn the nail head down onto a hard surface and to slightly blunt the point with a hammer. That enables the nail to be more easily driven and also increases its holding power. It also reduces the possibility of the wood splitting.

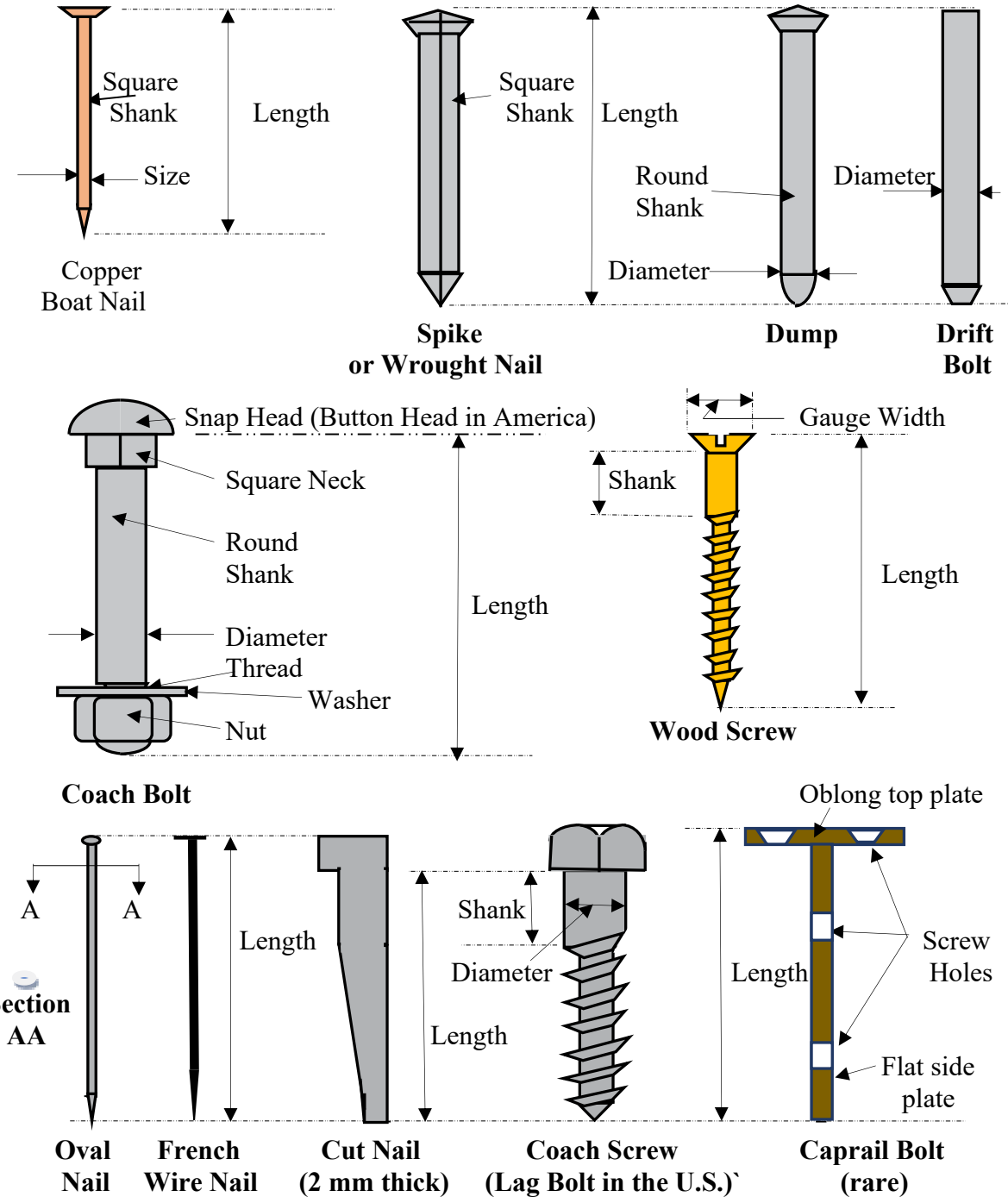


Figure 16 Typical Fastenings

Blunt ended cut nails are easily driven but damage the wood leaving them easy to withdraw. Using guide holes prior to driving the nail also reduces the possibility of splitting. Lengths of unclenched round or square bar iron used for fastenings are called drifts. Coach bolts were used in wooden structures but for bolting steel parts together hexagon headed bolts which do not have the square neck were used. Deck bolts for securing wooden decking to steel beams or plating were similar to coach bolts but with a flat head. They are usually galvanized. The grain in the dowell over the bolt head should align with the grain of the wood being secured. It is a sign of good shipwrightry.

Hidden (or Blind) Fastenings

Good quality decks are often laid with hidden fastenings, i.e., the decks show no sign of the fastenings, which are put in through the sides and bottoms of the individual planks. The side spikes driven through horizontally are usually driven into pre-bored holes to prevent the timber splitting horizontally. See Figure 17 below. The process is called side spiking. The nails driven through the side of the deck plank into the beam underneath are called tosh nails or, in America, toe nails and the process of driving them is called toshing or, in America, toe nailing. House carpenters call the process

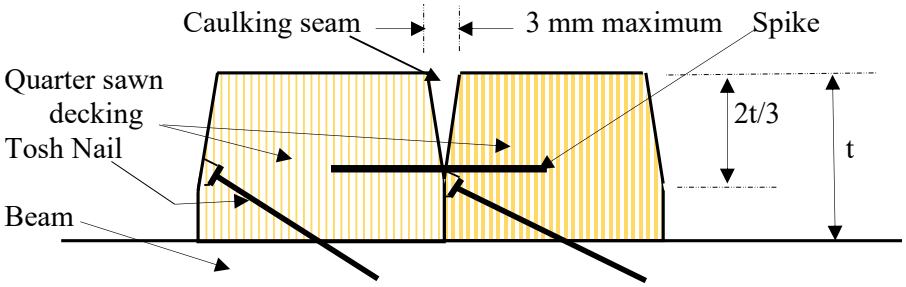


Figure 17 Hidden (or Blind) Fastenings

skew nailing. When two such nails are driven at an angle to each other the process is referred to as dovetailing or tusk nailing.

Washers

All nuts have to be bedded down on washers so that, when tightening the nut, the wood or other material underneath is not torn to pieces. Sometimes, in order to spread the load, washers are also fitted under the heads of keel, bilge keel, stem and sternpost bolts as well as under the nuts. Washers, which have to be fitted the correct way, are of two main types:

- plain or ordinary washers.
- plate washers.

Engineering bolts or studs would have machined washers but these are unlikely to be found in wooden boat construction. Plain washers are the standard washers purchased from any ironmongery shop and are usually of about 2 to 2½ times the diameter of the bolt for which they are to be used in diameter. They are punched out of mild steel sheet about 1½ mm to 2 mm thick. Plate washers are sheared out of 6 mm (¼") thick mild steel plate and are of about 75 mm to 90 mm (3" to 3½") square area. Whether they are punched out plain washers or sheared out plate washers they have a smooth (slightly rounded) edge and a sharp edge and should always be laid with the sharp edge faying to the timber. This is a small point often ignored by the amateur builder or repairer and is often the give away to poor construction. The diameter of the hole through the washer is usually the diameter of the bolt plus 1 mm. Where they are required to be watertight, washers are fitted underneath with a boat cotton or oakum grommet. Plate washers are also fitted with a layer of felt. Both grommet and felt should be well luted with a suitable material which, in the author's youth, was white lead but, these days, may be a resin, epoxy paint or something like Sykaflex. Nuts requiring extra security because of their purpose may be fitted with a split pin but that is rare in boat construction. Usually such bolts are fitted with a lock nut i.e., a second nut on the same bolt or a nylock nut. The lock nut is usually about three quarters of the thickness of the main nut and should be fitted first with the main nut on the outside.

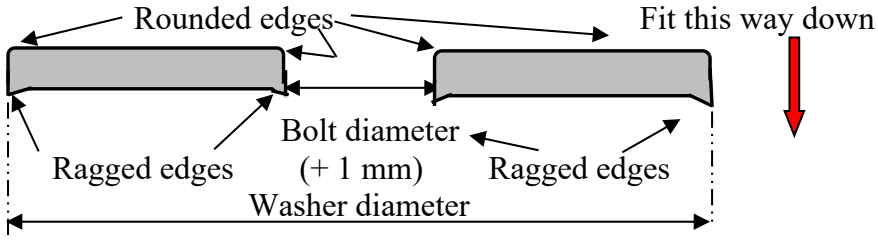


Figure 18 Section through a Ring Washer (Exaggerated)

Treenails[2]

To overcome the difficulties of iron spikes or clenched copper nails, boats, particularly those built in Scandinavia, are often fastened by a very ancient form of fastening called treenails (pronounced along the London River as *trennels* or *trunnels*). They are most commonly used to hold the planking of wooden boats on to the main framing or timbers. Treenails, as the name implies, are nails turned out of wood. They may be of oak, ash, locust or other tropical hard woods of durable quality. Where beech is used it must be confined to the bottom not higher than the floor (wrung) heads. The treenails must be straight and of regular octagonal or round form, being either machine cut, compressed or planed, not grain cut or knotty and must be free from sap. The marine surveyor should note that treenails should be of good quality and of a description equal to the best material through which they are driven. They must be tightly driven and in all cases the treenails should be efficiently caulked or wedged on the outside. Not less than two thirds of the treenails should be driven through the inside planking, clamps or other structural items. The lay and spacing of the treenails depends upon the width of the plank being secured and whether or not the frames behind are sistered. They can be of plain, wedged or wedged and fox wedged types. The simple types are called plain treenails and have no wedges in either the head or the toe. Plain treenails are, however, incapable of closing a joint and the marine surveyor should bear that fact in mind when surveying repaired boats with that form of fastening. In all cases planks above eleven inches in width must be double fastened and those betwen eight and eleven inches in width must

[2] A treenail mooter was the specialist artisan often a retired shipwright employed to produce the different treenails at the shipbuilding site and to smooth them and make them the proper size Mooting was the name given to the process of making a treenail exactly cylindrical or octagonal to the given diameter or size called the moot using a tool similar to a pencil sharpener and called a mooting plane. The word moot was also used as a noun to describe the treenail's diameter. Hence, when so made, it was said to be mooted. In Chatham dockyard in 1698 there were two treenail mooters to 2,593 shipwrights. It was all done by hand and must have been an extremely boring even though a highly skilled job. These days treenails are turned by lathe. The etymology of the verb *to moot* is unknown. Trennels were often called pags and the task of fitting and driving them, pegging off.

be treenailed alternately double and single unless bolts are used through intervening frame timbers and, if less than eight inches width, then the planks should be singly treenailed. On planks over 100 mm (4") wide, the treenails are laid with the outer edge of the drilled hole three quarters of one diameter in from the two edges of the plank. On planks under 100 mm (4") width the treenails are fitted alternately either side of the centreline of the plank with the distance between the outer edge of the treenail hole to the edge of the timber being not less than three quarters of one treenail diameter. The heads of the treenails should sink about two mm (⅛") below the surface on varnished work to enable therm to take a resin skim.

The diameter of the treenail should not exceed one third of the thickness of the plank being secured and, as a rough guide to sizes, planking 32 mm (1¼") thick laid on heavy grown frames need treenails about 16 mm (⅝") diameter or moot while 50 mm (2") thick planking requires treenails of 22 mm (⅞") diameter. To take such treenails the hole is drilled right through the plank and the timber and the length of the treenail should be such that the point lies slightly shy of protruding out of the inner side of the frame timber. A treenail so driven that the point or inside end is flush with the inside of the frame timber was said to be wood on wood or peg and peg. Wedged or keyed treenails are fitted on the outside with a wedge or a crossed pair of wedges. Once driven the head (outer end) of the treenail is split and a hardwood wedge driven into the split with the long edge of the wedge lying transverse to the grain of the planking. Where extra security is required and to improve their holding quality, the points of the treenails are sometimes fitted also with fox wedges on the inside in which they are said to be foxed or fox tailed. This latter requires the holes drilled in the planking/timbers to take the treenail to be blind i.e., not drilled all the way through. If done correctly this is a very efficient means of fastening a wooden joint. The hole is drilled through the plank but only about two thirds to three quarters of the way through the frame timber

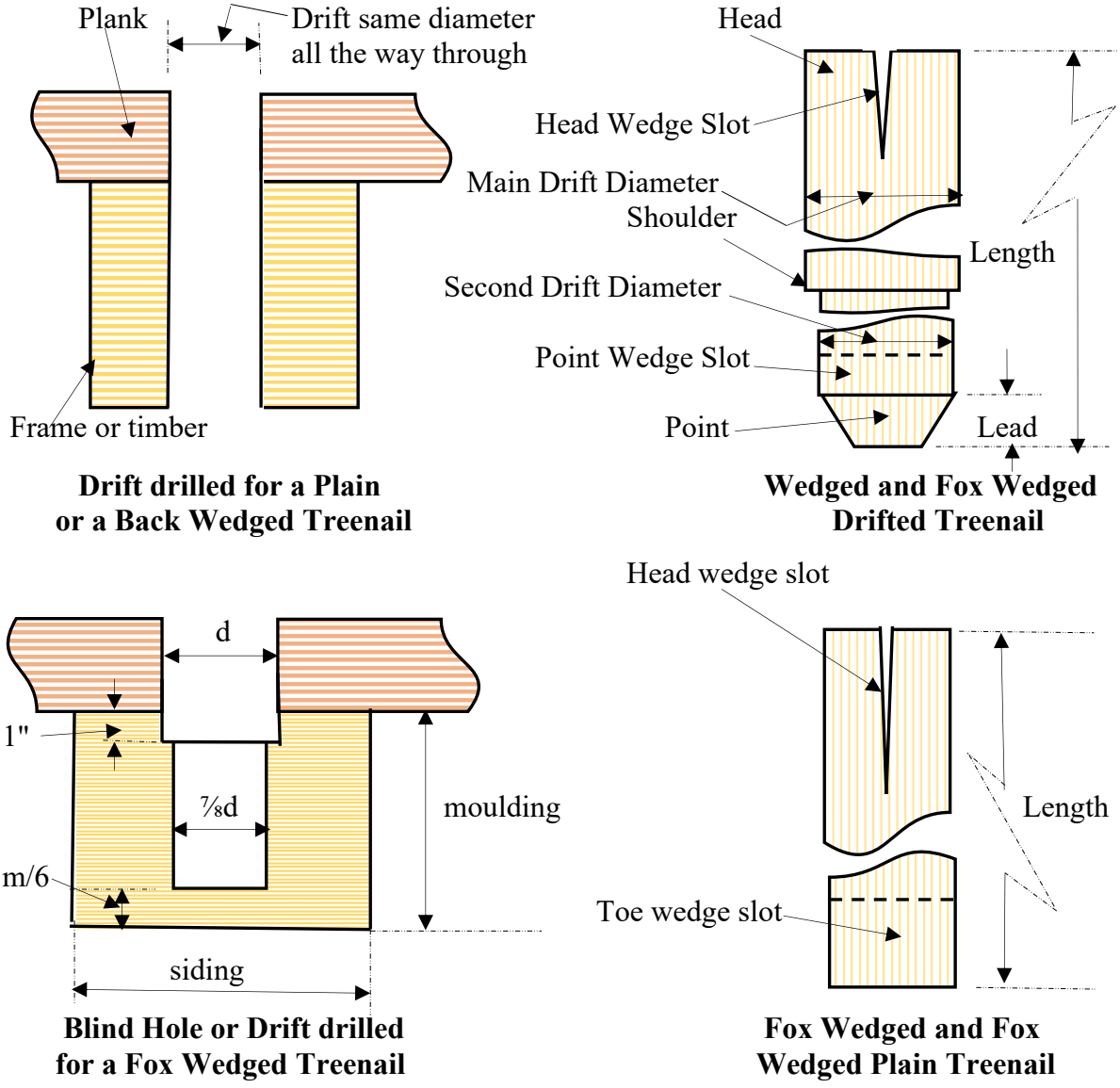


Figure 19 Details of Treenails

producing a blind hole. Before the treenail is inserted into the hole the point end is split and a hard wood wedge inserted. The so-called fox wedge should lie transversely to the grain of the frame timber. The treenail is then driven home and the head wedges fitted as for ordinary wedged treenails. The head and point wedge slots are laid at right angles to each other. If driven correctly, this method of fastening is very strong indeed and, once fitted, a wedged treenail is virtually impossible to remove. If such a treenail is properly driven, it will draw the plank close up to the timbers. If when driving a treenail, the wood through which it is driven splits along the grain because the treenail is too tight, the wood is said to be rent. Such rents or rendings are very difficult to caulk or chinse especially so in softwood planking. Where the timbers are laid in pairs i.e., sistered, the treenails are fitted at each frame with one treenail fitted into each sister. The length of the treenail that actually grips the wood through which it is driven is called its drift. Long treenails could be best driven with two drifts instead of one - the hole being bored with two augers of different sizes, instead of one. To improve the grip of the plank the treenails are often dovetailed i.e., with the point of the treenails leading alternately forward and aft[3].

SURVEYING TIPS:
The marine surveyor is recommended to look carefully at the treenails to see that they are not driven from both inside and out in the same holes, that they do not check the plank and are properly wedged on both ends.

The author does not recommend round treenails - the best form for every purpose being eight square - whether hand or machine made.

Table 5
Details of Treenails

Thickness of Plank mm	12	25	30	50	60	75
Diameter of Drift mm	10	12	12	20	22	25
Width across Flats Eight Squared Treenail mm	6	7	7	8	9	10

Once the shipwright has started to drive the treenail he must not stop for, if he does, he will not be able to start it moving again and they are the Devil's own job to bore out. A treenail cracked, bent or nipped between the plank and the frame due to bad driving was said to be necked and must - often with some difficulty - be drilled out and replaced. The treenail should be about ¾ mm (1/32") greater in diameter than the drilled hole. To ease entry and the driving of the treenail the toe is slightly chamfered and the treenail dipped in linseed oil. The treenails should be made from well open air seasoned wood and should be made and driven with accuracy and care. They should be properly rounded and of equal diameter from the point to within a quarter of their length from the head where they should begin to swell a little. When treenailing off (or pegging off as it was sometimes called) the bottom and topsides, it was the general custom to double bore each timber on the breadth of a strake if it exceeded 10 inches and to double and single bore all narrow strakes; that is, to double bore one timber and single bore the next alternately. One thing which should be particularly attended to by marine surveyor at this time, is to see that all the augers for any particular part of the vessel are exactly of the same size. For if that is not the case, it will be almost impossible, without a great deal of trouble, for even an expert workman to drive the treenails. The marine surveyor should be aware that treenailing off was often frequently performed by the less skilled workmen. On Scandinavian built vessels the treenails are not cross cut with slots but drilled with a small diameter hole down the centre which is then wedged open with a spike or peg of shaped hardwood – usually a different timber to that from which the treenail itself is fashioned. They are said to be pegged or spiked rather than wedged. After fitting, a short time is allowed to settle the timber and then the ends of the treenails extending outside the surface of the hull are dubbed off leaving a smooth surface. When pegging treenails or driving spikes the marine surveyor should be aware of the following points:

- **the form of the point of the common spike is such that it inclines not to follow the hole.**
- **spikes driven close to the holes, but not into them, will have their withdrawal resistance lowered.**
- **if the holes are not too large and the spikes follow the holes closely, the resistance to withdrawal usually will be increased.**
- **if the pegs or spikes do not follow the holes, the resistance to withdrawal may be greatly reduced.**
- **the driven end of the treenail is usually slightly reduced in diameter to form a lead.**

[3]. It is fancied by some that one of the factors that resulted in the general superiority of the Royal Navy over the French in Napoleonic times was that the British ships were fastened with treenails which were stronger and lighter and the French ships were fastened with iron spikes resulting in much weakness due to nail sickness. A moot point but see Dr. Sam Wlillis' *Hearts of Oak* trilogy. When the author as a young man was working as a shipwright the gang was given orders to break up two old badly rotted wooden lighters, which had been fastened by fox wedged treenails. They also had hooked wedged scarphs in the keel and other longitudinal timbers. It was found impossible to break the vessels up and, eventually, to get rid of them, they had, with much difficulty, to be burned.

Cyber Security & Ships

Do we understand | Are we preparing | Can we sustain

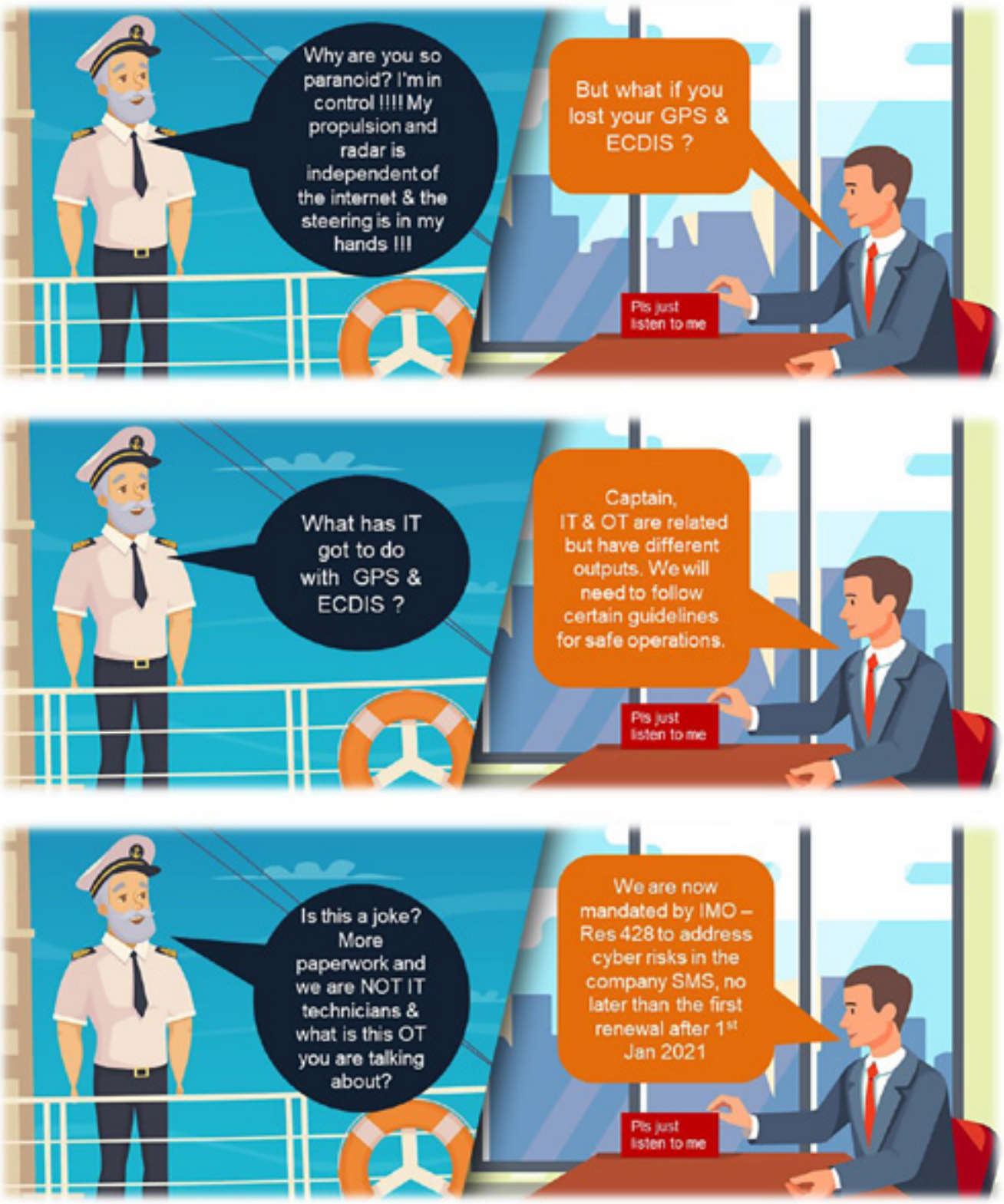
By
Capt Ruchin C Dayal
FIIMS

With widely reported cyber-attacks on networks of mega shipping companies like Maersk and Anglo Eastern, cyber security awareness and the run to compliance is gaining momentum.

The maritime industry has been overtaken by technology, and while we are struggling to come to terms with it, cyber-attacks on maritime infrastructure are gaining critical momentum. In this article, I have tried to identify some of the vulnerabilities existing onboard merchant ships, analyse them and look at the road ahead.

The Challenges

The Mind-Set



Geographical isolation exposes mariners to a set of unique challenges such as navigating through rough waters, onboard multi-tasking, liaising with authorities and even evading pirate attacks. Technology on ships plays a significant role to help maneuvering through these conditions and it enables communication in situations of emergency and distress.

Unfortunately, any type of technology has the potential to be used for malicious purposes. Cyber security awareness and culture is relatively new on the agenda of the maritime community, but it must be taken seriously to avoid catastrophic consequences. Cyber risks can be managed by applying logical and technical controls, unfortunately changing the mindset of an already tired ship crew is often the biggest challenge.

Ship Managing & Budgets

Almost all the merchant navy fleet comprises of a multi-vendor IT, OT and ICS environment; each vendor using hardware and software to accomplish assigned scope, with no bearing on scalability, overall compatibility or the existing and future security. With passage of time, vessels tend to significantly start looking different in networks and cabling to when they were delivered. Seldom are network plans updated, nor is there an inventory of the physical network paraphernalia nor of the software being used onboard. In a few ships where managers have been careful to implement some sort of order for the onboard IT, the control and integrity of maintained data is grossly erroneous and is often devoid of any OT and ICS elements.

Expecting the office IT team to understand the onboard cyber environment is a BAD IDEA. As recommended by BIMCO, it may be essential to have an experienced third party to assess cyber security risks onboard ships.

The Ship Staff

How many readers have been receiving seemingly unrelated mails in their accounts? Mails declaring winners and asking for addresses of bank accounts to make deposits are not uncommon, however, casual social-media behavior is making targeted phishing relatively easy. With the internet available to the crew all the time, fresh challenges have emerged in the already crowded security landscape – personalized mails, often quoting very private information are finding their way into individual mailboxes. Hardworking but poorly informed crew are finding their minds getting overwhelmed by these mails. The combination of hard-work and a disturbed mind can be lethal – for the crew as well as for the safety of the ship. Many companies have adopted a "responsible social media policy", within the existing SMS documentation, which is a great idea, but hard to implement.

Let's start at the beginning!

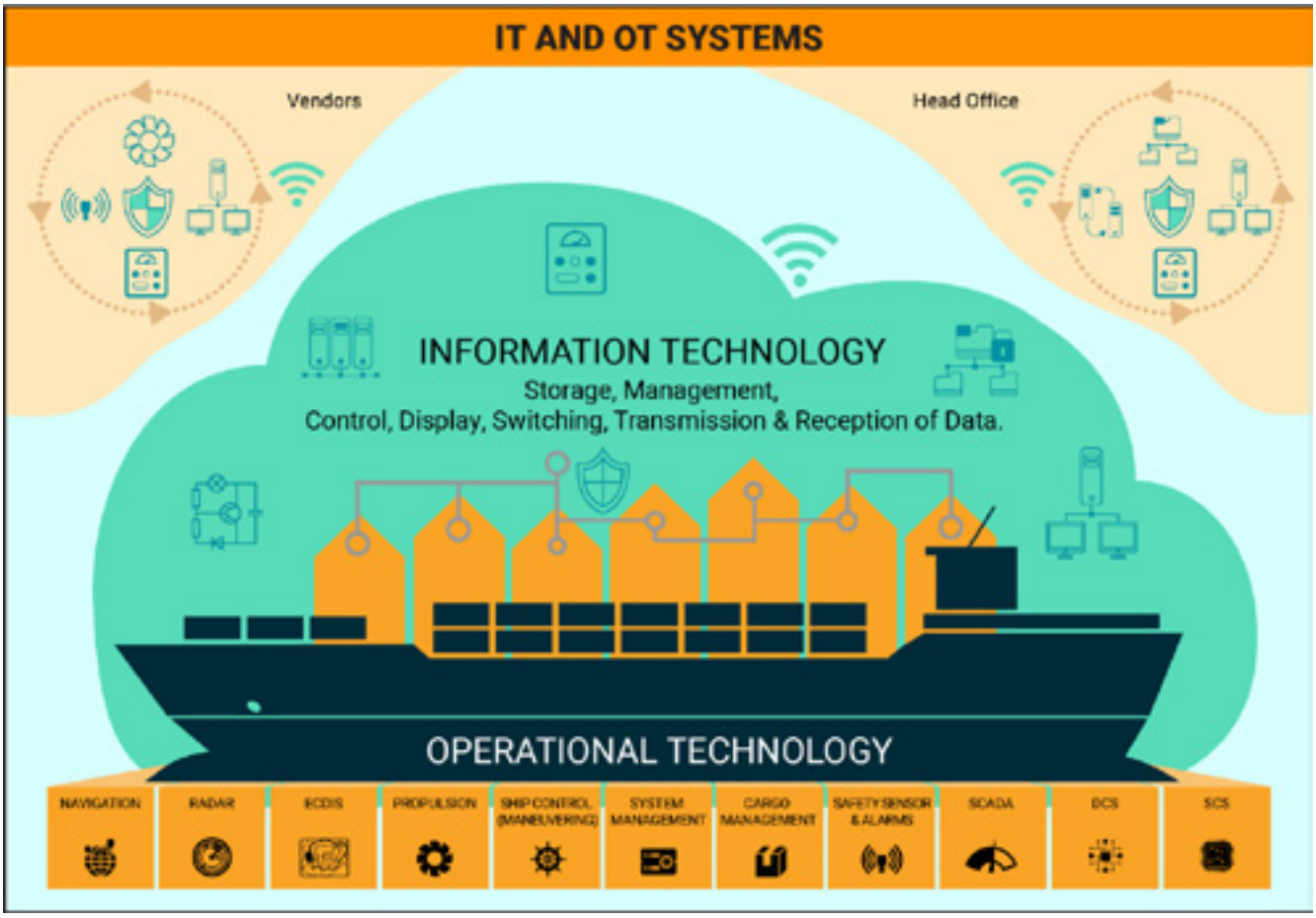
First things first – what is IT and what is OT?

To put it simply – software and hardware, where the output is data, such as communication by way of speech, text (email, records, accounts, etc) can be termed as Information Technology or IT. Onboard examples include onboard computers and accessories, emailing systems, calling systems, accounting systems, etc.

On the other hand, software and hardware, where the output is action (closing of valves, alarms, balancing power loads, etc.) can be termed as Operational Technology or OT. Onboard examples include ECDIS, Power Management, Integrated Automation System of engine (SCADA). Consider an air-conditioner, the thermocouple sensing the temperature of input air will regulate the start and stop of the compressor. Simple PLC (programmable logic controller) operation – code or firmware enabling this action is OT. Or take the example of a washing machine, where a sequence of events is controlled for the cycle selected – stop water, open soap, start rinsing and so on – all controlled by PLC code.

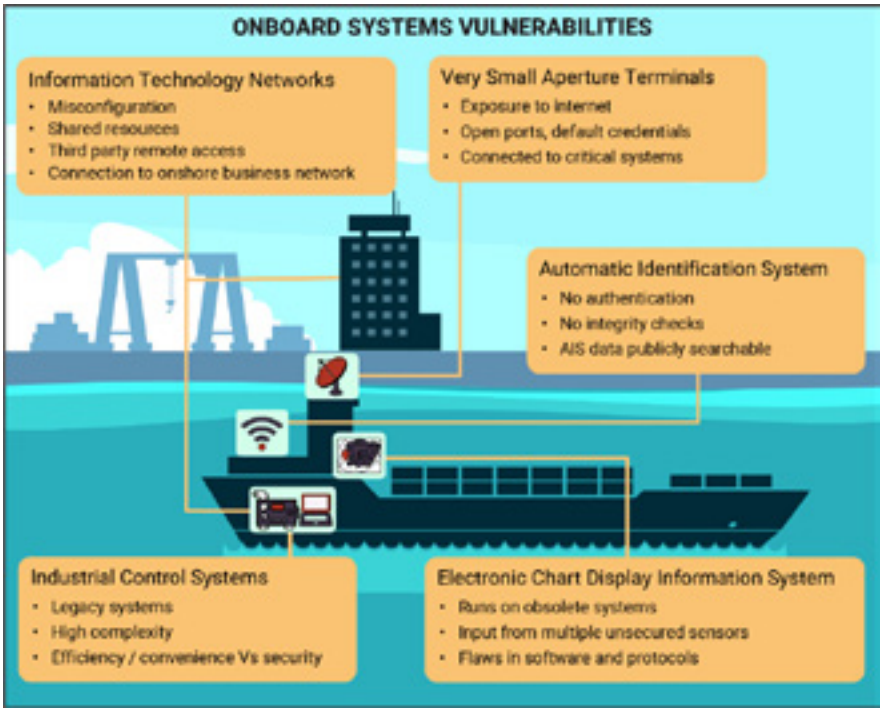
OT systems in the engine room are often referred to as ICS – Industrial Control Systems and are critical to shipboard operations.

While both IT and OT are using code (software), their outputs are different. What do we do when our laptop hangs? Most often than not we restart the machine, with windows autosaving our work, we can retrieve most of the data we are working on, however, OT systems are online and critical to the safety of the vessel. Can we simply restart the ECDIS or the steering gear, especially when in enclosed waters? Of course not, and hence the criticality of ensuring that these systems perform seamlessly each time and every time, ALWAYS.



Let us try and list out some of the common OT systems onboard and understand their vulnerability

Vulnerabilities are inherent weaknesses or flaws in a system that have the potential to be exploited by malicious parties, in the form of a threat.



The Global Positioning System (GPS) or the Global Navigational Satellite System (GNSS)

Many critical systems on board rely on the Global Navigation Satellite System (GNSS) for safe navigation, communication, emergency response, and traffic control. However, disrupting or manipulating GPS signals is fairly simple. INTERTANKO has recognised this risk and published an advisory document in 2019, where there is extensive information on jamming and spoofing of the GPS signals.

It may be noted that Jamming of a GPS signal, where the GPS is unable to show a position is fairly easy to detect but it is difficult to detect a spoofing attack, where the position may only be marginally in error, nonetheless slowly but surely misleading every instrument connected to the set. This kind of an attack used to be a war-time remedy for enemy fleets, however, there is ready technology available for using this in most parts of the world.

Manipulated Global Positioning System (GPS) signals have caused collisions, groundings, and environmental disasters. Hence imperative that while technology has eased up the position fixing environment on the bridge, we understand its limitations and do not replace the good old radar bearing and distance fixes or the parallel indexing techniques.

As a best practice, compare the position on the GPS set itself and that on the ECDIS or Radar – should be done at-least once a watch in open sea conditions and every hour when coasting.

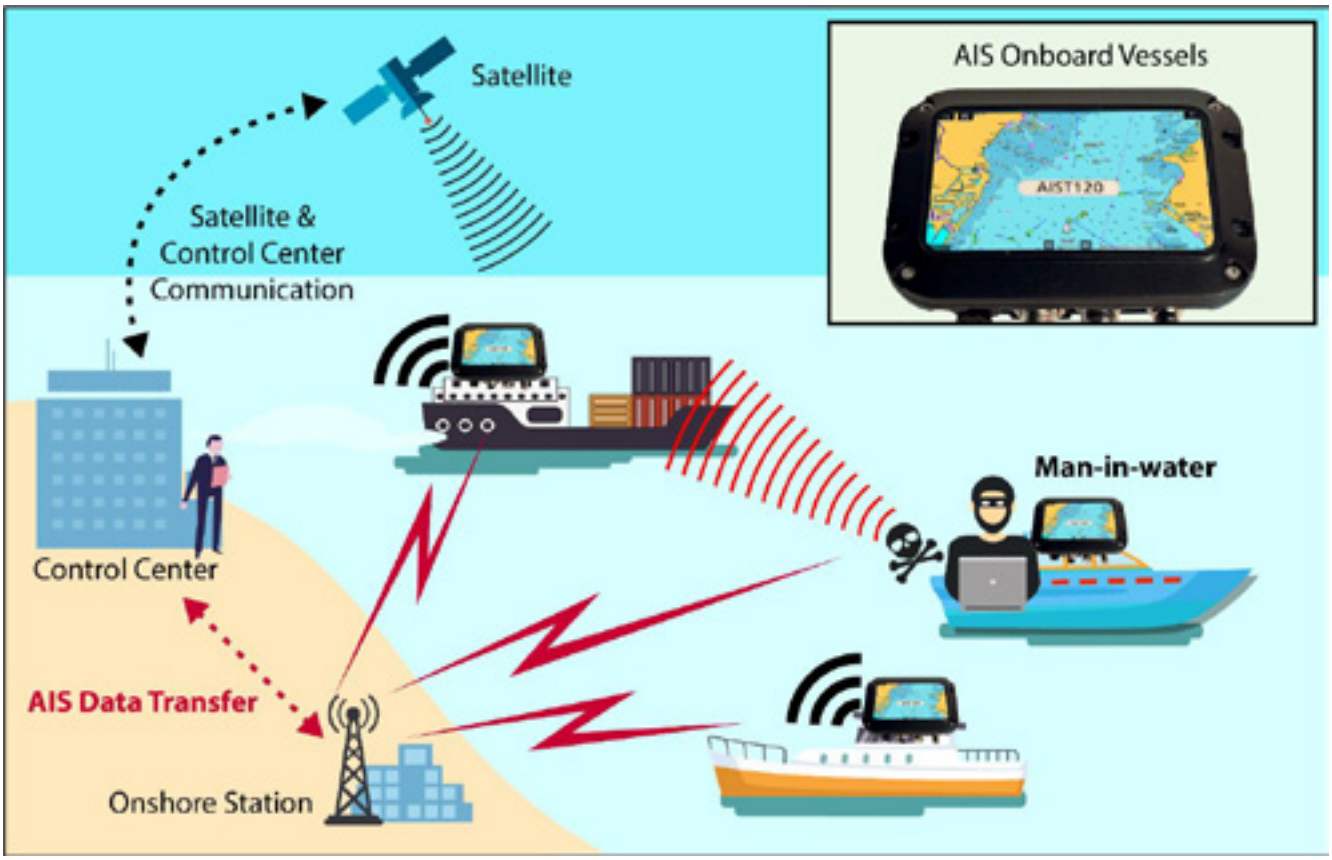
AIS – Automatic Identification System

The Automatic Identification System (AIS) is a ship to ship and shore radiobroadcasting system, using VHF (Very High Frequency). Working on a hand-shake principle, the AIS provides data of experienced traffic and feeds the radar and ECDIS, making the environment more meaningful. As a practice (right or wrong), it is routinely used to establish radio contact with oncoming targets in high traffic density areas. AIS is also used in Vessel Traffic Services (VTS), search and rescue operations (SAR) and accident investigation. Integrity of the transmitted information is critical to situational awareness and collision avoidance at sea.

AIS transponders communicate over the air without any authentication or integrity checks. This vulnerability can be easily exploited by introducing supplementary signals via a Software Defined Radio (SDR) and place fake "man-in-water" beacons, rendering the ship invisible or corrupting the information signals of the system. Making decisions based on potentially incorrect information can have catastrophic results. Furthermore, AIS data is publicly available via websites and apps such as Vessel Finder, Marine Traffic and Equasis; this brings about another set of problems, where the position and route of the ships becomes public knowledge and is ripe for a targeted attacker.

ECDIS – Electronic Chart Display Information System

The Electronic Chart Display Information System (ECDIS) has revolutionised modern day navigation and is mandated by the IMO for all commercial vessels. The challenge with the system is that it uses electronic charts which need to be up to date; while the corrections/ corrected charts can be received over the internet, the exposure this creates can have a debilitating effect on the vessels primary element – Navigation. Most companies are aware of this glaring vulnerability and have established adequate SOP's for handling the process.



However, ships continue to experience ECDIS failures attributed to this vulnerability. Additionally, more often than not, ECDIS software is run on legacy operating systems like Windows XP, which are no longer supported; with sensory feeds coming in from a multitude of other onboard systems such as Radar, Navtex, AIS, etc, each operating within their own OS, a wide surface for a compromise is created.

ICS – Industrial Control Systems

Onboard Industrial Control Systems (ICS) form the basis for automation in modern day shipping. Use of an ICS reduces man-power requirements, hence reduces human errors, increases efficiency and prolongs equipment life. ICS controls and monitors key parameters onboard, including temperature, pressure, level, viscosity, flow control, speed, torque, voltage, current, etc. However, the process of inter-connecting many of these systems, without much concern for any cyber security elements, ends up producing a highly automated albeit vulnerable environment. Furthermore, most of these ICS are based on outdated operating systems like Windows XP and Windows Server 2000. It is surprising that even Industry leaders like Kawasaki Man and ABB, amongst others are still using these legacy systems on ships delivered as recently as 2019.

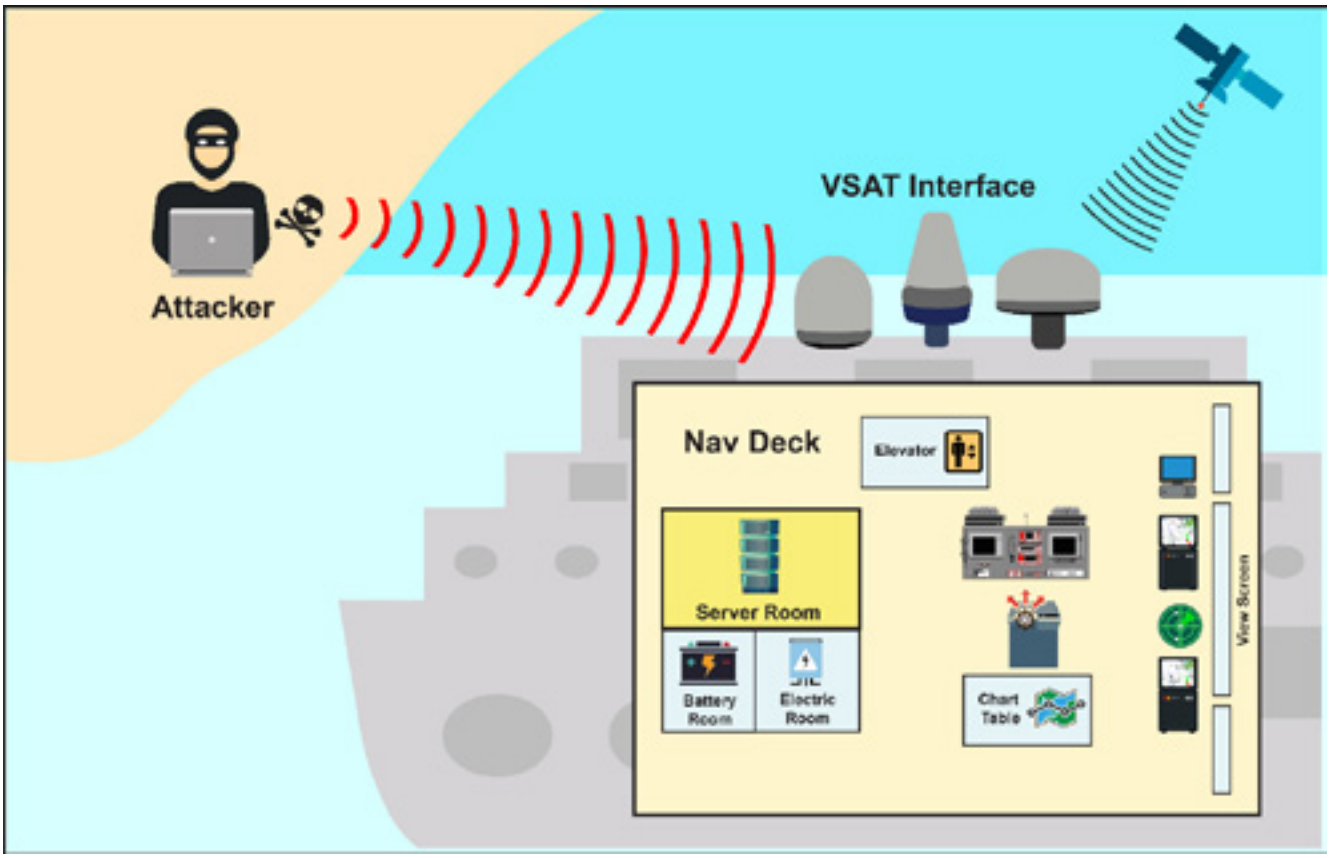
Much of the onboard ICS network is connected to the vessels ethernet network for onward transmission of data to vendors, office, etc. While many of the standard makers have their own firewalls or VPNs as a standard accessory, there are many who have neglected basic security precautions to make way for crisper budgets. More often than not, an array of devices and protocols from different vendors and technological eras are often "bolted together" to produce an integrated automation system. It is crucial for integrators, implementers, and operators of ICS to understand the system's limitations and the vulnerabilities of its components and protocols.

A major concern is that operators and engineers routinely bypass security for convenience and efficiency, which could have a very serious effect on the entire organisation. This behaviour is mostly attributed to the lack of awareness and competence, the commercial pressures (time and money) and unfortunately to plain non-adherence to security policies (unforgivable).

VSAT – Very Small Aperture Terminal

A Very Small Aperture Terminal (VSAT) is a communications station used to send and receive data via a satellite network. VSATs enable a range of communication and safety services including GMDSS, ECDIS, AIS, phone, internet, cargo management, vessel routing, crew welfare, and weather forecast. Most of the VSAT IP's stand exposed to open internet and coupled with default passwords being persisted with, are open to attack. This holds true even for ships delivered in 2020. Hence, while the ships geographic location is available via AIS aggregators, this vulnerability of the VSAT invites hackers to get into VSAT interfaces and make available all the details of the hardware in use.

Furthermore, vendors generally publish default credentials on their websites and many terminals run with unchanged default factory settings, for years, including administrator usernames and passwords. Once an attacker finds an open VSAT interface, they can upload malicious software and compromise the network, enabling access to critical control systems.



Countermeasures

The concept of cyber security is novel to many maritime stake holders, and it is timely to raise awareness about the existing countermeasures. IMO Res 428 mandates that cyber security elements need to be addressed and integrated with the company safety management system no later than the first renewal verification for DOC after 1st Jan 2021. Industry guidelines from BIMCO, complemented by the BIMCO onboard guide and workbook provide perspective to the compliance requirements of Res 428/MSC-FAL.1/Circ. 3.

It is essential for companies to earmark commensurate budgets for engaging professionals to work with the inhouse ship managers as well as with the office IT team.

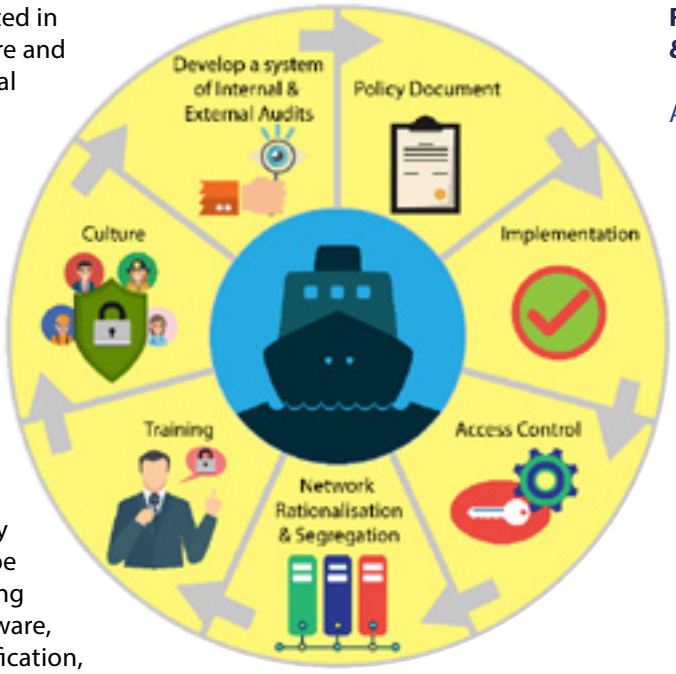
Defence-in-depth

Cyber Security is a long-term management commitment with commensurate budgets. Every organisation must adopt custom made cyber processes which can be integrated with their present-day safety management systems.

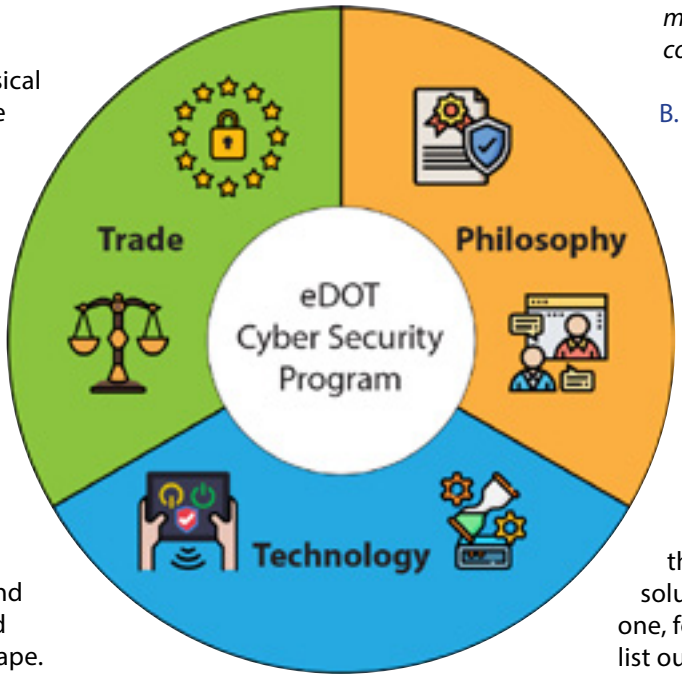
The notion that a cyber Security Solution can be bought off the shelf is a myth, and nor can a single solution work for every organisation.

It is important to understand that securing the maritime cyber environment "in depth" creates an all-encompassing protection mantle and builds resilience to external and internal threats. This layered

approach is depicted in the adjoining figure and includes procedural and technical countermeasures on each layer.



1. ***The Policy Document:*** Defence begins with the organisation's leadership, where strategies are formed, and policies are made. These policy statements must be exhaustive, covering anti-malware software, information classification, OT firmware patching, remote access protocols, application patching amongst a host of others.
2. ***The Implementation:*** Policies must be backed up by the plan for implementation, which will include Role Development, Procedures and records.
3. ***Access Control:*** Physical measures to prevent unauthorised personnel from gaining access into a vessel and to IT and OT onboard elements.
4. ***Network Rationalisation and Segregation:*** Establish the physical layout and condition of the shipboard network – produce logical and physical network plans. Segregate IT and OT networks by establishing an IDMZ. Establish relevant redundancies.
5. ***Training:*** None of the above will work if the Master and crew do not have basic knowledge for correctly using of technology and equipment (IT and OT), understand the existing vulnerabilities and appreciate the threat and risk in the current landscape.
6. ***Culture:*** Imperative that the management stays committed to establishing, implementing and sustaining a cyber hygiene culture. This must be a long-term initiative and the process of change is often sluggish and slow.
7. ***Develop a system of Internal and External Audits:*** A necessity for any system, dynamic analysis of audit data will help in modifying processes, addressing gaps and assist in continually improving the system.



Recommendations & Deliberations

A. The need of the hour is a Cyber Security Program integrating the following:

1. Philosophy

The basis of the framework: IMO Res 428/MSC-FAL Circ. 3, The ISO 27001 standard, NIST, BIMCO/Industry Guidelines, Class guidelines, etc; pragmatically combining elements to culminate in policy making, establishing scope, purpose and objectives, risk assessment and application of controls.

2. Technology

Hands-on knowhow of shipboard and office networks (IT and OT) within relevant context | adequate experience in integrating shipboard processes with technology | Development and deployment of a cyber security management tool.

3. Trade

Integrating the Philosophy and Technology with the nuances of ship operation and management, in a pragmatic, practical and sustainable manner, with the appropriate cost to benefit to risk ratio.

B. Management team for cyber security

Many companies who may have designed and implemented their safety management systems in the past and have a fairly decent sized IT cell, are in the process of establishing a cyber security management system entirely in-house. While this may seem like a logical solution, it really is not the ideal one, for several reasons; let me list out a couple.

1. *Barring a few, IT professionals are, by and large, concerned with hardware and software relating to solving day to day information processing challenges. Writing code for custom software, maintenance of code, setting up remote sharing and meeting systems, sifting thru software products, etc. is usually their forte. They are not seafarers and seldom appreciate the nuances of the day to day ship life. Furthermore, it's just not fair to expect them to understand the working of onboard ICS. From an organisational environment point of view, it is rather difficult to accept vulnerabilities within systems and processes designed by ourselves, isn't it?*

2. *A management system must comprise of policies, roles, procedures and records as a minimum, and has to be auditable for compliance via objective evidences, however, the balance between actual compliance and evidence of compliance must be established in a bold, pragmatic and sustainable manner. With enough on the plate of the ship-staff, adding additional duties and records by way of checklists, forms, entrees, etc, will not go down well with them and the process will falter at the very start. The design of the system should be such that it works for the ship-staff rather than the ship-staff working for the system. The cyber security program must be inculcated in the seafarer's culture. IT professionals cannot be expected to understand this culture, let alone designing something to integrate with it.*

Hence, Establishing, Implementing and sustenance of an efficient and effective cyber security system must be entrusted to an independent dedicated team with commensurate marine and technological professional qualifications. One of the prime requirements of engaging with a professional vendor should be certification under ISO 9001 & 27001.

C. Customised Training of Ship Staff

Develop custom training material, relating to onboard equipment. I strongly recommend a one-day networking training program for deck officers and engineers, which includes practical training – making contact with shore support and following instructions on remote sessions, understanding network designs and basic trouble shooting.

Establish a system of onboard drills and exercises along with digitised training, in line with company's competence management systems.

Conclusion

I would like to conclude with a request to the men in-charge, the decision makers – the Company Chairmen, Presidents, General Managers, Technical Superintendents, DPAs, CySO's, involved in ship management – Please recognise the risk landscape of today, when shipboard connectivity is relatively slow and appreciate the situation in the future when the connection speeds pick up. Ships satellite terminals will become sitting ducks for cybercrime. Furthermore, technology and information overload is an overwhelming experience for the seafarer; a co-mingling of professional roles and social expectations are draining the emotionally fragile sailing men and women. Urgently addressing their training needs and responsible self-regulation of social media behaviour by knowledge empowerment is the need of the day. *Do not adopt a system for complying with statutes, rather develop a culture, wherein statutes are complied with naturally and organically.* Please act today. Act now!!!

About the writer

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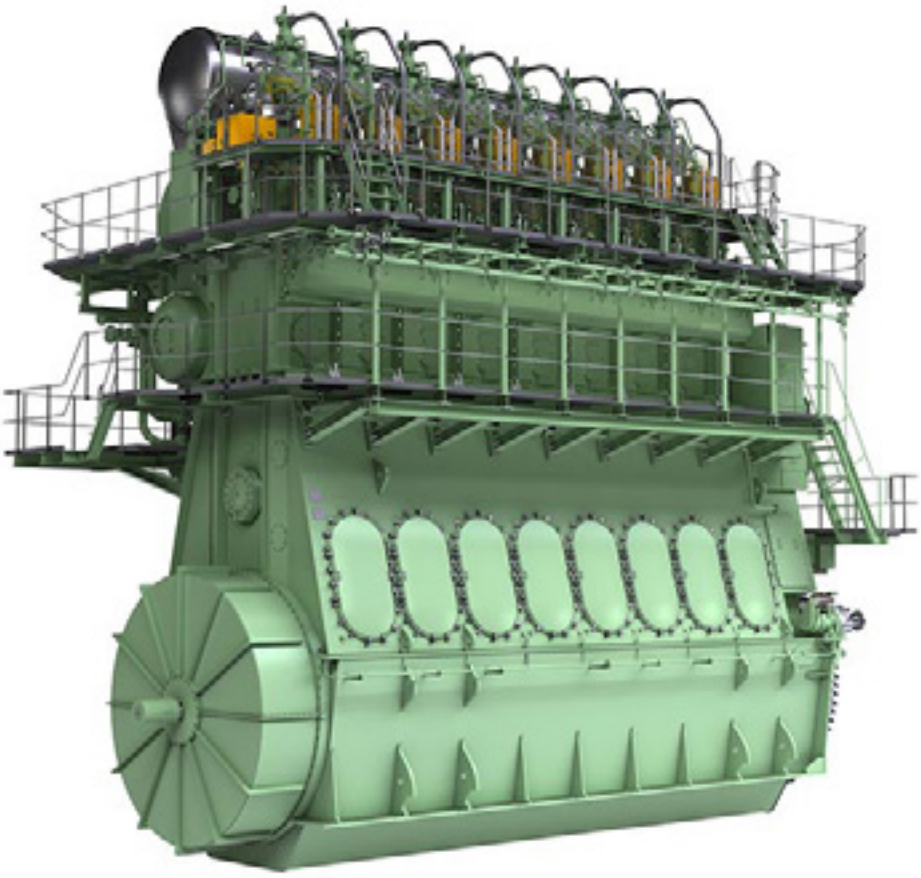
Decarbonizing shipping: the role of internal combustion engines

by **Christos Chryssakis**
Business Development Manager
at DNV GL – Maritime

Internal combustion engines (ICEs) represent the dominant technology in marine propulsion today. If ICEs are to play a role in the decarbonization of shipping, suppliers, regulators, shipowners and engine manufacturers will have to agree on viable alternatives to carbon-based fuel.

With the current focus on alternative marine power sources, it's easy to overlook the overwhelmingly dominant position of the internal combustion engine, or ICE, in marine propulsion. The marine two-stroke ICE is so well proven and so well established that it will continue to have a central place in ship propulsion for decades to come.

If demands for decarbonization in shipping are to be met, the question then becomes one of fuel; which fuels can be green enough, and available soon enough, to satisfy stricter emissions regulations, and how will engine makers adapt to the new norm of fossil-free fuel?



Internal combustion engines can burn nearly any type of fuel but manufacturers must have some certainty where to invest their resources.

Making the ICE transition

"All the big engine makers are looking at alternative solutions, everything from energy sources to engine technology," says Christos Chryssakis, Business Development Manager at DNV GL – Maritime.

Chryssakis believes that internal combustion power will be the dominant force in shipping for the next 20–30 years, due both to the development timelines for alternative power solutions and to the time it will take for those solutions to become a force in the marine market.

"In the meantime, if we manage to find good alternative fuels, ICEs can compete," he says. "The big two-stroke engines are close to efficiency limits, but gains can be made in other energy efficiency technology that will open the way for smaller engines consuming less fuel."

Finding the right ICE fuels

So what is the right combustion fuel for the future? "That is the big question," Chryssakis confirms. "It is still open to discussion, but we are learning a lot about some of the more likely options." While still searching for the right solution, shipping will soon need to achieve critical mass in low-carbon fuels to reach the IMO emissions targets for 2050, he says. These targets stipulate a 50 per cent reduction in greenhouse gas emissions and a 70 per cent reduction in carbon intensity by 2050. "Some of this will be achieved through efficiency measures, but the rest will have to come from alternative fuels."

The role of DNV GL will be to provide fact-based figures on how much fuel is needed and how it will be produced. "We are now updating our energy transition model based on the latest learning and regulations," says Chryssakis.

While markets and regulations will dictate price, another key issue is how fuels are produced. "Alternative fuels have to be produced with renewable energy and in a sustainable manner or they will ultimately not help to reduce the overall carbon footprint," Chryssakis points out.

The emergence of ammonia as fuel

Already a familiar industrial commodity, ammonia is one fuel alternative steadily attracting more interest in the industry. "Ammonia is a good way of storing hydrogen, but it has different handling requirements than natural gas," Chryssakis says. Ammonia takes up less space than hydrogen, but it is both toxic and corrosive. Existing class rules for ammonia as a cargo and as a refrigerant are a good starting point for developing rules for ammonia as a fuel, he says, but emissions still represent a challenge. "The technology required to burn ammonia in an internal combustion engine is still being refined."

Emissions from combusted ammonia may contain a high amount of nitrous oxide (N_2O), a powerful greenhouse gas, even small amounts of which present a risk to the environment. "We might

be able to clean this exhaust, but the technology is not proven." Small amounts of unspent ammonia may also be emitted, Chryssakis says. "Anything over 30 ppm locally can be dangerous, and as little as 5 ppm can be smelled."

Chryssakis mentions the option of ammonia tankers burning their cargo as fuel, much the same as modern LNG tankers do. But this technology will first gather momentum in newbuilds, he maintains, while regulations and contracts favouring sustainable power will drive retrofits. The cost of producing ammonia will also influence decisions.

A host of green ICE alternatives

Burning hydrogen in combustion engines is another option, says Chryssakis. And though hydrogen contains no carbon atoms, and thus emits no CO_2 when consumed, it is often produced using natural gas. Hydrogen can be used to partly replace LNG in combustion engines, thereby reducing their carbon footprint.

Biofuels have long been considered an alternative to petroleum-based fuel, but producing them at scale remains an issue. "Large-scale production, including facilities, has not performed well enough to justify realization, either economically or technically," says Chryssakis. "For example, if it takes 50 years for a forest to mature, and only two per cent can be harvested annually if we are to ensure regeneration, that would limit access to sustainable feedstock."

Synthetic fuels can use the same infrastructure and engines as petroleum fuels, but they will need to be produced from renewable energy in order to qualify as green. "The issues right now are scaling up production, and identifying suitable energy sources," Chryssakis says. "For example, it has been estimated that we would need 8 km^2 of solar panels to produce enough ammonia to operate one large container vessel for a single year."

The case for bridge fuels

Despite its status as a fossil fuel, LNG should not be discounted as a short and medium-term solution, Chryssakis maintains. "LNG can contribute a 15–20 per cent greenhouse gas emissions reduction, and it can also serve as a basis for using other fuels in the future. Evolving engine technology could also reduce methane slip from LNG." All engine makers are working to resolve this issue, he points out. "No one wants to risk stranded assets of ships unable to sail because of emissions restrictions."

If so-called bridge fuels are abandoned, he says, the alternative is to continue burning oil while in pursuit of the "perfect" solution. "But we cannot bet safely today on a solution that will not be available until 2035 or 2045. It is better to work with what we have, and concentrate on building a future-proof infrastructure that can match future ships."

With internal combustion technology providing the highest efficiency for decades to come, LNG is a key bridge fuel as the search for a feasible carbon-neutral alternative continues.

Competition to ICEs

With internal combustion technology providing the highest efficiency for decades to come, LNG is a key bridge fuel as the search for a feasible carbon-neutral alternative continues.

Chryssakis notes that batteries with currently available chemistries are approaching the physical limits of energy storage. "New storage chemistries may emerge that can offer tenfold improvement, but they are still not proven on a commercial scale, and probably the first applications will be seen in automobiles, not large units like ships."

Fuel cells are more suited than batteries when size is an issue, he says. "But they perform better under constant loads, so they need batteries to even out consumption." Then there are the issues of fuel access and storage to resolve, as well as fuel production methods. Fuel cell life expectancy also remains a significant variable, he notes.

The relative attractiveness of different power solutions will vary between segments as well, Chryssakis says. "For example, cruise passengers might be willing to pay a premium for cleaner ships. But how quickly are consumer attitudes changing in the same direction?" That being said, charterers and owners in the transport trade are becoming more attentive as consumer sentiment shifts towards green alternatives, and they are actively seeking alternatives, he confirms.

"We have a zero-emission strategy, but we must also be prepared for markets to evolve. Many in the industry want to follow their hearts in one direction or another, but we do not know enough about the right direction yet."

Keeping ICE options open

"Right now we are still in the phase where we need to explore all available options for ICEs. The most important thing is not to close doors too early. We can experiment today with what is available until the best alternative emerges," says Chryssakis.

ICEs can accommodate nearly all types of fuel, he says, but the market must be ready or manufacturers will not be able to justify committing their design capacity. "There are so many balls in the air now that stakeholders are facing very complicated decisions," Aabo acknowledges. In such an environment, engine manufacturers believe they can offer a robust option. "We know that ICEs will provide the highest efficiency possible in the foreseeable future. Unless something completely unexpected turns up, ICEs will be around for many years."

Search and Rescue Algorithm identifies hidden "traps" in ocean waters

by **Jennifer Chu**
MIT - Massachusetts Institute of Technology

New method may help quickly identify regions where objects – and missing people – may have converged.

The ocean is a messy and turbulent space, where winds and weather kick up waves in all directions. When an object or person goes missing at sea, the complex, constantly changing conditions of the ocean can confound and delay critical search-and-rescue operations.

Now researchers at MIT, the Swiss Federal Institute of Technology (ETH), the Woods Hole Oceanographic Institution (WHOI), and Virginia Tech have developed a technique that they hope will help first responders quickly zero in on regions of the sea where missing objects or people are likely to be.

The technique is a new algorithm that analyzes ocean conditions such as the strength and direction of ocean currents, surface winds, and waves , and identifies in real-time the most attracting regions of the ocean where floating objects are likely to converge.

The team demonstrated the technique in several field experiments in which they deployed drifters and human-shaped manikins in various locations in the ocean. They found that over the course of a few hours, the objects migrated to the regions that the algorithm predicted would be strongly attracting, based on the present ocean conditions.

The algorithm can be applied to existing models of ocean conditions in a way that allows rescue teams to quickly uncover hidden "traps" where the ocean may be steering missing people at a given time.

"This new tool we've provided can be run on various models to see where these traps are predicted to be, and thus the most likely locations for a stranded vessel or missing person," says Thomas Peacock, professor of mechanical engineering at MIT. "This method uses data in a way that it hasn't been used before, so it provides first responders with a new perspective."

Peacock and Pierre Lermusiaux, also a professor of mechanical engineering at MIT, who oversaw the project, and their colleagues report their results in a study published today in the journal Nature Communications. Their coauthors are lead author Mattia Serra and corresponding author George Haller of ETH Zurich, Irina Rypina and Anthony Kirincich of WHOI, Shane Ross of Virginia Tech, Arthur Allen of the U.S. Coast Guard, and Pratik Sathe of the University of California at Los Angeles.

HIDDEN TRAPS

Today's search-and-rescue operations combine weather forecasts with models of both ocean dynamics and the ways in which objects can drift through the ocean,

to map out a search plan, or regions where teams should concentrate their search.

But the ocean is a complicated space of unsteady, ever-changing flow patterns. Coupled with the fact that a missing person has likely been continuously floating through this unsteady flow field for some time, Peacock and his colleagues say that significant errors can accumulate in predicting where to look first, when using a simple approach that directly predicts the trajectories of a few drifting objects.

Instead, the team developed a method to interpret the ocean's complex flows using advanced, data-driven ocean modeling and prediction systems. They used a novel "Eulerian" approach, in contrast to more commonly used "Lagrangian" approaches — mathematical techniques that involve integrating snapshots of the ocean velocity due to waves and currents to slowly generate an uncertain trajectory for where a missing person or object may have been carried.

The new Eulerian approach uses the most reliable velocity forecast snapshots, close to the point where a missing person or object was last seen, and quickly uncovers the most attracting regions of the ocean at a given time. These Eulerian predictions are then continuously updated when the next batch of updated velocity information becomes available.

The team has named their approach TRAPS, for its goal of identifying TRansient Attracting Profiles, or short-lived regions where water may converge and be likely to pull objects or people. The method is based on a recent mathematical theory, developed by Serra and Haller at ETH Zurich, to uncover hidden attracting structures in highly unsteady flow data.

"We were a bit skeptical whether a mathematical theory like this would work out on a ship, in real time," Haller says. "We were all pleasantly surprised to see how well it repeatedly did."

"We can think of these 'traps' as moving magnets, attracting a set of coins thrown on a table. The Lagrangian trajectories of coins are very uncertain, yet the strongest Eulerian magnets predict the coin positions over short times," Serra says.

"The key thing is, the traps may not have any signature in the ocean current field," Peacock adds. "If you do this processing for the traps, they might pop up in very different

Image courtesy of the researchers/http://news.mit.edu/

A new MIT-developed search-and-rescue algorithm identifies hidden "traps" in ocean waters. The method may help quickly identify regions where objects — and missing people — may have converged.

Image courtesy of the researchers/http://news.mit.edu/

The team demonstrated the technique in several field experiments in which they deployed drifters and human-sized mannequins in various locations in the ocean. They found that over the course of a few hours, the objects migrated to the regions that the algorithm predicted would be strongly attracting, based on the present ocean conditions.

places from where you're seeing the ocean current projecting where you might go. So you have to do this other level of processing to pull out these structures. They're not immediately visible."

OUT AT SEA

Led by WHOI sea-going experts, the researchers tested the TRAPS approach in several experiments out at sea. "As with any new theoretical technique, it is important to test how well it works in the real ocean," Rypina says.

In 2017 and 2018, the team sailed a small research vessel several hours out off the coast of Martha's Vineyard, where they deployed at various locations, an array of small round buoys, and manikins.

"These objects tend to travel differently relative to the ocean because different shapes feel the wind and currents differently," Peacock says. "Even so, the traps are so strongly attracting and robust to uncertainties that they should overcome these differences and pull everything onto them."

The team ran their modeling and prediction systems, forecasting the ocean's behavior and currents, and used the TRAPS algorithm to map out strongly attracting regions over the course of the experiment. The researchers let the objects drift freely with the currents for a few hours, and recorded their positions via GPS trackers, before retrieving the objects at the end of the day.

"With the GPS trackers, we could see where everything was going, in real-time," Peacock says. "So we laid out this initial, widespread pattern of the drifters, and saw that, in the end, they converged on these traps."

The researchers are planning to share the TRAPS method with first responders such as the U.S. Coast Guard, as a way to speed up search-and-rescue algorithms, and potentially save many more people lost at sea.

"People like Coast Guard are constantly running simulations and models of what the ocean currents are doing at any particular time and they're updating them with the best data that inform that model," Peacock says. "Using this method, they can have knowledge right now of where the traps currently are, with the data they have available. So if there's an accident in the last hour, they can immediately look and see where the sea traps are. That's important for when there's a limited time window in which they have to respond, in hopes of a successful outcome."

This research was primarily funded by the National Science Foundation's Hazards SEES program, with additional support from the Office of Naval Research and the German National Science Foundation.

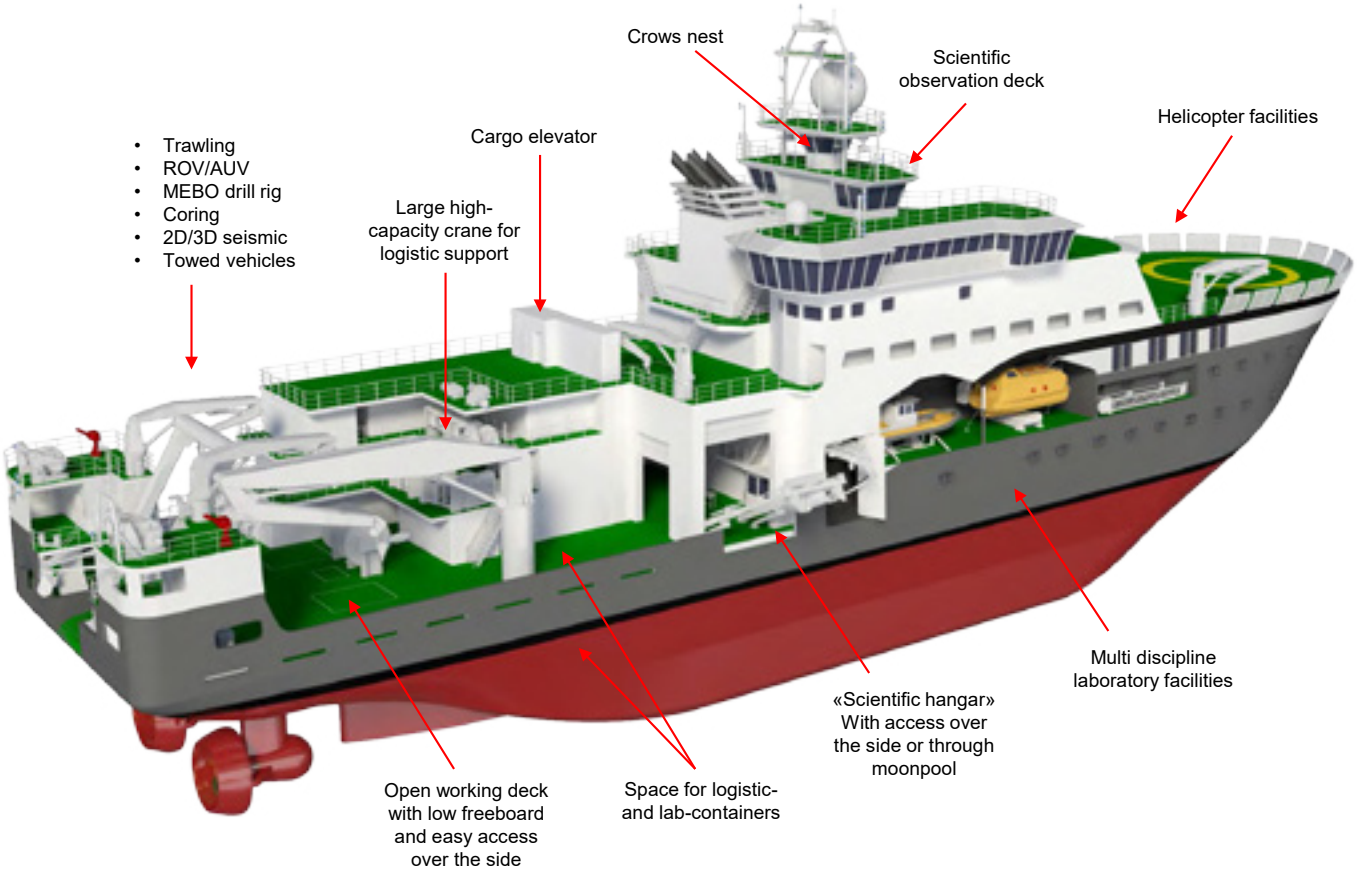
THE MAKING OF THE NEW NORWEGIAN ICE-BREAKING RESEARCH VESSEL RV KRONPRINS HAAKON

By JAN BREMNES

With thanks to Øystein Mikelborg, Per Wilhelm Nieuwejaar and Einar Vegsund for their contribution to this article.

This article was first published at **hydro-international.com**. This photo from **www.npolar.no**

Norway is a maritime country with a very long coastline, plus it is very much a polar nation with 80% of its sea territory and 45% of its land mass north of the Arctic circle. It is the only country with territorial claims both in the Arctic and the Antarctic. In spite of this, Norway has not had a purpose-built polar research vessel since Roald Amundsen's Maud (1917), having instead relied on converted commercial vessels for such purposes. That has all changed, however, now that Kronprins Haakon has come into service. This article provides insight into the making of this new multi-purpose research vessel.



Kronprins Haakon was a long time in the making. The design contract was awarded to Rolls Royce Marine in 2008, but it was not until 2013 that the Norwegian Parliament allotted €145 million for the construction and outfitting of the vessel.

Year-round Operations

Kronprins Haakon is a multi-purpose research vessel built according to the new Polar Code as a PC3 Ice-breaker class ship, suitable for year-round operations in multi-year ice. The Norwegian Polar Institute, the Institute of Marine Research, and the University of Tromsø will use her jointly, mainly in the Arctic, but also in the Antarctic.
With its 100 metres (330 feet) in length and 21 metres (70 feet) breadth, the vessel caters for up to 55 persons, including scientists, researchers, students and crew members. It will be a good observation platform for researchers for their work under extreme climate conditions. The ship is a multi-purpose vessel that covers different fields of research work such as stock assessment, oceanography, geophysics, marine biology and marine geology.

The vessel is designed to carry two helicopters, with the helicopter hangar and the landing platform in the bow area. The vessel is designed with a large open work deck where the stern is formed like a stern trawler. In addition to 'ice gallows', trawl winches have been installed for both pelagic and bottom trawling, enabling the vessel to trawl in both open and ice-covered waters. On the port side of the stern there is a hangar for deploying the Hugin AUV.

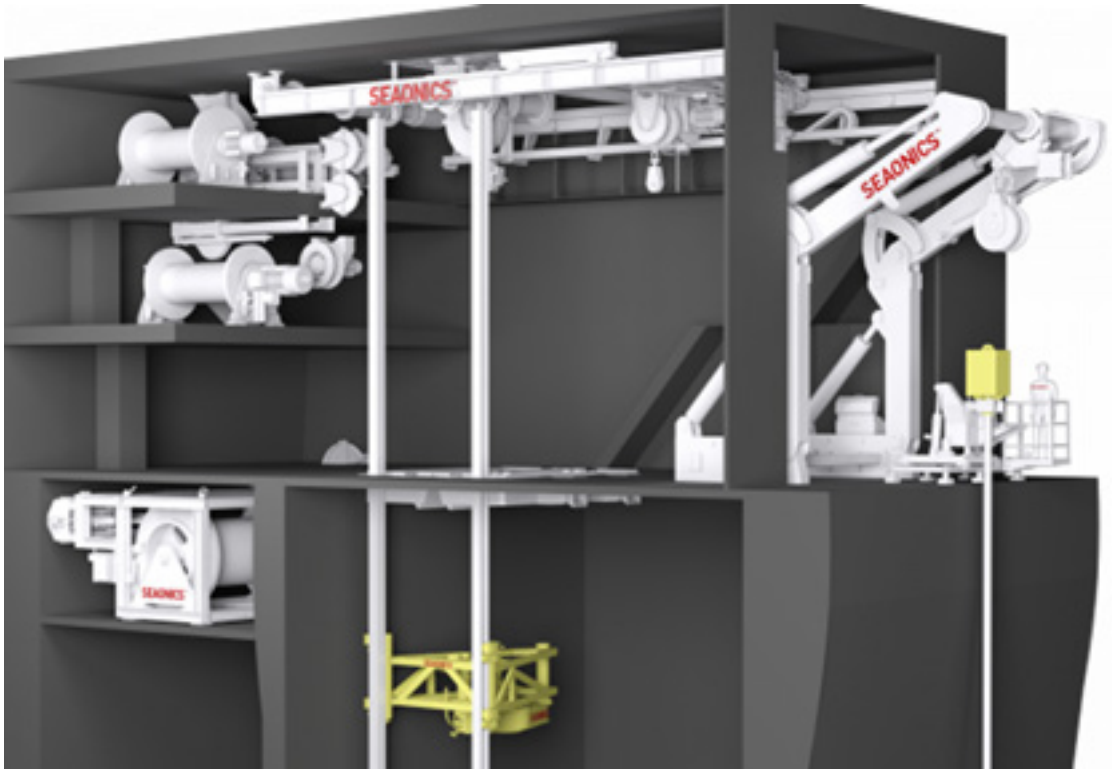
The work deck also has facilities for seismic operations and a seafloor drill rig, such as the MeBo driller, and with its grid of container fixing points it can deploy, tow and recover a variety of mobile equipment and towed vehicles, using the A-frame installed at the stern.

Handling Equipment

In front of the working deck there is the main hangar, with a 3 x 4m moon pool and opening to the starboard side, for deployment of ROVs such as the Ægir6000, Kley France Giant Calypso corer and other instruments for sampling the water column or the seafloor. There is also a separate CTD hangar for water samples next to the main hangar. The Norwegian company Seaonics has delivered complete state-of-the-art handling equipment for extreme conditions, and the package includes winches, cursor system for safe moon pool deployment of ROV and scientific equipment, deck cranes, and overboard systems, including A-frames and launch and recovery systems (LARS).

On-board laboratories

Inside the ship there are 15 laboratories for the researchers on scientific cruises, including Wet Geology/Benthos laboratories for analysing coring samples, ice samples and to determine invertebrate species composition, abundance and size from benthic sediments, and an isotopic lab to monitor radioactive contamination (gamma and beta emitters) in the



The cursor system for deployment through the moon pool

environment and an environment toxicology laboratory to study the harmful effects of various chemical, biological and physical agents on living organisms. There are also laboratories to examine water samples, collections from plankton net and fish collected from the trawl. Most of the laboratories are located on the 3rd deck, which is the same as the working deck, to make the workflow as easy as possible. To store and conserve samples during the cruise there are four cooler rooms and two freezer rooms. In addition, there is space for three container laboratories outside on the work deck. The vessel also hosts an auditorium for 50 persons and a separate education lab. On the 9th deck, above the bridge, there is an observation room for sea mammal and bird observations.

Contradictory requirements

Designing a research ice-breaker is not an easy task. On the one hand, you have the demand for a silent vessel with minimum Underwater Radiated Noise (URN) and bubble-free zones for all transducers, and on the other, there is the need for extreme force when breaking ice. Head of design at Rolls-Royce Marine, Mr Einar Vegsund, was responsible for the design of Kronprins Haakon, and says the following about his work on this design:

"Noise signature and air bubble sweep down is a challenging task for all oceanographic research vessels and even more challenging for ice-going vessels since the hull and propulsion systems must be designed to meet the extreme environmental conditions in polar areas.

As ship designers, we have to balance several contradictory requirements and find the optimum balance between efficiency, noise, ice-breaking capability, redundancy, reliability, manoeuvrability, seakeeping, etc.

The main source of underwater radiated noise is normally the propellers. Due to the requirements for manoeuvrability in ice-covered areas an azimuthing type of propulsion system was selected, even though this is not the type of system with the lowest noise signature, and a huge effort was made to optimise the system and make it acceptable (propeller, electric motors, steering gear etc.).

The new RV Kronprins Haakon is ice classed according to PC-3 ICE-BREAKER notation and the propellers must have the strength to 'eat' ice of 1.5m thickness. The vessel is equipped with two ducted, 5-bladed fixed pitch propellers with a diameter of 4,500mm and has been designed to be free of sheet cavitation at speed up to 11 knots.

Design propellers have been tested and verified in the large HYKAT cavitation tank at HSVA, Germany. Other machinery and auxiliary systems have been designed according to low noise principles being resiliently mounted on well-stiffened foundations.

A high number of acoustic sensors are hull mounted in the forward part of the vessel and exposed to disturbances from air and particles generated by the bow as it pierces the water and waves. In order to avoid damage to the sensors from ice they are flush mounted and protected by titanium windows.

Any piece of equipment protruding the hull will be damaged when the vessel is ice-breaking and therefore no gondola or appendix is allowed. The hull itself has an extreme requirement for smoothness and welded connections are grinded to avoid vortexes. The vessel is also designed with a carefully designed keel diverting the water flow from the bow away from the sensors at the bottom of the hull. Computational Fluid Dynamics (CFD) software are probably the best tool to use when investigating details of hull design and arrangement of hydroacoustic sensors and Rolls-Royce used this actively during the entire ship design process."

Acoustics package

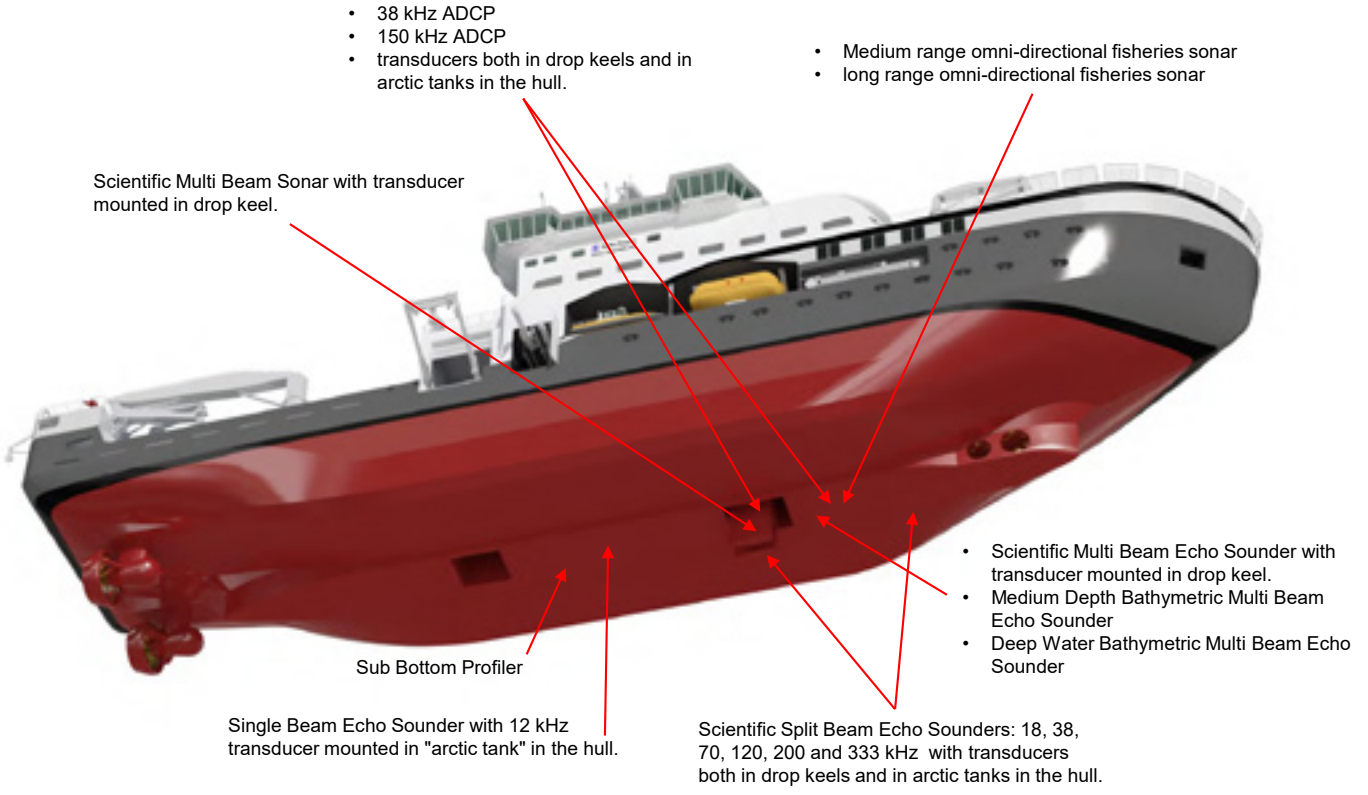
Under the keel, the ship is outfitted with a large acoustics package from Kongsberg Maritime (KM). This package includes deep and medium depth multibeam systems for bottom mapping, including the EM 302, EM 710 and EA 600, while systems such as SBP300 and TOPAS can be used to look at sub-bottom structures. Position reference will be provided by the state-of-the-art and industry standard HiPAP 501 system. Also part of the delivery is the KM series of Simrad scientific systems, including a new EK80 wideband split beam fisheries acoustics system, modern scientific multibeam systems ME70 (looking downwards) and MS70 (looking sideways), and omnidirectional sonar SH90 in addition to the new SU90 that can detect and track biology for several kilometres around the vessel. Kronprins Haakon also carries the new Simrad FX80 trawl monitoring system, which can provide a live camera feed from the vessel's sampling trawl.

Unlike other existing research ice-breakers, the Kronprins Haakon is designed and equipped with acoustics that can both measure and quantify biology in all components of the marine ecosystem. Quantitative multibeam (ME 70 and MS 70) and omnidirectional sonar systems (SU 90 and SH 90) target areas close to the surface and near the bottom where traditional echo sounders cannot be used.

Two keels

Also unique to the Kronprins Haakon is its ability to collect scientific data both when operating in ice and in open waters. To achieve this, the vessel is equipped with two retractable keels (drop keels) that secure an optimal environment for the acoustic instruments. Two drop keels are needed because there is not enough space for all the equipment in one keel. The port drop keel contains: ADCP 38 kHz and EM 710. The starboard drop keel contains: EK 80, MS 70, ME 79, ADCP 150 kHz. However, as the drop keels cannot be deployed when the vessel is breaking ice, the Kronprins Haakon also carries an additional acoustic package of flush mounted EK 80 echosounders in ice protected arctic tanks, so data can be collected even when the vessel is operating in ice.

Communications and navigation systems are mainly supplied by Norwegian companies, such as the K-Bridge Integrated bridge system from Kongsberg Maritime and Dynamic Positioning (DP) system from Rolls Royce Marine. These systems will assist the crew with safe sailing and operations.



Report outlines huge potential for offshore wind and those involved with the sector

Offshore wind currently represents just a small piece of the world's energy supply. But that's changing faster than ever before as new and existing players look to tap the huge resource potential being unlocked by shrinking costs and technological advances, as outlined in a recent comprehensive market report.

In the coming two decades, the rapidly maturing offshore wind market is expected to become a trillion-dollar business as the pace of installed capacity growth accelerates, according to World Energy Reports' (WER) Outlook for Offshore Wind Power: The Frontier of Future Energy, which was published in June.

Growing, with huge potential

Globally, the total installed energy capacity for both onshore and offshore wind farms at the end of 2019 totalled 651 gigawatts (GW), or about 10% of global electricity generating capacity, according to the WER report. While just 25.5 GW, or less than 0.5%, of that installed capacity is currently located at sea, the rate of new installations offshore has been growing at a much faster rate since 2010: 26% compound annual growth rate (CAGR) compared to 14% for onshore. Even amid the current coronavirus pandemic, WER expects this trend to continue, with 16 GW of additional offshore capacity to be added in 2020 and 2021, driven primarily by ongoing activity in the well-established Northern European sector as well as the newer, fast-growing Chinese market. China, already the leader onshore, emerged as a major offshore wind player in 2018 and has continued to expand its substantial project pipeline.

When comparing onshore wind vs. offshore in terms of untapped potential, it's clear that offshore is simply unmatched. The WER report estimates global offshore wind potential to be technically capable of supporting more than 120,000 GW of electricity production capacity (equating to approximately 420,000 TWh), which is more than 20 times greater than current world demand.

By 2040, WER forecasts offshore wind capacity will increase to somewhere in the range of 340 GW-560 GW, led by Europe and China, with newer entrants the U.S., Japan, South Korean and India among top markets. The report identifies some 500 GW of projects and development zones currently in the planning and development stages, mainly coming from Europe, Asia and the U.S. Details for each project are laid out in the report as well as in a corresponding online database.

Lower costs

Offshore wind farms are not new; they have been around for decades. So why is offshore wind taking off faster now than ever before? WER's report points to a combination of factors helping to grow offshore wind's role in the word energy mix. The simplest but most important reason for growth is that offshore wind has made great strides over recent years to become increasingly cost competitive compared to other energy sources, including fossil fuels. In the years ahead this momentum will only build as costs continue to fall.

The growing volume and size of offshore wind projects, along with improving supply chain competencies larger, more efficient turbines (the current largest is 14 megawatts (MW)), and the utilization of offshore transmission substation hubs have all helped to reduce offshore wind's levelized cost of energy (LCOE). According to WER, LCOE has declined from a global average $170/MWh in 2010 to strike prices of $60/MWh to $110/MWh in 2016 to 2018 European and U.S. auctions. Recent prices have been seen as low as $47/MWh in recent European auctions. WER says declining LCOE is allowing offshore wind to compete with fossil fuel projects in European and Chinese markets. It's still a different story in the U.S., but WER sees cost parity by the end of next decade. Today, installation capital expenditure (capex) cost for bottom-fixed turbine projects averages just over $3,000 per kilowatt (KW) with transmission. WER projects this will fall to fall to $2,500/KW by 2030 and $1,900/KW by 2040.

Floating future

Another significant factor leading to a major jump in projected installed capacity over the coming years is the advancement and commercial demonstration of floating offshore wind turbines, which open up new areas to exploit: specifically, in deeper waters where the construction of wind farms was not previously feasible. Currently almost all offshore wind power generation comes from bottom-fixed turbines, which are restricted to water depths of about 60 meters or less. However, as concepts continue to evolve and become proven, floating turbines will enable wind farm construction in deeper waters that hold some 80% of the world's wind capacity potential. Representing another boost for overall capacity potential, these areas are typically further from shore where the wind generally blows stronger, resulting in higher turbine capacity factors.

Today's most proven floating wind turbines are Equinor's Hywind, employed on the 88 MW Tampen project, and Principle Power's WindFloat, being used on the 50 MW Kincardine project, but WER's report looks at more than 50 floating wind concepts in various stages that are being studied across the globe. Just as is occurring for traditional fixed-base turbine projects, the increasing size of floating projects and the industrialization of the hull construction process is helping certain concepts reduce project LCOE. For example, as Equinor matures the technology, it aims to bring the LCOE of Hywind projects to €40 -60/MWh by 2030.

A pipeline of more than 50 GW of floating capacity requiring $93 billion to $148 billion of capex investment has been identified by WER. As is the case in the bottom-fixed segment, the U.K. presently has the largest floating pipeline at more than 25 GW, followed by Norway (more than 5 GW) and Japan, the U.S., South Korea, Ireland, France and Taiwan, each with multi-GW pipelines. WER's report highlights the development of a much large pipeline after the middle of this decade, with potential zones discussed in the U.S., Japan, Norway, U.K. and France.

Big potential means big opportunities

Forecasted near and long-term increased activity bodes very well for the global supply chain. WER expects offshore wind projects will require between $1 trillion and $1.5 trillion of capex over the next two decades. Much is still on the table for the gamut of suppliers and marine services firms, as 80% of offshore wind projects detailed in the report and database are still in early stages of planning and development.

With a pipeline of activity so large, there's plenty of work to be had by existing players and new entrants alike. We've already seen a number of traditional offshore oil and gas players—from operators such as Shell, Total, Equinor and Repsol, all the way down the supply chain—transfer their skillset into the offshore wind market over the years. For these firms and others, including traditional offshore oil and gas players such as yards for jacket and HVDC substation fabrication, as well as for construction and assembly of floating foundations, opportunities abound as projects get larger, deeper and further from shore.

Offshore wind farms need servicing, creating even more work for a wide range of support providers from boatbuilders to turbine technicians and marine surveyors. In Europe, for example, onshore operation support bases are having associated positive impacts (long-term direct jobs, and bolstered local supply chains) in port regions that had been historically active but have struggled more recently due depressed oil and gas and shipping markets. Using the current UK $94,000/MW/year operational expenditure (opex) cost, the current pipeline of projects could require up to $46.6 billion of annual opex spend within the next decade, says WER.

Why do container-ship stacks collapse and who is liable?

By **Are Solum**
Senior Claims Executive,
Lawyer, Arendal

In this article, which gives an overview of the typical causes of containership stack collapse, the legal implications when dealing with the resulting liability claims are discussed.

Understanding causation is key to preventing incidents, but also to determine liability in individual cases.

Heavy weather has been one of the fundamental challenges for carriers since the dawn of shipping. Advanced technology for voyage planning and weather routing helps the Master, but his judgment will be questioned if an incident occurs. Containers, the securing mechanisms and container stacks are exposed to great forces when container ships move in heavy weather. Parametric and synchronous roll resonance phenomena have caused several serious accidents to container ships during the last years.

Parametric rolling describes large spontaneous rolling motions occurring in head or stern seas and has to do with dynamics of the length of ship and waves as well as the vessel's wave encounter period. A vessel's roll angle can increase from comfortable rolling motions to over 30 degrees in only a few cycles causing excessive acceleration on the container stacks. Synchronous rolling is caused by the ship's rolling period becoming synchronous with the wave period. The waves may then cause resonance, meaning that the

ship may lose control over the roll angels as the action of the wave rolls the vessel increasingly over.

Size matters as bigger vessels move differently in the sea compared with smaller vessels. For example, investigations following the APL China incident in 1998 revealed that large box ships with large bow flares are particularly exposed to parametric rolling. Furthermore, the containers on board the largest container vessels are stowed up to 40 meters above the waterline and 60 meters wide across the deck. When ships and container stacks of these dimensions start rolling, you do not have to be a physicist to understand that container stacks will be subject to great forces when the vessel starts to move with the motions of the sea.

Ship stowage plays an important factor because weight distribution on-board also influences the vessel's motions at sea. The GM is a measurement of the initial static stability of the vessel. It is of the utmost importance to get the GM within the right range before the voyage. This represents challenges in terms of correct cargo planning both ashore and on-board. In practice, advanced software will do most of the job, but computer programs depend on correct software development, correct data entered as well as human interaction and, ultimately, human decisions.

The metacentric height (GM) is calculated as the distance between the centre of gravity of a ship and its metacenter. The metacentric height influences the natural period of rolling of a hull and a low GM will cause the vessel to roll excessively with too large movements. A high GM implies greater initial stability against overturning, but high GM is also associated with shorter periods of roll which will cause rapid movements and greater forces on the cargo stowage. Hence, the GM will have to be correct - not too high, not to low.

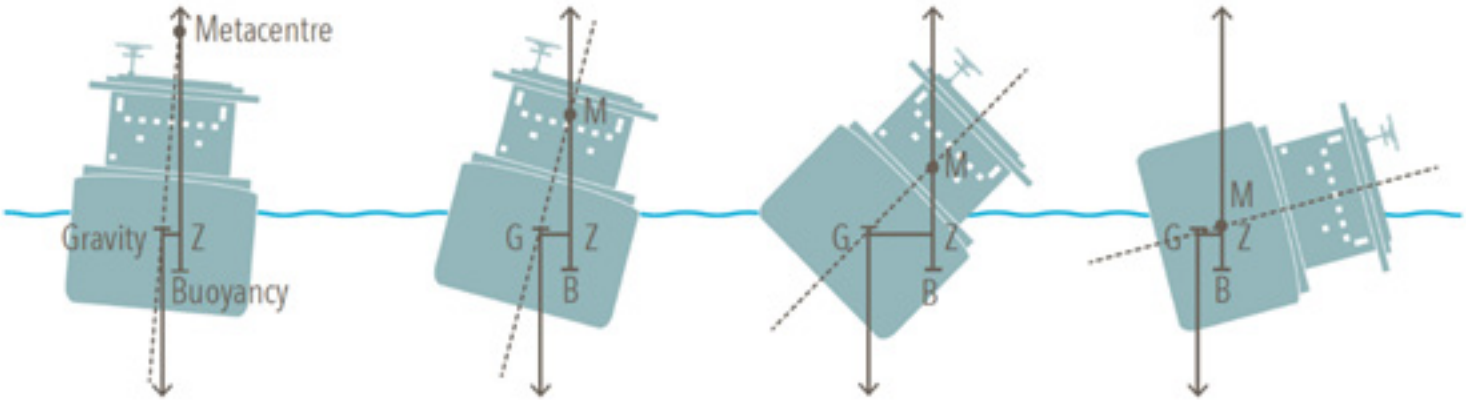
Cargo stowage inside containers causes problems as a container stack is only as strong as its weakest container. If cargo inside one container starts to shift, it may have a domino effect on the stack. There have been severe cases where one piece of cargo has damaged its container structure resulting in the collapse of a complete row of containers. Therefore, the Container Securing Manual (CSM) must be followed accurately, and further stowage guidelines should be sought for problematic cargoes. One of the challenges is that container carriers largely depend on shippers, freight forwarders or their sub-contractors to pack and secure cargoes adequately. Errors are inevitable.

The container is designed to fit the purpose of containing cargo, but if exposed to excessive weight pressure from excessive loads, containers may suffer structural failure. Container shells are exposed to wear and tear, rough handling and operations which may weaken their structure. If one container fails, the rest of the stow above and around will follow.

The weight of cargo will be declared by the shippers. Mis-declaration of weight is an industry problem and may cause considerable difficulty for cargo stowage planners as they rely on cargo details as declared by the shippers. If numbers are inaccurate, or even deliberately mis-declared, the integrity of container stacks may be jeopardized.

Lashing and securing of thousands of containers in large stacks onboard is a major challenge. Failure to do it correctly may have serious consequences. In simple terms containers on deck are attached to each other with twist locks in the four corners of the container. Further lashing rods are attached between the container stack and lashing bridges or hatch covers. Each twist lock and lashing rod needs to be in its right place to work and be able to withhold required forces. Inadequate securing, missing or failing twist locks and lashings that become loose are probably among the more common causes of containers lost at sea. Failures in securing have caused severe incidents.

Multiple causes often make cases complex, not least when working with liability. In most cases there are elements of several of the abovementioned causes which lead lawyers deep into legal considerations about issues such as proximate causes, intervening causes, independent sufficient causes and foreseeability.



TYPICAL LEGAL CONSIDERATIONS

Assuming that causation is established, the next step is applying the law to the particular facts. We will now look at some of the reoccurring legal issues for cargo claims and charterparty claims with a focus on seaworthiness.

Containerised cargo is usually shipped on the container shipping lines' standard terms of carriage which usually incorporates the Hague or Hague-Visby Convention (the Hague Visby Rules).

Whether or not the contractual carrier of cargo is liable for damage or loss of cargo will be determined by whether the carrier is in breach of his duties under the convention, or whether the damage occurred as a result of perils for which the carrier is exempt from liability.

The carrier's fundamental duty is to properly care for the cargo.

Under Hague Visby Rules, Article 3 Rule 2, the carrier shall "properly and carefully load, handle, stow, carry, keep, care for, and discharge the goods carried." This requires the carrier to adopt a solid system to fulfil its obligation throughout the time the cargo is in the carrier's custody. For instance, if lashings of container stacks appear to come loose during the voyage the carrier is under an obligation to correct the problem and tighten the lashings. This is a contractual obligation meaning that the *contractual* carrier is contractually bound even if he is not the actual carrier and in direct control of crew onboard. Generally, the carrier is not obliged to improve stowage inside the container. This responsibility will normally lie on the shipper's side, see also Hague/Visby Rules, article 4, rule 2 (n).

When cargo is shipped in apparent good order and condition but is discharged damaged, the carrier bears the burden of proving either that the damage occurred without fault (H/V rules Article 3, rule 2), or that it was caused by an excepted peril within Article 4, rule 2 - *Volcafe Ltd v CSAV, 2018, UKSC 61*.

The "excepted perils" and non-fault provisions of the Hague/Visby Rules

1. Error in management of the ship

The Hague/Visby Rules, Article 4 Rule 2 (a) states that "neither the carrier nor the ship shall be responsible for loss or damage arising out of (…) act, neglect, or default of the master, mariner, pilot, or the servants of the carrier in the navigation or in the management of the ship."

It might be possible for carriers to rely on negligent navigation as an excepted peril if it can be proven that there was, for example, a lack of good seamanship in deciding to sail in severe weather conditions. Also, failure to take the action necessary to prevent excessive rolling may be considered failure to properly navigate and therefore exempt the carrier from liability.

"Management of the ship" does not include management related to the cargo under English law. This principle was set out in The Gosse Millard case (*Gosse Millard v Canadian Government Merchant Marine*, 1927, KB 432): "If the cause of the damage is solely, or even primarily, a neglect to take reasonable care of the cargo, the ship is liable, but if the cause of the damage is a neglect to take reasonable care of the ship, or some part of it, as distinct from the cargo, the ship is relieved from liability". This means that if a container stack collapse is solely caused by error in cargo stowage, there is no exemption from liability for the carrier based on the Hague/Visby Rules, Article 4 rule 2 (a).

2. Perils of the sea

The Hague/Visby Rules, Article 4, rule 2 (c) states that "Neither the carrier nor the ship shall be responsible for loss or damage arising out of (…) perils, dangers and accidents of the sea or other navigable waters" In *Scrutton on Charter Parties and Bills of Lading*, 20th Edition, Article 112, Justice Scrutton has defined such perils to include *"perils peculiar to the sea or to a ship at sea, which could not be foreseen and guarded against by the shipowner or his servants as necessary or probable incidents of the adventure"*. Hence, the starting point under English law is that such a peril must be "of the sea" in the sense that the loss must be attributed to natural causes.

The criteria "could not be foreseen" means that the peril must be beyond what is reasonably foreseeable and could be avoided by the carrier. This has naturally

made the "perils of the sea" defence increasingly more difficult for carriers as technology has developed. For general weather conditions throughout the voyage, carriers will usually be expected to have the necessary equipment to avoid the peril. However, the defence remains possible. For example, unusually high or challenging waves may be considered unforeseeable and exempt the carrier from liability. Experts have debated whether parametric rolling or resonance, which can occur in even moderate weather conditions, is foreseeable. The forces on container stacks may for example be considerably higher if the vessel experiences resonant rolling in moderate weather than in more usual rolling and pitching in exceptional extreme conditions. The legal landscape is yet to be completely clarified.

3. No fault or privity of the carrier

Hague/Visby Rules, Article 4, rule 2 (q) exempts the carrier form liability for damage occurring "without the actual fault or privity of the carrier, or without the actual fault or neglect of the agents or servants of the carrier." This is usually referred to as the "catch all exception" and, crucially, carriers can rely on this exception if they are able to prove that there was no fault on their part. In container stack collapse cases, the carrier may typically argue there is no fault on his part if the fundamental duties to care for the cargo is fulfilled, and thereby refute liability under the contract of carriage. The "non fault" exception is extended to fault by the carriers' servants.

Bill of Lading claims and seaworthiness

The Hague/Visby Rules, Article 3, rule I (a) sets out one of the fundamental duties of the carrier: "The carrier shall be bound before and at the commencement of the voyage to exercise due diligence to make the ship seaworthy." The Hague-Visby Convention governs carriage of goods under contracts of carriage but is often incorporated in charter contracts by way of "paramount clauses". A question of seaworthiness may, however, differ from Bill of Lading claims and charter party disputes.

An important point for claims under Bills of Lading is that "seaworthy" will also mean "cargoworthy" under English law. See for instance *Bills of Lading*, Sir Richard Aikens, Richard Lord and Michael Bools ch. 10.99. This means that the carrier's obligations as to seaworthiness may vary in respect of different cargo consignments under different contracts of carriage: the containers, storage and stowage must be fit for purpose. If not, the carrier may be in breach of the Hague/Visby Rules, Article 3, rule I (a).

Charterparty claims and seaworthiness

Ultimate liability for damages and liabilities arising out of a container stack collapse case will often end up as a discussion regarding seaworthiness between (contractual) carriers of cargo and the actual carrier (the shipowner) under charterparty contracts. The shipowner's fundamental duty to exercise due diligence to make the ship seaworthy may follow by both terms of contract and background/ case law. This was discussed in *FC Bradley & Sons Ltd. v. Federal Steam Navigation Co.* (1926) 24, LLOYD'S REP 446.

The classic definition of seaworthiness is that "the ship must have the degree of fitness which an ordinary careful owner would require his vessel to have at the commencement of her voyage having regard to all the probable circumstances of it".

A question which often arises in container stack collapse cases is to what extent the ship and equipment was sound and correctly applied upon departure and whether it was fit to withstand the ordinary perils of the sea. Hence, seaworthiness will be considered in context with what the owner could reasonably foresee in terms of occurring sea perils. For instance, inadequacies with regard to the vessel's lashing and securing equipment in a stack collapse case could be enough to render the vessel unseaworthy. In the Moore case it was held that *"if cargo, whilst properly stowed, is not properly lashed and in consequence shifts so as to undermine the vessel's stability, the vessel will be unseaworthy at the outset"* (*Moore v. Lunn* (1922) 11 L1. L. Rep. 86,92).

Furthermore, if there is an excessive top heavy stow on departure which compromises the stability of the container stack itself, the vessel may arguably be in unseaworthy condition due to the error in stowage.

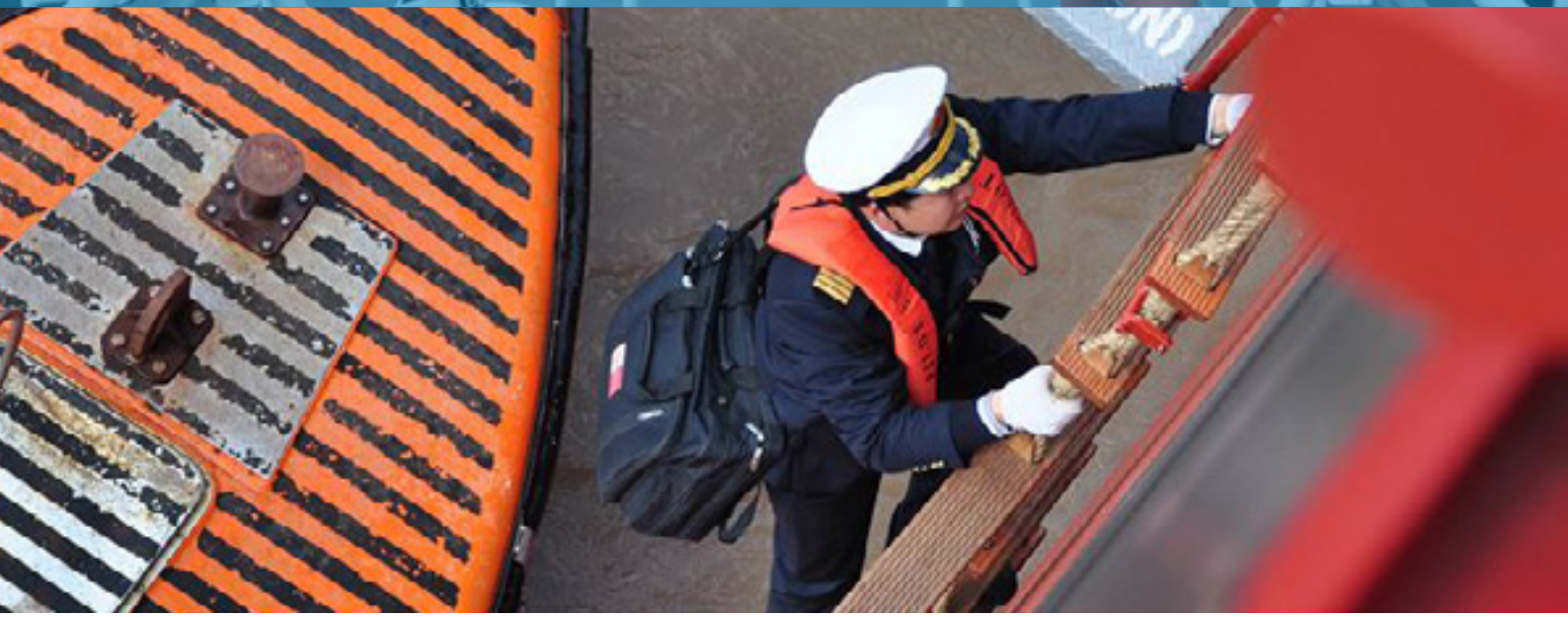
Ship documents such as a sound passage and weather routing are a frequently visited elements in causation debates following container stack collapse incidents where heavy weather plays a part. The recent court decision in the CMA-CGM Libra case (*Alize 1954 v Allianz Elmentar Versicherungs AG* ("the CMA CGM Libra")) examines how poor passage planning can cause a navigational error, which in turn may render the vessel unseaworthy. The CMA-CGM Libera case is a different case scenario (grounding), and the discussions in heavy weather stack collapse cases will differ as there are usually several causative factors. Passage planning and seaworthiness may, however, occasionally be relevant for determining liability in a stack collapse scenario if it transpires that failure in passage planning is causative.

In addition to cargo claims and the legal implications under bills of lading, liability for environmental damages has been high on the agenda in connection with the severe incidents in recent years. When containers and cargo drift in the ocean or end up on shorelines, authorities will usually turn to the "waste producer" which is usually considered to be the shipowner or operator of the vessel. The waste should be, and will be, removed. The ultimate liability for the costs and losses will often end up in dispute under charterparties.

To conclude, the law often applied in stack collapse cases is over one hundred years old and made to fit, sometimes uncomfortably, with modern ships and technologies. Regrettably, container stack collapse cases have serious consequences considering both monetary losses, ship safety and environmental impact. There is no doubt that carriers, insurers, lawyers, judges, and arbitrators will continue to be challenged by the complexity of container stack collapse cases for years to come.

Seawork Asia 2020

24 TO 26 NOVEMBER 2020 | SHANGHAI EXPO CENTER, CHINA



Seawork Asia is where buyers, sellers, influencers and legislators come together for three invaluable days every two years, all keen to reap the benefits of business in the rapidly expanding Asian commercial marine market.

The first Seawork Asia took place in 2014 and has gone from strength to strength since. The exhibition takes place every two years; Seawork Asia 2018 attracted more than 100 exhibitors and more than 5,700 attendees from 12 countries, bringing 240 brands and 5,000 products to the event.

The exhibition offers an interactive platform to the Asian market, including key networking opportunities such as the exhibition banquet and dedicated presentation slots.

The ideal platform for world-renowned maritime brands and organisations, 96% of Seawork Asia visitors either authorise or influence the purchasing decisions of the companies they represent.

Key sectors

Seawork Asia will have key exhibitors and visitors from the following sectors:

- Workboat and floating plant design, build, repair & maintenance
- Patrol, police and coastguard vessels
- Marine equipment
- Marine civil engineering and construction
- Dredging and coastal development
- Marine contracting, vessel & port services
- Marine renewable energy
- Commercial diving & underwater services
- Safety and training
- Staffing, manpower & recruitment
- Marine finance, insurance and legal
- Logistics and marine transportation

Seawork Asia also offers a high-level 1 day Forum focusing on current hot topics, enhancing the three day exhibition. Industry-leading speakers are lined up to impart in-depth knowledge and share their expertise on new technical developments and industrial trends; providing a general overview of the existing commercial marine, workboat and patrol boat market.

Working together

Business Match meetings with VIPs such as China Coastguard, China Rescue, vessel operators and the China Maritime Pilots Association (CMPA) take place during the exhibition.

The CMPA has worked with Seawork Asia since the exhibition's inception in 2014. 2018 saw the CMPA hold the China Pilot Boat Equipment and Safety Seminar during Seawork Asia with more than 100 representatives from various pilot agencies and well-known domestic and foreign suppliers attending the conference. During the seminar, guests discussed the important issue of pilot boarding and disembarking safety.

This year's China Pilot Boat Equipment and Safety Seminar will continue to promote the coordinated development of pilot production and safety, discuss reform and improved communication and promote the scientific development of pilot boats.

The 2020 edition will see the run up to the 14th-Five-Year plan for China which gets underway in 2021. The members of the CMPA are particularly interested to meet more international companies in the industry focusing on both the design and construction of pilot vessels.

Winning new business

Seawork Asia presents a unique opportunity for organisations to build and maintain their market positions in China and the East Asian Region. One such company is Hadrian Safety Rails.

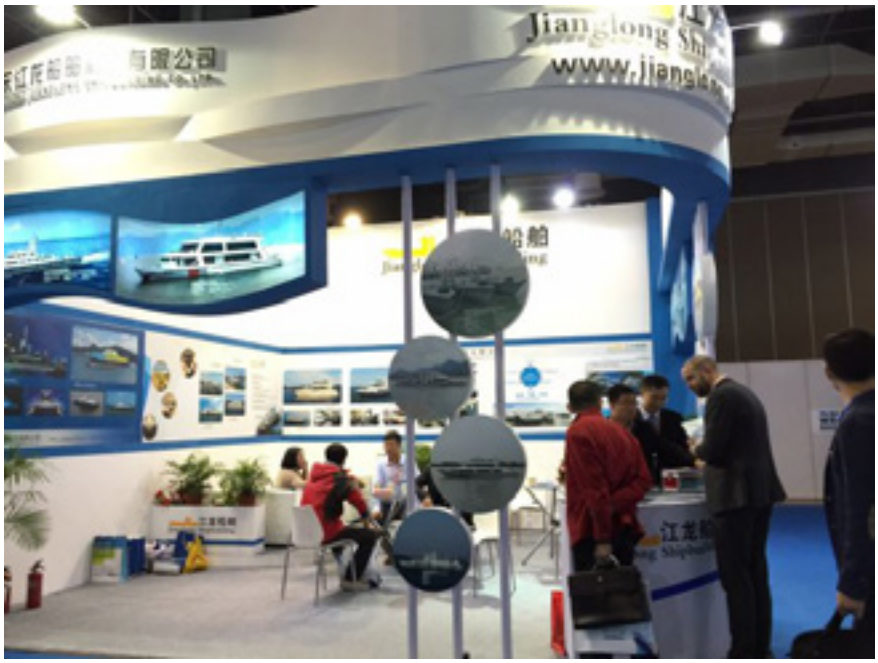
Designed for ease of installation, or retrofitting, to work boats, buildings and structures, the Hadrian Safety System provides a functional integrated safety system for inspection and maintenance purposes and a solution to modern fall protection problems with a proactive restraining system for multiple users. Following a successful Seawork Asia 2018, exhibitor Hadrian Safety Rails has seen yet another of its renowned safety systems fitted, this time to the new RiZhao pilot vessel.

John Wells, director of Hadrian Safety Rails, says, "Seawork Asia has been an extremely useful platform to introduce the Hadrian name into the Chinese Market for the first time. It has been a very worthwhile venture for Hadrian Safety Rails as we have not only had the opportunity of a presentation slot to the China Maritime Pilots Association delegation and follow up series of meetings with the Senior Pilots. In addition, we have made some invaluable contacts. Hadrian Deck Safety Systems has now been installed on a number of boats within China."

Business support

Companies exhibiting at Seawork Asia could be eligible for business support from the UK Government. TAP (Trade Access Programme) grants are just one of the business support programmes available from the UK Department for International Trade and Seawork Asia is part of this year's programme.

Recent news reports saw 3.2% growth in China's GDP in the three months to the end of June compared with the same period last year; early days but possibly one of the first global signs of an economic recovery from the effects of COVID-19.



TAP grants support UK SME's to enter new markets by exhibiting at overseas trade fairs; promoting their goods and services to an international audience. Grants are aimed at less experienced exporters, defined either in terms of the company's exports as a percentage of total sales or the company having been exporting less than 10 years. Contact Seawork Asia to register interest for a TAP grant.

New to Seawork Asia

Every Seawork Asia exhibition attracts new exhibitors from across the commercial marine industry. Two companies that are joining Seawork Asia 2020 for the first time are Nanjing Compressor and Chuntai Communication Technology.

Supplier to some of China's most well-known vessels, Nanjing Compressor (Nanjing Xinjuan Marine Compressor Co., LTD) is to exhibit at Seawork Asia for the first time. The company's compressors are installed on the ocean-going Yuanwang 1~8, snow escort, military and research vessels.

Specialists in thermal imaging, Chuntai Communication Technology supplies high-end maritime shipborne tracking systems and hand-held portable thermal imaging night vision equipment. With more than 20 system types available, Chuntai Communications Technology is able to advise on and supply specific solutions to customs enforcement, maritime fire service, maritime Search and Rescue, pilotage, marine police enforcement, marine scientific research, armed police patrol and other official clients.

Seawork Asia 2020

The fourth edition of Seawork Asia will take place at the Shanghai Expo Center from 24-26 November 2020. For further details and information on opportunities available, call **+44 1329 825335** or email Jo Miller at Seawork Asia's organisers, Mercator Media, at **jmiller@mercatormedia.com** We look forward to meeting you at Seawork Asia 2020.

Better oil detection sensors reduce cost of oily bilge water

Over 70 percent of the earth that we live on is made up of oceans, lakes, and rivers. These water ways have become integral parts of our lives. One look at a marine traffic map will put into perspective just how busy our vast oceans are every minute of the day. Not only do we use these waters for trade and travel, but they also provide unique ecosystems and are necessary for the lives of billions of species including our own.

Around the world people have agreed upon the importance of keeping our waters clean and regulations are set internationally and domestically by regulatory bodies to keep pollution levels in check. In international waters, the International Maritime Organization (IMO) limits bilge water discharges to 15ppm. The U.S Coast Guard (USCG) also limits the discharge of oil in bilge water to 15ppm in US territorial waters and further limits special use areas, such as inland waterways and the Great Lakes where vessel operators must adhere to a 5ppm discharge limit or a total restriction on vessel discharges. Violations of these regulations can result in large fines as well as criminal prosecution.

Oily wastes and waste oils are by-products of operating ocean-going vessels, which generate millions of tons of such wastes annually. Oily bilge water is the mixture of water, oily fluids, lubricants and grease, cleaning fluids and other wastes that accumulate in the lowest part of a vessel called the bilge from a variety of sources including engines, piping, and other mechanical and operational sources found throughout the machinery spaces of a vessel. Most of these wastes are generated in the vessel's engine room and end up in the bilge >>

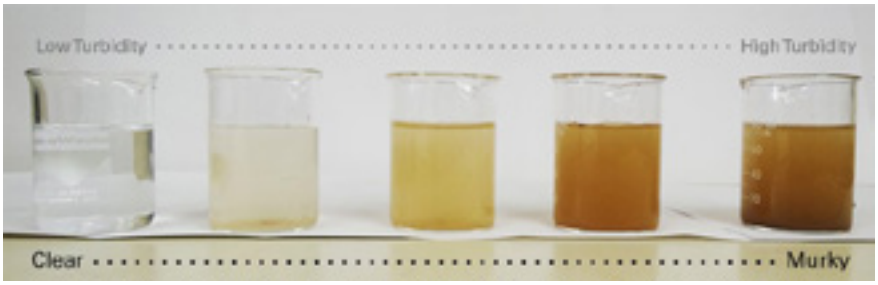
before being discharged overboard. It is at this time that your oily water separator and bilge oil content monitor are put to the test.

Since 2005, when MEPC.107(49) began being enforced, light scatter technology has ruled the oil content monitor market. However, despite the technology's apparent popularity, OCM's that use this technology are often plagued with considerable maintenance needs, false positive high readings, and false negatives from misreads of ultra-emulsified oils. This all comes down to how the these OCM's detect oil molecules.

Light scattering detection technology works by shining a laser light into an oily waste water sample. This laser gets reflected off various molecules in the water, attenuating the light energy before it is absorbed by photo detectors on the opposite side of the cell. The scattering of light in general is dependent upon the oil droplet size and refractive index as well as the concentration of droplets. This ratio of light energy into light energy out correlates to a concentration level in parts per million.

Steve Ketchum brings over a decade of experience onboard Navy ships to his position as the Director of Product Development & Environmental Product Management at NAG Marine and has had ship efficiency in mind when working with Turner Designs Hydrocarbon Instruments in developing NAG's latest oil content monitor. "The laser light is not discriminating," Ketchum explains. "In other words, it cannot tell if a molecule is oil, particulate, or sediment. In situations where there is a lot of turbidity, the light in / light out ratio of a light-scatter oil content monitor will interpret this as a high concentration of oil and you'll waste a lot of man-hours trying to fix a false positive high alarm."

These interferences keep the onboard oily water separator in recirculation, often causing confusion over where the real issues lie. "We've come across numerous ship Engineers who contact us to replace their Oily Water Separator because they are stuck with



A set of water samples showing increasing turbidity (left to right), as well as changes in colour. Illustration courtesy Village of Chase, British Columbia

constant 15ppm alarms. However, we find that their problems are usually misdiagnosed to the OWS, when the real culprit is their Oil Content Monitors," Ketchum states.

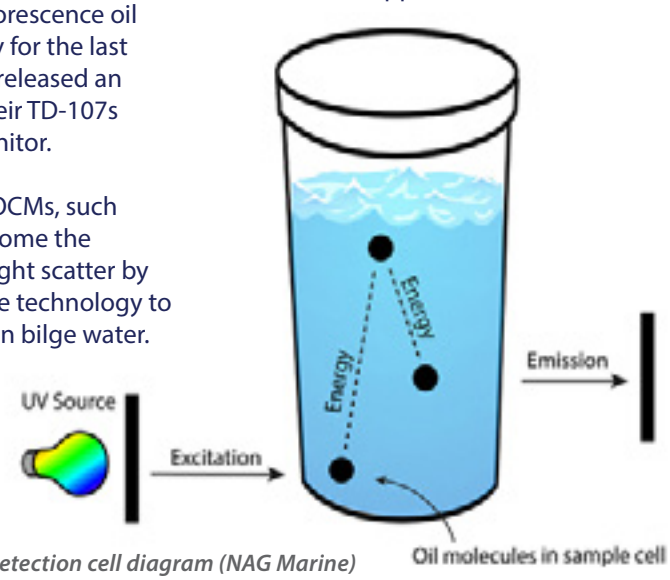
Old ships and dirty bilges covered in rust, silt, soot, and ash will often require considerable maintenance to ensure proper operation of the monitor and sadly, even attempts to clean the ship bilge could result in further issues for a light-scatter OCM. Surfactants and detergents that are used to clean the dirty surfaces are designed to breakdown oil particles into tiny, ultra-emulsified particles. In many cases, the photo detectors in light scattering OCMs are not sensitive enough to detect an ultra-emulsified oil of less than 10 microns in size. This could result in a false negative, allowing ultra-emulsified oils to be discharged over the side of the ship producing a tell-tale oil sheen on the water.

The maritime industry needs an updated solution, and fluorescence technology is poised to be just that. NAG Marine has been on the forefront of using fluorescence oil detection technology for the last decade and recently released an updated model of their TD-107s Bilge Oil Content Monitor.

Fluorescence based OCMs, such as the TD-107s, overcome the problems posed by light scatter by using UV fluorescence technology to detect oil molecules in bilge water. Oil is comprised of fluorescent compounds, each having a unique wavelength "signature". Using fluorescence, these compounds can be detected as an actual concentration of oil in water, with detection limits down to the parts per billion level.

By focusing readouts on a specific wavelength, a fluorescence-based monitor can ignore solids such as rust or silt and is less affected overall by turbidity, ultimately preventing false positive high readouts. Fluorescence is also capable of detecting ultra-emulsified oils to the parts per billion level, far greater than competing light scatter OCMs.

By putting proper oil detection technology in place, it is possible to save man-hours and the enormous costs associated with pumping oily-waste off to a barge or replacing an oily water separator system. NAG Marine's TD-107s features a small footprint and offers a modular, removable detection cell for simple swap-out by the end-user via plug-and-play connections. It is IMO MEPC.107(49) Compliant and US Coast Guard approved.



Simplified UV fluorescence oil detection cell diagram (NAG Marine)

INNOVATION

Making ship systems smarter with simulation

Source: Wärtsilä

"We have a vision of a more efficient, more connected, smart marine ecosystem," says Neil Bennett, Global Director of Simulation at Wartsila Voyage. "Being part of the development of autonomous shipping is fundamental to shaping that future."

Simulation is integral to developing autonomous systems. The computer models that underpin simulation-based training – capable of replicating almost infinite permutations of marine environments, vessel traffic situations, and ship equipment – are the same that are used to inform the decision-making capabilities of intelligent systems. Deployed in real time with real people in simulators, those same models can be used to test and validate the human-machine interface and, eventually, to teach the crew how to use those systems.

Three projects at Solent University, Southampton in the UK highlight the diverse roles that simulation plays. The university's research staff in the Warsash School of Maritime Science and Engineering recently participated in the MAXCMAS project – a GBP 1.4 mn, two-year project in which autonomous vessels were programmed to obey maritime regulations for the avoidance of collisions. The project tested the algorithms it had developed by modelling scenarios using simulation before a live trial was conducted onboard an autonomous minesweeping vessel in Weymouth Bay.

Building in seamanship

Preparing vessels to obey regulations written with human seafarers in mind is not a simple task, explains Terry Mills, Senior Simulation Technician at Solent University, Southampton. "The regulations are well written, but are always open to interpretation. And the interpreter is a human. A machine sees rules in black and white, so we had to build in seamanship. We ended up with a set of algorithms and an interface that could be retrofitted to any size of ship."

A much larger project was the Europe-wide, EUR 43 mn, Sea Traffic Management initiative. Ten simulator training centres – the European Maritime Simulator Network – worked together with the goal of understanding and then facilitating the kind of data exchange that will be crucial for safely operating autonomous vessels.

Wärtsilä, as a simulation provider, took part in this project, which Mills describes as an attempt to establish "air traffic control at sea." One key goal was understanding the data sharing needed between ports, vessels, and other stakeholders – such as ship service providers and onward logistics companies – to enable "just-in-time" sailing.

Three hundred vessels were fitted with tools to collect and transfer data. Studying interactions between these vessels provided important insights into how sea traffic could be better managed to optimise vessel voyages and port calls – reducing fuel cost and emissions. But even with so many vessels participating, the number of times ships would meet each other physically would have been rather limited. With the help of the simulator network, they met virtually, giving researchers the opportunity to collect more data faster.

Remote control training

A new potential project builds on Solent's strong previous experience in remote and autonomous ship systems. The university is bidding for funding to extend its investigations into training seafarers in remote operations. The project aims to link Warsash's simulation centre with one of the scale models it currently uses for ship handling training at a dedicated facility, Timsbury Lake. By using a simulator programmed with a scale model of the vessel and the lake area to control a real vessel, the project will provide a more realistic training experience for remote seafarers.

"One of the biggest barriers to training for remote operations is the capacity to test on full-scale ships," says Mills. "Using a real vessel would be expensive and dangerous if something went wrong. Simulations are great for learning pilot skills, but cannot provide that jeopardy."

The risk of putting a dent in one of the scale models on Timsbury Lake will provide that dose of realism. The fact that students will be operating manned models the same area will also allow researchers to study the interaction between remotely operated vessels and manned craft.

To assist in autonomous and advanced navigation projects such as these, Wärtsilä has created an open approach that makes it simpler for universities and research institutions to deploy its simulation technologies. While Wärtsilä often provides the hardware for such projects – including 3D screens and control units reproducing bridges – it is the software that is more critical. This includes the operating platform as well as models of sea areas and ship systems that can then be used in simulator rooms or fed into computers as needed.

One example is the Intelligent Shipping Technology Test Laboratory (ISTLAB) at the Satakunta University of Applied Sciences (SAMK) in Rauma,

Finland. The lab, among the first of its kind, is designed as a testing environment for remotely controlled, autonomous vessels. Wärtsilä recently delivered a navigation simulator and specific mathematical models for the project. They will be used to carry out simulated testing of remote-controlled vessels that the organisers hope will culminate in a real-world case study.

The smart tug of tomorrow

The benefits of early-stage simulation testing are already being seen in one real-life application – the IntelliTug project, a collaboration between Wärtsilä and Singapore's leading harbour and terminal towage operator, PSA Marine. The project aims to develop the smart tug of the future by retrofitting Wärtsilä's smart navigation system on PSA Marine's harbour tug, PSA Polaris. Through the simulator, the team tested the integration of cutting-edge technologies deployed – including collision avoidance software and system usability – with feedbacks from PSA Marine's tug masters. The success of the simulations boosted the project team's confidence to proceed with the next stage of the testing. In March 2020, Wärtsilä and PSA Marine successfully completed initial sea trials for the IntelliTug project.

The smart navigation system, comprised of Wärtsilä's Dynamic Positioning system, a sensor suite and a newly developed sensor fusion engine, allows the tug master to carry out passage planning while maintaining safe distances from other vessels during autonomous navigation. The IntelliTug project enhances the tug masters' capabilities through heightened situational awareness and eases the task of addressing other complex demands they may face.

Alexander Ozersky, Deputy General Manager of Intelligent Systems, Wärtsilä Voyage, explains: "Every system separately was complex, and once you connect them it was going to be even more challenging. We took the decision to try and debug all the pieces in the simulation using the actual control and a mathematical model of the engine. From an engineering perspective, we saved a huge amount of time, making quick mistakes as cheaply and as safely as possible."

Testing the integration of systems on an autonomous vessel is one thing; providing the systems involved with the intelligence to make decisions in complex marine environments is another challenge entirely. Here, the capability to simulate scenarios is just one building block. Another necessary foundation is the ability for systems to learn from experience.

It is a challenge that Wärtsilä has already addressed in its Advanced Intelligent Manoeuvring (AIM) function, part of its package of artificial intelligence tools. AIM is a track prediction system and anti-collision support tool designed to improve situational awareness and reduce the probability of officer inattention or poor judgement leading to an incident. It anticipates that vessels will move in compliance with collision regulations, but also needs to account for how humans interpret those regulations in various situations.

"Interpretation depends on context," says Ozersky. "The acceptable distance between vessels is one example. Less than one mile would be unusual in open water but very normal in a harbour."

Simulation meets machine learning
The artificial intelligence for AIM and other products – including Wärtsilä's Vessel Traffic Services for managing traffic in ports – needs to absorb the habits of local traffic and refine its simulations based on its observation of how vessels actually move. So far, the system has collected data on traffic movements at several ports. With each new set of data, the simulations become more realistic.

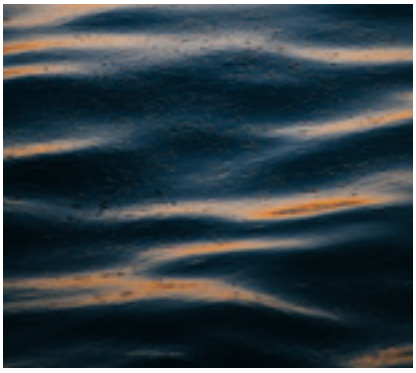
This combination of simulation and machine learning will be critical in controlling autonomous vessels. It is already available in decision-support software today and is being trialled in autonomous navigation systems. Before it is let loose on a wider scale, there are many problems to be solved. Among these are the ways in which autonomous vessels interact with other automated systems that do not follow similar protocols – let alone the even less predictable ways in which manned craft may respond to autonomous ships.

Neil Bennett concludes: "Our simulation technologies are providing researchers with a platform to run these studies, and we are constantly being challenged by the need to advance our technology further. We can already do a lot with the technologies we have, and we are evolving products to meet the needs of future autonomous vessel systems."

Source: Wärtsilä

WAKASHIO GROUNDING AND OIL SPILL: WAS THE MAURITIAN GOVERNMENT UNPREPARED?

By Professor Christian Bueger, who is the director of SAFE SEAS and a professor of International Relations at the University of Copenhagen. He has been studying issues of maritime security, counter-piracy operations, capacity building and maritime domain awareness since 2010 and has widely published in the area.



The devastating oil spill that wreaked havoc on Mauritius' coastline raises the question of whether the response by the government was appropriate. Was the country unprepared for a disaster of this scale? Were officials over-confident or misjudged the risk?

Evidence indicates that Mauritius was very well prepared; the event did not come as a surprise. Importantly, the country dealt with similar incidents very successfully before. Yet, a public inquiry will have to address a number of questions.

First analyses indicate that weather was not the problem. Yet, the vessel deviated from the usual course that traffic in the region takes. The ship was on a collision course.

No oil spilled at the grounding. The Mauritius coast guard took preventive actions. The government activated its National Oil Spill Contingency Plan the next day. By the 28th of July, the Dutch salvage company Smit Salvage had been contracted to work with local logistics giant CELERO to keep the MV Wakashio afloat and pump out the over 4,000 tons of oil and diesel. When the first out of four tugboats arrived three days later, the recovery operation was ready to begin.

The responsible minister for the environment said that he was confident that all "necessary precautionary measures to prevent any kind of pollution at sea" had been taken.

The weather conditions were against the minister's plans. The recovery operation was put on halt. The sea was too rough.

By August 5th observers spotted some minor oil sheen around the vessel. The "the risk of oil spill was still low", the minister argued. Only hours later, the MV Wakashio flooded and started sinking the next morning. Oil started to spill into the sea at a high rate. As a result, the disaster that is by now well documented unfolded. Government officials radically changed their tone.

In reaction, the prime minister not only declared a "state of environment emergency", but also said that the nation did not have "the skills and expertise to refloat stranded ships." The minister of fisheries, told international news media, "This is the first time that we are faced with a catastrophe of

this kind and we are insufficiently equipped to handle this problem."

The foreign minister called upon the UN, the EU, India its neighbour France, as well other countries and organizations for emergency assistance.

These public statements by governmental officials raise the questions whether authorities were unaware about the risk and unprepared.

Mauritius was prepared

A look into the archives reveals that the government was anything but unprepared. The opposite seems the case. It shows that until the disaster, Mauritius was the 'poster' boy of regional oil spill prevention. Mauritius was one of the first African countries to finalize in 1990 an oil spill contingency plan with support from the International Maritime Organization and the UN Environmental Programme.

Between 1998 and 2003, Mauritius was one of the beneficiaries of the Western Indian Ocean Island Oil Spill Contingency Planning project run by the World Bank. Through the assistance of the project, the government updated the national contingency plan. Workshops and training were conducted, and a regional agreement signed.

The Marine Highway Development and Prevention Project running from 2007 to 2012 continued this work. Funded by the Global Environmental Facility the country received more training in oil spill prevention and reviewed the plan. After the end of this project Mauritius received training under the UNEP's Regional Seas Programme and the Nairobi Convention.

In addition, the country is also one of the main beneficiaries of the MASE project of the European Union under which maritime security structures are developed for the region.

As part of these projects, between 2003 and 2012, the country held five larger exercises and drills on oil spill prevention. Moreover, Mauritius had plans to conduct an exercise later this year.

In short, the country benefitted from quite substantial capacity building assistance by the United Nations family and other actors. Governmental representatives regularly participated in workshops and conducted training exercises.

Level of Preparedness

Only some months before the disaster occurred, governmental officials attended a workshop on the theme. In March 2020 the UN Environmental Programme organised the workshop on 'Cooperation in preparedness and response to marine pollution incidents' in Zanzibar.

As the records show, representatives from the ministry of environment and the ministry of fisheries of Mauritius attended. They gave a presentation on the countries "national oil spill preparedness status". The records of the meeting reveal, first, that officials were very well aware that the country is at a high risk of oil spills due to the vicinity of one of the world's busiest shipping routes. Second, it documents that the country had a range of sophisticated planning, response and disaster assessment tools. Third, the Mauritian officials highlighted that not all elements of the strategy were very practical, and that some components of it were missing, such as a wildlife response plan.

The presenters emphasized that regional cooperation was not working very well, and that

the country has too "limited resources in terms of funds and human capacity".

Earlier incidents

In disaster response, a good plan is not enough. Practical experience matters. Did Mauritian authorities encounter any real-life incidents? While not necessarily at the scale of the MV Wakashio incident, authorities had to deal with two major cases in the past years.

In April 2005 a collision occurred off Port Louis between the MSC Katie and the MV Nordsun. The MSC Katie sustained cracks and was grounded on a reef to avoid sinking. Mauritian authorities successfully prevented an oil spill.

An incident that was very similar to the grounding of the MV Wakashio occurred in June 2016. The MV Benita went aground not to far from the site of the current oil spill. While the vessel was damaged, a salvage company was quick on site. The contractors pumped the fuel out of the vessel, and only a very minor spill occurred. The company tugged the MV Benita away to India. On route the vessel sank.

As a result, Mauritius was not only aware of the risk and had elaborated planning tools, authorities also had experience with incidents of this kind.

Is this the explanation why the minister of environment was so confident that all was under control? It is likely the case.

The Mauritius oil spill tells us what can happen even if you are well prepared. Planning does not always go as intended. Capacity building and training has its limits.

A public inquiry: Questions to ask

Mauritius will need to launch a public inquiry into the accident. The investigation will certainly establish that the government's response was not perfect. It will identify areas in which the agencies could have performed better.

First, the authorities had stocked an insufficient amount of containment equipment such as booms. The response had to wait for equipment to arrive or rely on the improvised devices made by volunteers.

Second, was the right salvage company chosen and did the Dutch experts have the right strategy? The ship owner Nagashiki Shipping contracted the company. Yet, It is important to know how the experts cooperated and coordinated with the coast guard and the government overall.

A third major question concerns whether maritime situational awareness could have detected the ship early on. Better maritime surveillance might have recognized the ship earlier. We need to know if the disaster could have been prevented by a coastguard interception.

Finally, the regional dimension needs to be looked at. Why did the regional mechanisms for maritime security and environmental disaster developed in the diverse capacity building projects had no role at all in the response? Would it have made a difference if the government relied on the expertise of organizations such as the Regional Maritime Information Fusion Center?

Learning these lessons will help other countries to prepared for and prevent the next disaster. Moreover, the lessons might lead to a better integration of Maritime security and environmental efforts in capacity building. Perhaps they will even assist in building a less fragmented regional architecture in the Western Indian Ocean.

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Photo Credit: IMO
IMO helping to mitigate the impacts of MV Wakashio oil spill in Mauritius
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Shipbuilding in dire straits: global ordering hit hard in the first half of 2020

by **Jasmina Ovcina**, author at Offshore Energy

There has been a dramatic fall in shipbuilding activity during the first half of 2020 as the COVID-19 pandemic curbed owners' willingness to order new ships amid market uncertainties and restricted access to capital.

Based on data from VesselsValue, the number of ordered ships in the first half of 2020 has almost been halved when compared to the same period a year earlier. Namely, the valuations agency's record shows that in the first half of 2020 there were around 332 new ship orders across all sectors, a 47 % fall when compared to a total of 625 orders in the first half of 2019 across all sectors.

This is further down from the corresponding 2018 figures that equalled 881 orders.

Data from Clarksons Research Service, cited by Yonhap, paints a similar picture, with global new shipbuilding orders totalling 5.75 million compensated gross tons (CGTs), or a total of 269 ships being ordered during the January-June 2020 period.

The tally is believed to be the lowest since 1996.

According to Clarksons, Chinese shipbuilders secured the majority of orders totalling 3.51 million CGTs, or 145 ships, followed by South Korean shipbuilders with 1.18 million CGTs, or 37 ships, and Japanese players with 570,000 CGTs, or 36 ships.

The ongoing situation has also impacted the number of delivered vessels, with a lot of slippage being reported so far this year.

VesselsValue told Offshore Energy-Green Marine that at this point in 2019 there were 873 live vessels delivered, while there are 758 this year. The UK-based maritime online valuation provider explained that being halfway through the year means over half of the 2020 vessels were expected to be live. However, there are a lot of ships still on order which are likely to slip further into 2021.

CONSOLIDATION

The shipbuilding sector has been battling the dry spell for some time, which has driven some industry majors to join forces and consolidate ranks.

This has been the case with Japanese shipbuilders which are faced with fierce competition from South Korea and China. The consolidation wave among Japanese shipbuilders has been in progress since 2016, with Mitsubishi Heavy Industries (MHI) launching talks to form alliances with three compatriot shipbuilders – Imabari Shipbuilding, Oshima Shipbuilding and Namura Shipbuilding.

The downturn has seen China merge its top shipbuilders China State Shipbuilding Corporation (CSSC) and China Shipbuilding Industry Company (CSIC).

Meanwhile, South Korean top builders, Hyundai Heavy Industries and Daewoo Shipbuilding & Marine Engineering (DSME), are undergoing a regulatory review of their proposed merger.

OUTLOOK

The pandemic has hit European shipbuilders, predominantly engaged in the constriction of cruise and RoRo vessels, extremely hard, as yards face construction delays from cruise liners and seek to secure financing for continuation of activity on existing ships. Since the beginning of this year, we have seen German shipbuilder FSG file for insolvency and more recently Kleven Verft filing for bankruptcy after a loan termination.

Operations at STX Offshore & Shipbuilding Co. in Korea ground to a halt after unions launched a general strike on June 1 calling for an end of unpaid furloughs, as reported by the Korea Herald. The cost-cutting measures impacting the workforce are being pursued as the shipbuilder failed to secure any new orders since the beginning of this year.

Aside from COVID-19 related impact on new ordering, there is also the issue of vessel overcapacity in the industry at a time when demand is constrained, particularly in the container shipping sector. BIMCO's data shows that in the last three years of the past decade, demand outgrew the fleet as the TEU capacity of the fleet grew by 75.6% whereas demand measured in volumes was up 46.1%.

This imbalance left the container shipping market in a worse condition at the end of the decade than at the start.

So, how do we save the shipbuilding industry from going bust if ordering of new ships is not the solution?

Restricted demand growth prospects coupled with overcapacity across shipping markets are clear indicators that the industry must up its efforts when it comes to demolition and retiring old, inefficient fleet. On the other hand, with the growing pressure for the industry to cut its emissions and decarbonize there is also the need to build greener and more technologically advanced ships.

The survival of shipbuilding companies is likely to depend on the shipbuilders' ability to rise to the occasion and speed up the construction of zero-emission ships. Be it hydrogen, ammonia, or electrically powered, one this is certain: the clock on decarbonizing is ticking and the time has come to make that giant step into the future.

Returning to 'business as usual' is not an option, and the new reality of demand downturn and economic troubles shows that for shipbuilding it will probably mean the survival of the toughest and most innovative.

SACRIFICIAL ANODES...

...a waste of money?

By **David Pestridge** MIMMS

David is a yacht and small craft surveyor based in the UK south west region. He founded White Hat Marine Surveying in 2008 when he retired from the British Army after a 17 year career with the Royal Electrical and Mechanical Engineers.

Building on 20 years' experience as a sailor and boat owner he completed the highly respected IIMS Diploma in Yacht and Small Craft Surveying.

David is a Chartered Engineer, has a Master's Degree in science and is a member of the IIMS management board.

Sacrificial anodes are something every boat owner should be aware of, yet not every boat owner will need them. The principle is quite simple; the material that the boat is made of and the environment in which it is kept has the propensity to cause serious metal loss through corrosion if things get out of balance. Sacrificial anodes are there to help mitigate minor imbalances in this situation but cannot in themselves fix a problem that is out of control. That all sounds rather nebulous doesn't it?

The process we are concerned with here is galvanic corrosion; the corrosion of one metal in the presence of another where both are electrically connected by a conducting medium. The variables here are the types of metal involved and the medium in which they are used (fresh, brackish or salt water). We can deduce which metals are more susceptible to galvanic corrosion by considering their relative potential in a series known as the Galvanic Series. Here is a simplified galvanic series for a selection of typical marine metals in salt water (the relative order of the metals may change slightly in different marine environments).

Gold – Most 'noble' metal

Titanium

Stainless steel 316 (passive)

Stainless Steel 304 (passive)

Silicon bronze

Stainless Steel 316 (active)

Monel 400

Phosphor bronze

Admiralty brass

Cupronickel

Brass plating

Yellow brass

Naval brass 464

Tungsten

Stainless Steel 304 (active)

Chromium plating

Copper

Cast iron

Mild Steel

Lead

Tin

Zinc anode

Aluminium anode

Magnesium anode – Least 'noble' metal

So, whilst it would be really useful to build our boats out of gold and titanium, they are not the most practical of hull building materials for several reasons. You may be surprised to see plain old mild steel so far down the table and that is probably the most significant observation to make. Mild steel is readily corroded by almost all of the other marine metals, however that is mitigated by what is called the surface area effect, whereby a less noble metal (e.g. a steel hull) can lead to the corrosion of a more noble metal (e.g. a small brass skin fitting) due to the imbalance in their relative surface areas.

This brings us to the final consideration, how effective is any given anode? The choice of anode material is dependent on the medium in which the vessel is predominantly used. Magnesium anodes are best suited to fresh water, aluminium for brackish waters and zinc for salt water. An easy way to remember this is to remember how water flows with this cunning euro-mnemonic "Mountains Am Zee": M (fresh water – magnesium) A (brackish – aluminium) Z (sea – zinc). Next to consider is the size of the anode and how much metal it can 'protect'. There is no precise answer as to how effective any individual anode will be as its position, electrical contact and the size and composition of nearby metals all influence its performance. As a rule of thumb however, we should expect a typical anode to be effective to a distance of 6-7 times its own length. So, for a typical 3.5kg magnesium narrowboat anode that is approximately 300mm long, it should be effective to a distance of about 2 meters in any direction.

A sacrificial anode's effectiveness is directly proportional to the purity of the metal from which it is cast. Zinc anodes must be more than 99% pure zinc if they are to function effectively and their performance is greatly reduced by the presence of impurities such as lead or iron. So, whilst high quality zinc anodes from a reputable supplier are expensive, you are paying for this guarantee of quality that the anode will do its job. There are plenty of lesser quality anodes available online which come at a greatly reduced price. These are typically cast by scrap merchants melting down old zinc fittings and part worn anodes without the equipment or expertise to refine the resultant metal. As is nearly always the case; you get what you pay for.

Narrowboat anodes can be fitted as either welded or bolt on

Part wasted magnesium anode with deep irregular pits

Fully wasted zinc anode – 'well sucked lollipop'

So how can we make best use of this knowledge to keep our boats in good order? The deductions we make here are very dependent on what type of vessel we are considering, what is has been built from and where it is being used. Narrowboats are most commonly found with a pair of anodes fitted at the bow and another pair fitted at the stern, typically on the swim, with occasionally a smaller anode on the rudder. Noting our observation regarding the effective range of an anode, this leaves much of the mid-section of a narrowboat unprotected. Given that this is where we often find the heads and the galley with their associate through-hull fittings, this can lead to galvanic corrosion in this area of either the hull or the skin fittings if they are made of cheap non-DZR (dezincification resistant) brass. So for a narrowboat, the optimum anode fitting plan is to fit them in pairs on either side at 1m from the bow, 1m from the stern and then evenly spaced at 4m intervals along the hull sides, fitted below the waterline and just above the chine. A final few key 'rules'. Don't fit them on the bottom plate as they will get snagged or rubbed off or the hull will rest on them when the hull is slipped and never paint anodes as that stops them working completely.

The use of anodes on FRP sailing and motor yachts is slightly more nuanced given the absence of a large steel hull and instead a non-conducting hull material. Here we are concerned with the various metal through-hull fittings, the propshaft/s, propeller/s, p brackets, outdrives and any below the waterline hull fastenings used in the construction. Most modern boat propellers are cast from either manganese bronze or stainless steel mixed with several other alloying components to deliver a strong, durable propeller which is corrosion and erosion resistant and all within a cost envelope. Skin fittings found on FRP vessels on the other hand range from domestic grade yellow passivated brass bathroom fittings to top quality cast fittings from reputable companies such as Blakes. Here the surface area of the propeller can outmatch a nearby low quality fitting or the presence of a couple of top quality fittings can outmatch the propshaft or rudder bearings. Due to the lack of electrical connectivity offered by the hull itself, we now introduce the principle of bonding to enable the sacrificial anodes to be suitably 'connected' to the full suite of skin fittings and other machinery to be protected. This is done internally with suitable marine grade tinned copper strand wire and marine grade fittings.

New saildrive zinc anode

Bronze grounding plate

A final consideration in how to protect the boat from galvanic corrosion is the risk posed to it by other vessels via shore power connections. The earth wire is connected as a common ground for all vessels and the pontoons themselves. There have been many instances of vessels suffering dramatic and, in some cases, terminal corrosion due to the faulty connections of shore power terminals or nearby vessels, which can turn your own hull into one massive anode and wreak havoc with propshafts, props and if a skin fitting is compromised the vessel is at risk of sinking.

A galvanic isolator (sometimes also referred to as a zinc saver) is fitted into the vessel's earth wire immediately after the shore power connection socket and before the earth wire connects to the boat electrics in any way. It is a solid-state device which blocks any stray currents and prevents the boat's anodes being used to protect nearby vessels and the pontoon!

They are not particularly expensive but are worth the outlay for the protection that they offer, especially if the vessel spends a lot of time connected to shore power.

A more thorough (and expensive) solution is to fit an isolation transformer, which introduces a physical break in all three incoming shore power wires and transfers power onto the boat magnetically via the transformers windings. This can provide a very safe electrical environment for working on the vessel's electrical systems and for any swimmers in the water as the boat is no longer physically connected to the shore side power circuit. They are also excellent at preventing local stray current corrosion, but that is a subject for a blog in itself.

IN SUMMARY:

Fit the right anodes for your environment "Mountains-Am-Zee"

Buy quality anodes from a reputable source

Fit them according to the vessel type at the recommended scaling

Make sure they are below the water-line but not on the bottom plate

Consider whether the vessel needs bonding

Examine the shore power connection and upgrade it if possible

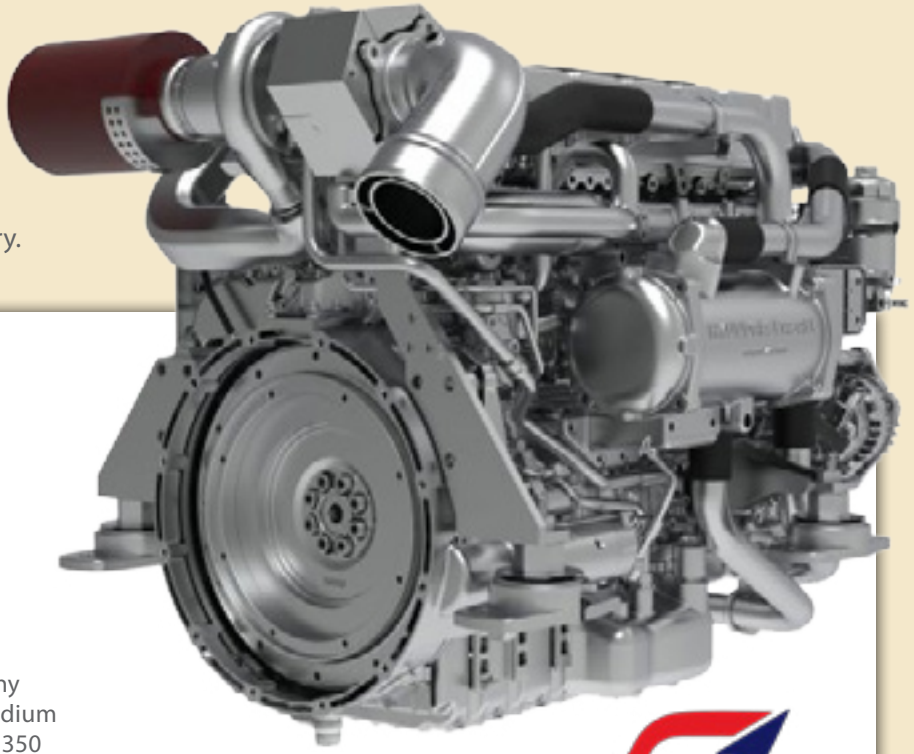
Do not paint anodes or grounding plates

Other reading on this topic
The author refers you to an excellent, recently published handy guide which covers this and related matters, co-written by Jeffrey Casciani-Wood HonFIIMS and Elliott Berry FIIMS that is available from the IIMS.

What A Marine Surveyor Needs to Know About Corrosion, Electrolysis, Galvanism, Anodes & MIC is available in paperback at £25 plus post and packaging or as a downloadable pdf for just £22. Click for details at **https://bit.ly/3hVwjxf**.

NEW PRODUCTS

Each quarter The Report brings you an update on some of the new products and innovations to hit the boating, shipping and maritime industry.



Hyundai SeasAll focuses on diesel propulsion

Hyundai SeasAll has released a trio of new diesel engines, the new SB30-OB outboard and a pair of engines based on the 6.7 litre 'G' family produced by parent company Hyundai-Kia Motors. The two new medium speed G7 engines are the G300 and G350 and turn at 2,500 and 2,800rpm respectively. They feature solenoid-controlled common rail fuel injection and an electrically activated waste-gate turbo charger.

With an easily accessible seawater impeller, eco-type oil filter and electric oil extraction pump, the new engines and suitable for both commercial use and larger pleasure craft.

"The diesel outboard market is expected to expand decisively compared to the existing gasoline outboard market in Korean waters," explained Seung-Kab Jeong, Hyundai SeasAll's chief executive. "As a result we expect the S30-OB to play a significant role as a cash cow in the company."

Introducing a new friction reducing fairlead

The A.597 roller fairlead from performance sailing hardware manufacturers Allen is a cam cleat accessory for mainsheet jammers and is designed to reduce friction and wear from the mainsheet system.

This product was developed on feedback from some of the world's most knowledgeable Finn sailors at the 2019 Finn World Masters. Feedback from some of these greats in the sport included; reducing the friction involved when pumping or playing the mainsheet through a mainsheet jammer.

The A.597 replaces the standard fairlead on a mainsheet jammer with a roller system. Initially designed to fit with the range of mainsheet jammers available from Allen, but can also be easy installed to any cleat with a 38mm fixing hole centrer.

Evoy develops 150 hp electric outboard motor together

Evoy's vision is to eliminate emissions from boats. Norway based Evoy is focused on the commercial market with an inboard propulsion system for boats between 20 and 40 feet. The goal is to have the new electric outboard completed and ready for the market in first quarter of 2021. The prototype outboard is based on a 90 hp and with a more powerful lower leg, it will likley perform equivalent a 150 hp petrol engine with electric propulsion. The testing will be carried out in the fall of 2020 will give the final results on performance and range.

Evoy 150

Ocean Signal announces compact EPIRB

A new Emergency Position Indicating Rescue Beacon (EPIRB) features a 30% reduction in size compared to other EPIRBs and a 10-year battery life. Ocean Signal said it has developed the world's most compact Category 1 (auto-deploy) EPIRB – the SafeSea EPIRB1 Pro. Weighing 422g, the EPIRB1 Pro measures just 178mm (h) by 89mm (w) by 100mm (d).

The SafeSea EPIRB1 Pro is designed to release automatically from the Category 1 Auto Deploy Bracket once submerged in water and float free from a sinking vessel. When floating on the surface, it will then transmit the boat's distress message to alert rescue authorities. Users of the EPIRB1 Pro can expect their beacon to be located within 100m, 95% of the time, within five minutes of the distress signal.

Ocean Signal's SafeSea EPIRB1 Pro communicates the location of the survivors to search and rescue services in three ways – the designated 406MHz Cospas-Sarsat satellite system with position provided by an integrated GPS receiver, a 121.5MHz homing beacon, plus a high brightness LED strobe light to maximise visibility in low light conditions.

ocean SIGNAL

Vetus expands its thruster series

Vetus has expanded its BOW PRO thruster series with two new larger Boosted models, the BOWB180 and BOWB210 launched. The latest models are energy efficient and have longer runtime, utilising features such as heading hold or position keeping.

A third connection on the motor leads the current to an internal charger, stepping up the voltage from 12 volt to 24 volt or 48 volt. This allows a 12V or 24V charging source, such as the propulsion engine alternator, to charge a 24V or 48V battery bank. The thruster battery bank is charged any time the thruster is not being used.

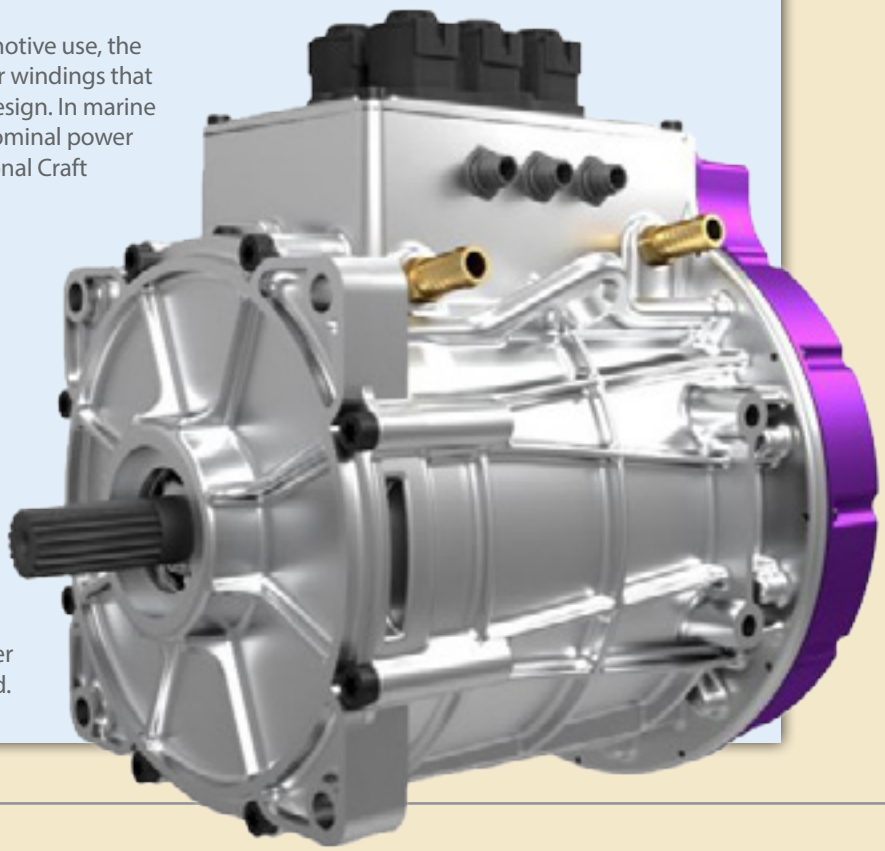
Innovative Volabo electric motor expect by year end

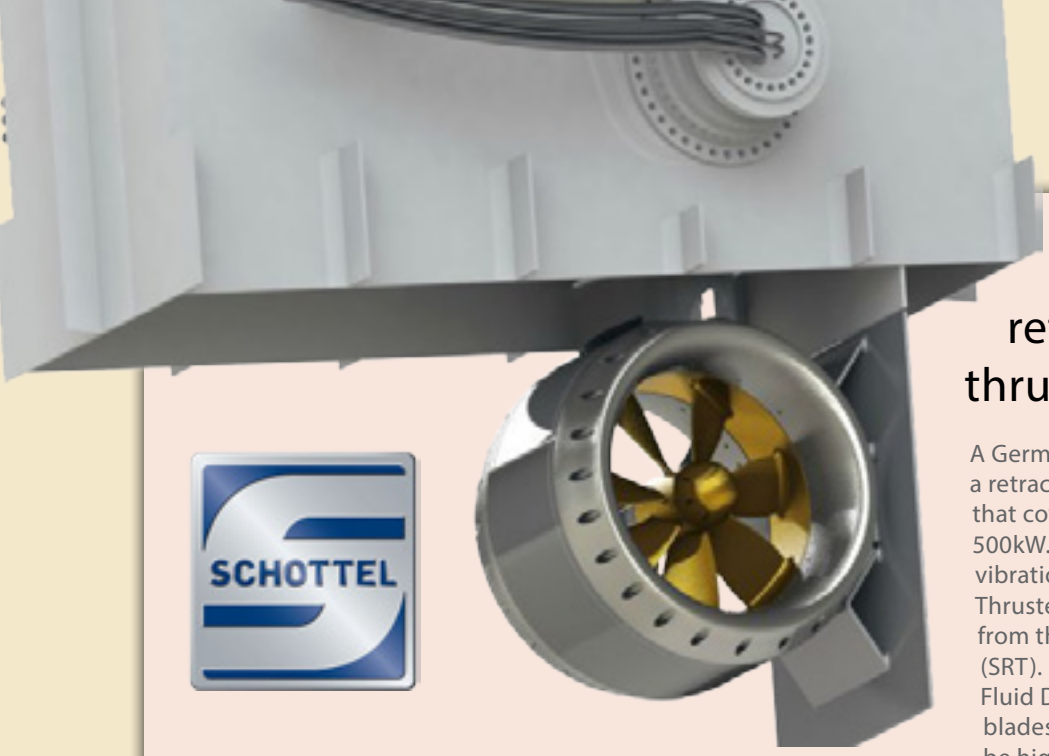
The company behind the innovative Volabo electric motor has announced that they have now put the motor into series production with the first units being available at the end of the year.

Developed and tested for both marine and automotive use, the Volabo electric motor uses a unique form of stator windings that allow much better torque and a more compact design. In marine form it will produce 80kW of peak power and a nominal power of 50kW and it is expected to match the Recreational Craft Directive requirements.

A feature of the Volabo motor is that it operates at 48 volts DC which the company claims is a 'safe to touch' voltage. This means that the wiring and clamping technology is much simpler and technicians do not require extensive training and certification.

The motor can be mounted either vertically or horizontally due to a reinforced end shield and this makes it suitable for connection to saildrives, outboard motors, shaft drives and z-drives. The 50kW power output has been selected to meet the propulsion requirements of a wide variety of craft including RIBs and smaller workboats where electric propulsion is in demand.





Schottel launches retractable rim thruster

A German propulsion expert has launched a retractable variant of its rim thruster that covers the power range up to 500kW. Designed for low-level noise and vibration, the Schottel Retractable Rim Thruster (SRT-R) has been developed from the company's existing rim thruster (SRT). Optimised by CFD (Computational Fluid Dynamics), the internal propeller blades are hydrodynamically designed to be highly resistant to cavitation.

The SRT-R can cover a thrust radius of 360 degrees. This offers additional versatility, and also allows the thruster to be optimally adapted to any requirement and operation profile, including dynamic positioning operation or as a take-home device.

The SRT is an electric propulsion system. The electric motor stator is installed in the outer part of the tunnel, while the propeller blades are attached to the inside of the rotor. This results in a space-saving and low-weight thruster. It converts electric power directly into propulsion power. Surrounding water permanently cools the electric motor, preventing it from overheating.

Stay tension can be measured in realtime via smarttune

Cyclops Marine has launched a simple-to-install load sensor that accurately measures stay tension in real time and transmits rig-loads wirelessly to a smartphone or boat instruments.

The smarttune load sensor is the first in a new smart range of load sensors and enables users to measure and repeat their fastest settings, control their forestay sag and headsail shape, alongside the mast bend to manage the mainsail shape for optimal racing performance in all conditions, on all points of sail.

The load sensor can be swapped in for the existing turn screw in minutes and showing the live rig load on the user's smart device seconds later.

The load sensor also shows the rig live load so the crew know they are not overloading it, plus sends live data to mast instrument displays and mobile apps, creating a better communication link between trimmers, tactician, and helm.

PUT EVERYTHING IN WRITING!

By **Karen Brain**

INSTRUCTION, CLIENTS & TERMS AND CONDITIONS

In life most things are simple, and this is so if basic guidelines are followed in what ever you do in your business and personal life. It is so easy to overlook, neglect to do or decide in a fleeting moment of haste that a step is not necessary and so omit it; and those omissions can often lead to substantial long-term grief.

In this short article we are going to look at a few basic steps that should be undertaken when dealing in business i.e. when forming a binding agreement (a contract) to reduce the possibility of "grief".

We start by asking three basic questions:

1. Do you know who instructed you?
2. Do you know who your client is?
3. Do you know if your terms and conditions are accepted?

So, a scenario is: You take a telephone call from a person, perhaps a sales broker, asking you to undertake a survey on a vessel for which he has a potential purchaser. Business for you may be slow, or it seems a good opportunity or you know the broker well. So, you say yes you will do the survey.

- **Have you formed a binding agreement (oral contract) at this point? Good question. Not if the amount to be charged has not been discussed and agreed; consideration is a required element of forming a binding agreement (a binding contract) and this can be money or monies worth.**
- **Have you advised them before accepting the job that all your work is undertaken under your terms and conditions; these may be standard terms and conditions?**

Let's go back a stage. A contract (a binding agreement) may be oral or written and is formed by:

- **Offer**
- **Acceptance**
- **Consideration**
- **Intent to create legal relations**
- **Certainty**

The last two elements are normally quite obvious so we will not concentrate on these in this article.

In the above scenario who is offering and who is accepting?

It should be made clear that you as a surveyor are offering your services at the agreed price with your terms and conditions applying; the client should be the one accepting your offer, preferably in writing.

Your terms and conditions may be attached to an email or included as an attachment to a letter and you may request they are signed and dated by your prospective client and that they return a signed and dated copy to you before you undertake the work – this is preferable. Or you decide to refer to your terms and conditions applying to all your work and direct them to an attachment to an email or an inclusion in a letter. Another alternative is to state your terms and conditions apply to any work you undertake and refer them to a copy on your website by providing the URL; you may do the latter and still ask them to confirm they agree to your terms and conditions. There are different options available to incorporate terms and conditions in a binding agreement.

A final catch all is to state that even if they do not confirm they agree to/sign your terms and conditions, they agree to your terms and conditions by accepting your offer of services. Whatever you do, you must make sure your terms and conditions apply to your contract (your binding agreement) with your client.

If you agree with the sales broker to do the survey what is his status? Is he an agent of the potential purchaser? Has he become your client? Payment for a service is just one element that is looked at by courts when deciding who are the parties to a contract. You may have formed a contract with more than one person by accident. Thus, the rule is, always write to your client before commencing work and ensure they confirm you are working for them only and that they accept your terms and conditions.

It is helpful if you always state in your survey report that the survey is only for the benefit of your client "Mr Bloggs" and there can be no reliance on the document for other parties and neither do you have any liability to anyone else except your client and that the document cannot be released to any other party without your written agreement. You may wish others to be able to rely on the survey report and if so you would need to add that other parties can rely on the survey report but only if you give your written agreement (consent). The decision is yours as to how wide you wish your liability to be to parties.

So, three simple things to remember:

- **Know who is instructing you**
- **Identify your client by confirming in writing to your client your instructions, your offer and supply them with your terms and conditions at this point**
- **Ensure your terms and conditions are accepted by your client**

"put everything in writing"

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The root of most problems with contracts is caused by common formation problems.

By **Karen Brain**

Contracts and law govern and fundamentally affect the operation and functioning of businesses. As such, businesses and their personnel should be aware of and understand the formation of contracts and their key elements that will affect the relationship and liabilities to their clients.

First you have to ascertain if a binding contract (a binding agreement) actually exists. Secondly, if so, what terms have been incorporated into the contract.

This article "dips" into the arena of forming contracts. It is not meant to be a comprehensive overview of contract law, which is highly complex, it merely seeks to summarise the fundamental elements of a contract which a business should consider when contracting with other entities.

Offer

1. An offer is a promise by one party to enter into a contract with another party.
2. An offer must be (a) specific (i.e. unambiguous/unequivocal); (b) complete; (c) capable of acceptance; and (d) made with intention of being bound by acceptance.
3. An invitation to treat is not an offer. An example of this is a shop window. If you are not dealing on your own standard terms, it may be beneficial to send an invitation to treat and wait for the other party to return with an offer. This then gives you the discretion and flexibility in accepting or rejecting that offer.
4. An option is to send out all correspondence marked "subject to contract", until you wish to form a binding contract. This clarifies that communications are invitations to treat and avoids you potentially being bound to the other party inadvertently.
5. Check that your standard terms are included in your contracting procedures and ensure those staff forming contracts understand how to ensure to include your terms and conditions in a contract.

Acceptance

1. Acceptance is a final and unqualified assent to an offer.
2. It must be communicated to the offeror to be effective, however, conduct can sometimes constitute acceptance.
3. Do not forget that contracts can be made by email/orally and they do not have to be formal written documents; and you can modify contracts also in this way by intention or accident. So, the rule is "use informal communications with caution!"

Sometimes it is better to consider heading all emails with "subject to contract" as a failure to do so runs the risk of forming a contract without the intention and/or having the appropriate protection.

4. Now for the battle of the forms. At what point is the contract formed? Which party's terms will apply? If a party offers to contract on its own terms, which the other party accepts but then imposes its own terms, there is no acceptance but rather a counter-offer. Each party wants to ensure its terms are the last set of terms despatched prior to performance, at which point the contract between the parties is formed.
5. Acceptance is the final step before the contract is formed and becomes binding, unless the other party agrees to vary the terms of the contract at a later date; so at this point normally no other terms can be incorporated into the agreement, unless the agreement provides for it.

Consideration

1. A promise cannot be enforced unless there is consideration given or promised in exchange for it.
2. Consideration does not need to be adequate, however, it must have some value (monies or monies worth).
3. Deeds do not require consideration to be given. A deed is a written document which is executed with additional formalities and by which an obligation binding on some person is created or confirmed.
4. Past consideration is no consideration, i.e. if a party performs a pre-existing obligation, it does not constitute consideration for a new obligation.
5. In most cases consideration is obvious but if you are not sure it exists either acknowledge in an agreement the existence of some consideration (e.g. £1) or execute the agreement as a deed.

Intention

1. A contract cannot be made unless the parties have a mutual intention to create a legally binding agreement.
2. An intention to create legal relations is presumed in commercial situations but it is always better to make it clear.

Certainty

1. The agreement must be complete. It must not lack an essential term which constitutes the fundamental purpose of the agreement.
2. The agreement must not be vague or ambiguous i.e. uncertain.
3. Although in some circumstances a court may decide to fill in perceived "gaps" in a contract in accordance with the parties' intentions at the time, this should not be relied on.

Do think carefully when you are forming a binding agreement (a contract) with one or more parties to ensure you have incorporated your terms and conditions in the contract that you may wish to rely on at a future date.

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A day in the life of...

Jeffrey Casciani-Wood

Mike Schwarz caught up with veteran, retired surveyor, Jeffrey Casciani-Wood, aka Mog as he is known, just a month before his 90th birthday. Happy birthday Jeffrey from the IIMS family.

Believed to be the Institute's second oldest member, he will turn 90 next month and held the position of President between 1997 and 2000. Many members will know and have met Jeffrey - most would sum him up as a character with an encyclopaedic knowledge of the surveying profession. He has enjoyed a rich life, much of it devoted to the marine surveying profession. His knowledge and experience of the marine industry is vast and, although retired for a number of years, Jeffrey just loves to keep his hand in and continues to contribute in any way he can. His latest article on fastenings, Part II of which is published in this edition of The Report, is another fine example. Mike went in search of the man behind the character.

QUESTION 1

How many years did you practise as a marine surveyor and what was the appeal of the profession that drew you into the industry?

I actually started learning about surveying when I was an apprentice. Often we would drydock a ship which was undergoing one of the Class surveys when it was necessary to 'open up the lifeboats' also for survey. They were mainly wooden clinker-built lifeboats and I knew the class surveyor quite well because I was the only lad doing the job. He would frequently ask me what I had found, have a quick look at any defects I told him about, write in his notebook and then clear off. A couple of days later we would have repaired the defects, boxed the boat up and that was it. He would also often ask me how busy we were and, if we were not too busy, he would 'find' non-existent defects to give us some work. When I finally gave up working as a shipwright in 1957, I worked for some eight years in the drawing office at Blackwall yard after which I started working in 1965 for a city consulting engineer. In that role I was classed as a surveyor finally setting out on my own in 1970. I officially gave up work as a surveyor when my wife died in 2005, so the answer is 43 years plus!

What was the appeal? My father died when I was aged just 10 and he had been in the 'Andrew' (The Royal Navy) in the first world war and the (probably wildly exaggerated) tales of those days thrilled me and, from a very early age, I wanted to go to sea like my dad. When I reached the age of 14, my mother told me that, because of her circumstances, I had to leave school and go to work. She had a good friend called Gus Forsberg who was the Company Secretary of a shipyard at Blackwall, and he offered to give me a job. I was delighted. I started work there on the 1st day of January 1945. The rest, as they say, is history.

A view over West India Docks from the east. Blackwall basin is the round dock in the middle fore ground. On the day I started work the shipwrights were docking a destroyer in the drydock that leads off the basin (underneath the two white sheds in the middle foreground to the left of the basin).

QUESTION 2

Given that you have been retired for a number of years what is it that drives you on to remain current in the market, even today, by which I mean writing magazine articles, publishing handy guides, attending and presenting seminars?

When I first started as an apprentice, Bert Powell, the charge hand who had the job of teaching me said, "This aint a trade, son, it's a disease, and what you'll need most of all is a sense of humour!" He was right on both counts. I simply caught the disease. It is incurable. The sense of humour grew over the years. The profession has given me a very interesting life. I have travelled to over seventy different countries, visited every continent and sailed on a number of seas including several trips on trawlers and the (in)famous Liberty ships, and, I think that I am right in this when I say that I am probably the only one in the IIMS who has worked under enemy fire in the second world war. I remember working on a ship in what is now St. Katharine's Yacht Harbour, London and watching the last of the flying bombs go over. Some memories I would prefer to forget.

I really enjoy writing those papers and booklets because I know that they help many people to pick up some of my own hard-won knowledge which I enjoy sharing. I learned very early on that the best way to learn is by making your own mistakes even though you hide them by calling them experience. It is better, if you can, to learn the lessons from someone else's mistakes and those papers and booklets often contain knowledge gained that way.

Blackwall Yard No 2 dry dock. The last on the London river and now a listed building.

Taking UTS Measurements on a Narrowboat in the Dry Dock at Enfield.

QUESTION 3

What in your opinion have been the biggest and most challenging changes over the past 50 years in the surveying profession and have they necessarily improved a surveyor's lot?

The coming of the container with the consequent disappearance of the break bulk general cargo ship and the merchant marine and, subsequently, the closure of many commercial docks and nearly all the British shipyards. That has resulted in many people coming into the profession who do not have that background of shipyard work and/or seagoing experience that I had behind me. That has been a very big challenge and has meant that the folk who do try to follow the profession have to start from the ground (or waterline) up, often when they are already mature adults. I am often privately horrified at some of the things I have heard surveyors say, or seen what they write, although I am willing to grant that it is not really their fault. It is usually due to lack of experience and I do not envy them.

QUESTION 4

What was the most useful item of kit in your toolbox and why?

My hand hammer. I still have my shipwright's 2 lb. spike pein hammer and it is very useful. I wouldn't part with it. A classic example of its use is when carrying out a survey on a steel Dutch barge or similar. Although an ultrasonic machine is absolutely essential and necessary and will tell you the local thickness of a shell plate, a hammer blow will tell you the general condition of a much wider area of plating, but you need training to both learn where to hit and to hear and understand the timbre of the sound of the blow. Surprisingly, the hammer testing of a steel plate is not a 'teach yourself' trick of the trade.

QUESTION 5

What are the biggest challenges facing modern day marine surveyors, particularly those who did not come into the business the way you did as an apprentice in a shipyard?

The biggest challenge is getting the necessary breadth of experience. Many of them only have experience of say frp yachts with no experience of wood, steel or ferro-cement construction. A good surveyor should be able to survey a vessel whatever her material of construction, give a reasonably good idea of the condition of her rig and a similar superficial report on the condition of her machinery. It would help, in my opinion, if everyone who took the Diploma course in marine surveying, had to attend a minimum number of training days before setting out on his or her own. Ideally, he/she would also have spent some time with and understudying an experienced surveyor. I realise that raises problems and would be difficult to enforce and/or practice, but it is the only and very best way to gain knowledge and to understand the necessary experience. Another challenge is to gain the ability to write a good quality and accurate report in good English. Often, it is simply badly written English that gets a surveyor into trouble with his clients.

Isle of Dogs and the West India Docks. I built the last two vessels to be built on the London river at Limehouse hole - bottom right where the two big sheds can be seen. We used to call it the Hog yard. Blackwall Basin is the circular dock off to the left.

QUESTION 6

Which two aspects of your work as a marine surveyor are you most proud of and gave you the most pleasure?

The first I would say is that I was responsible for building the last two ships (large rubbish barges actually) to be launched into the London river in the old Hog Yard at Limehouse Hole. It is underneath a concrete roundabout now. Sic transit Gloria mundi!

Me receiving my Lifetime Achievement Award to celebrate 70 years in the surveying and maritime world at the 2015 IIMS Conference dinner aboard HMS Belfast, London. Together with Capt Bertrand Apperry (IIMS President at the time) and Mike Schwarz (centre).

The second was the receipt of the Lifetime Achievement Award presented to me at the IIMS Conference dinner aboard HMS Belfast as a length of time in the business momento. I was very deeply moved by that. The men I served my time with at the Orchard Dock would have been proud of me.

QUESTION 7

How important is it for a marine surveyor to be a member of a professional body such as IIMS and what part should such an organisation play in today's modern world?

To answer the first part of the question: Very important indeed. Practising surveyors should be encouraged to attend the various training events and strive to move up the membership scale. They should also be encouraged to write articles for The Report and to share their knowledge with others. They should be very proud of being an important part of the engineering profession.

The second part is more difficult to answer. I think that one of the things that should be considered is that organisations such as IIMS bring to the attention of the public at large and, perhaps more importantly, the Members of Parliament and Government, the importance of the various branches of the engineering professions, especially marine surveying.

QUESTION 8

Given your extensive experience, what are the three best bits of advice you can pass directly on to the current generation of surveyors and those just making their way in this game?

Whenever you leave a job to go home ask yourself "What have I learned today?" and answer it honestly.

Learn as much as you can about the material from which the boat is built. If it is wood, start learning about timber from the moment the seed that yields the tree falls into the ground. Similarly, for frp, steel and ferro-cement. You should be able to identify quite accurately whether a boat is built of iron or steel manufactured by a particular method by the grinding method. That knowledge helps not only to know where to look for defects in a structure but also to know WHY they are there.

Build yourself a good library of reference books and technical papers on all types of boats, boatbuilding practices and materials, and do not scorn it because the book was published before you were born. I learned why steel made in a Bessemer converter is not allowed in sea going classed ships from a book that was published when my mother was just eight years old!

QUESTION 9

If you had your time over again, would you change anything?

Yes. I had passed the Essex County Scholarship when I was 11 and was receiving a good combined education at a Technical College when family circumstances forced me to leave. As I was under 16 when I started work, I had to have one day off a week to keep my hours under the legal maximum. I should have used that day to go to Poplar Technical College to continue my education. I didn't and so wasted much time. Had I have done so I would have had an HNC by the time I was a third-year apprentice and probably a doctorate by the time I was 22. I regret that time wasted and the only excuse I have is that I didn't have anyone to guide me. If I could go back, I would definitely change that.

QUESTION 10

I understand you have been writing an anthology of your life as a marine surveyor. What can you tell me about this work and when might we be able to read it?

I wrote the history of the first part of my life for my family and they keep nagging me to bring it up to date. That is available now. It takes the reader, more or less, to the end of my apprenticeship. For the last ten years, however, as time allows in a very busy life, I have been writing a Manual on the Marine Surveying of Small Craft based upon my experience of the profession. Volume 1 is on the final edit stage. Volume 2 is in draft form and Volume 3 almost complete. It is based on my experience of working in the profession from the age of 14. I think that it will be ready in a year from now.

This poster was produced to advertise The London Graving Dock and Thames Shipyards exhibition. The Thames Festival Trust put on this exhibition about the ship and boat building industry on the River Thames to recognise the history and heritage of the London Graving Dock Co, based in Blackwall since 1617.

Averil and me with eldest grandson Jason and his wife Raksha, Jasmine and Roisin their daughters (great grand daughters) in Tower Gardens, London. This is just one small part of my lovely family.

QUESTION 11

I recall you saying that another great grandchild is expected. How many grandchildren and great grandchildren do you have and how do you possibly keep up to date with them all? Would you advise any of them to become a marine surveyor?

Norma, my wife of fifty-three years, two months and sixteen days, gave me three sons and two daughters. My eldest son, Alan, died five years after my wife. I have ten grandsons and six grand daughters and, to date, twenty-two great grandchildren. Daisy, unfortunately, was still born. All being well, my granddaughter Janine will deliver my twenty third great grandchild (a boy) at the end of September. As far as keeping up to date is concerned, fortunately, I have a very dear friend called Averil, who keeps a diary with all their names, addresses and dates of birth and regularly updates me on such important matters as birthdays. They cost me a fortune at Christmastide. Anastasia, my eldest great granddaughter is eighteen. Give me another few years and perhaps I shall see my great-great-grandchild. My daughter with whom I live has said that I shouldn't advise any of them to go into my profession – you have to love ships and boats and ignore everything else! Not strictly true but well on the way.

QUESTION 12

Apart from drinking tea and completing the newspaper crossword every day, what other hobbies do you have?

I have often said that, D. V., I shall die of too much blood in my tea stream. I like to play Scrabble with Averil and to do the 'Tory Dailygraph' cryptic crossword every day as it keeps my brain working. As for other hobbies, for many years I played the double B flat contrabass tuba and/or the G bass trombone in a Salvation Army brass band. I had to give that up some fifteen years ago as it became physically too difficult. I love classical music and particularly enjoy listening to Schubert, Sibelius, Mozart and Beethoven but, when I am alone, I still love to listen to a good brass band march; but my favourite pleasure is listening to Myfanwy or Cwm Rhondda sung by a good Welsh Male Voice Choir – the most beautiful sound on Earth. I am an Anglo-Welsh-Italian-east London Cockney mongrel and it stirs the Welsh-Italian part of my soul like nothing else. I loved singing Hen Wlad fy Nhadau when Wales played England in the Rugby (Union of course) matches but, as I have a voice like a crow with a sore throat, it used to annoy my poor wife (and the neighbours) no end. Happy days.

Photograph of Barking Citadel YP Band in 1941. Middle row, third from the left: me on 2nd horn.

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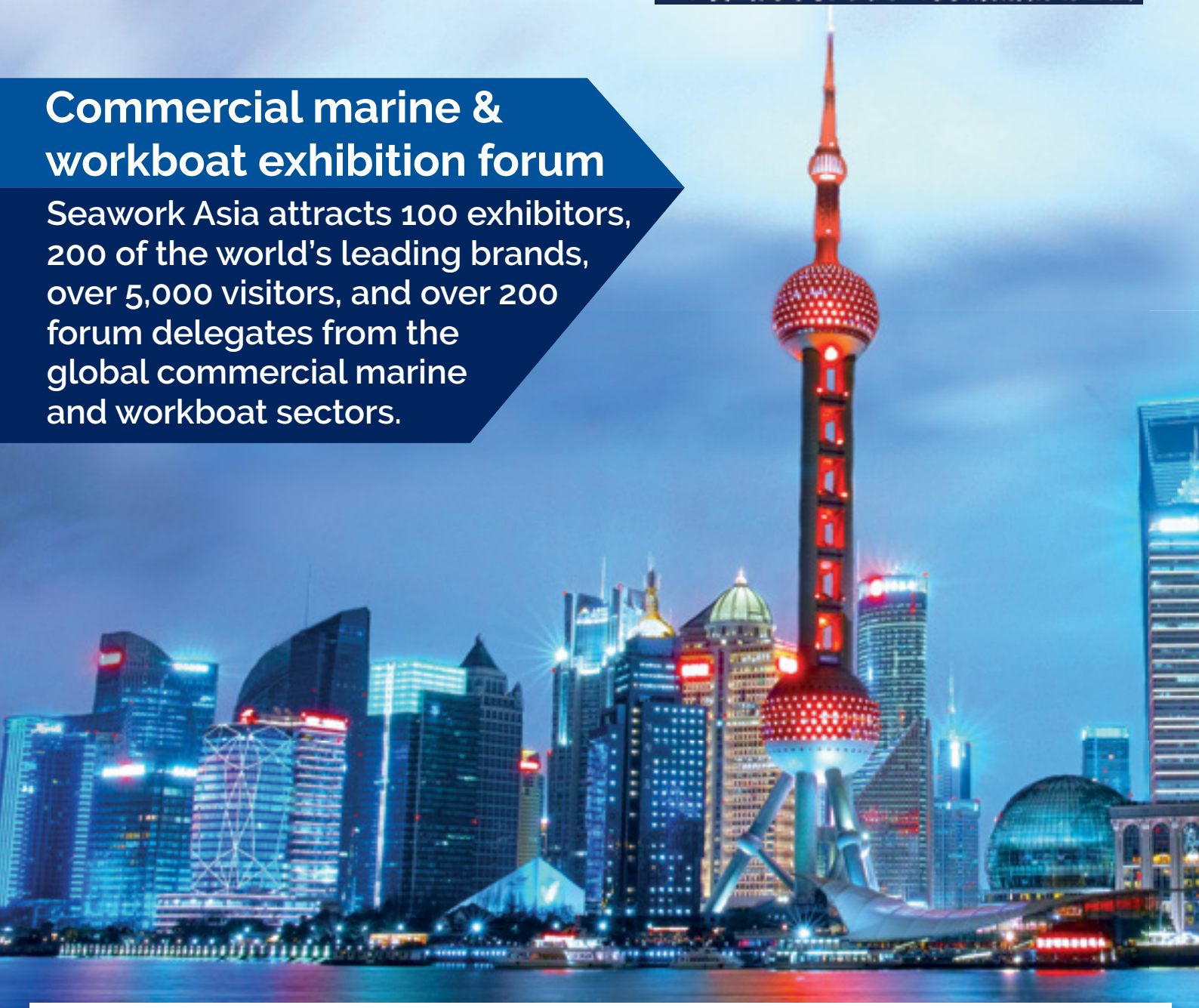

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