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MARITIME REPORTER AND ENGINEERING NEWS

SINCE 1939

October 2019

C-JOB CEO BASJAN FABER BORN TO DESIGN

MR's 80TH ANNIVERSARY
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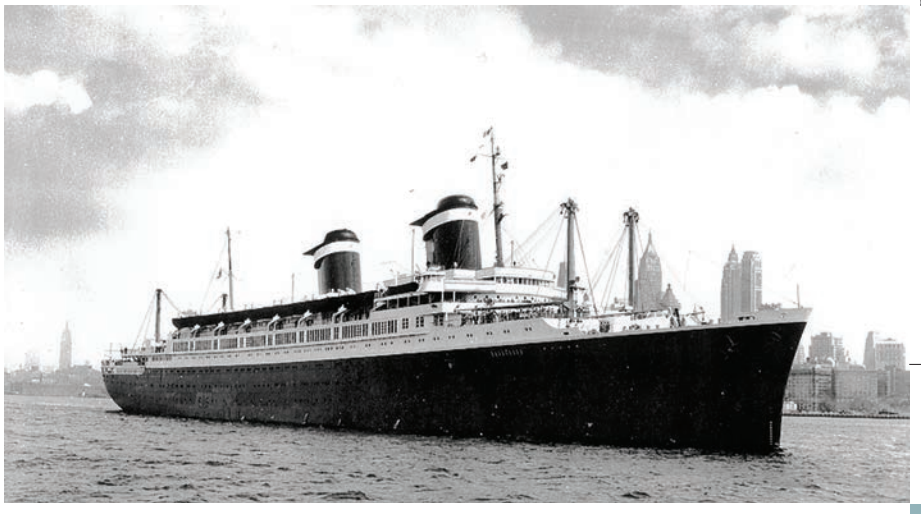

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MARITIME REPORTER AND ENGINEERING NEWS

MARINELINK.COM

ISSN-0025-3448
USPS-016-750
No. 10 Vol. 81

Maritime Reporter/Engineering News (ISSN # 0025-3448) is published monthly (twelve issues) by Maritime Activity Reports, Inc., 118 East 25th St., New York, NY 10010-1062. Periodicals Postage Paid at New York, NY and additional mailing offices.

POSTMASTER: Send all UAA to CFS. NON-POSTAL AND MILITARY FACILITIES send address corrections to Maritime Reporter, 850 Montauk Hwy., #867, Bayport, NY 11705.

SUBSCRIPTION INFORMATION

In U.S.:
One full year (12 issues) $110.00;
two years (24 issues) $190.00

Rest of the World:
One full year (12 issues) $189.00;
two years $228.00 (24 issues)
including postage and handling.

Email: mrcirc@marinelink.com
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Editorial

80 Years & Counting

Traditionally, anniversaries are a time of reflection, with an in-depth examination of "what was." In celebration of *Maritime Reporter & Engineering News'* 80th Anniversary, which falls in tandem with this, our Marine Design Annual, I opted to take a different approach and discuss "what will be."

In overstating the obvious, the world today is a very different place than it was in 1939 when **John J. O'Malley** created the first edition of *Maritime Activity Reports.* Then again, it is in some ways hauntingly the same.

While the technology onboard ships and boats today has evolved dramatically, and while maritime industry has been in the crosshairs of regulators and environmentalist for the past decade, cargo ships today remain, pound-for-pound, the most efficient, cost effective and environmentally benign means to move cargo from 'point A to point B.' Take one ship or barge cargo, throw it all onto planes, trains or trucks, completely removing maritime from the equation, and get back to me on the 'carbon footprint' that results. I can't give you the exact numerical results, but it wouldn't be pretty. Is there room for improvement in the maritime sector? Unequivocally, the answer is yes. And as is the case with many technological evolutions and revolutions over the past 80 years, the impetus for change and improvement is regulation: ship owners, ship designers and shipbuilders are forced to find a means to makes a good solution even better, and without a doubt they collectively are attacking the task with abandon.

While I certainly haven't been here for all eight decades of *Maritime Reporter's* history, I have been in this position for more than 30% of our existence, logging my 27th anniversary in August. When I started here in 1992, as I've often told my sons aged 23 and 21, there was no internet (or at least not one that was used), there was no email and cell phones were as big as a brick.

In 1992, if "the environment" was mentioned at all it was more marketing slogan than real environmental action. But the environment is front and center, or it should be, on the agenda of every shipping company in the world. Simply put, if you're not devising a means, today, to run your ships cleanly, in step with ever-tightening environmental regulations while still turning a profit, you might as well get out of the business, because eventually you will be put out of business. In step with environmental concerns is the speed and evolution of technology, in general, itself. Ships and boats used to be designed to operate for 30 years or more, but that's no longer the case, as new technologies that used to last for 10 to 15 years are now turning over in five to seven years, presenting the conundrum to shipowners on upgrading existing fleet or building new.

That is why this edition is centered on the future of marine design. Last month I was on a whirlwind trip through Europe, covering 1500 miles in 8 days, and I had the opportunity to spend a few hours with our cover subject, C-Job CEO and cofounder **Basjan Faber**, on a beautiful Sunday afternoon in Amsterdam. Faber is a young and vibrant leader of a young, vibrant and fast-growing naval architecture firm, C-Job, which today employs about 160 people, expanding most recently by opening an office in Houston to serve the Americas. As the headline states, Faber was truly *'Born to Design,'* knowing from the age of 11 that his future was in the design of ships and boats. The story on Faber and C-Job starts on page 34.

Following that feature is our interview with Gibbs & Cox CEO **Chris Deegan**, as this venerable design house celebrates its own 90th anniversary in 2019. The list of Gibbs & Cox design credits on the defense and commercial side is long and distinguished, and trust when I say the photo vessel that stretches from pages 40 to 41 is always a crowd pleaser.

Our business has changed dramatically too, and today there are an overabundance of information options personally and professionally. But while the way in which we deliver information changes daily, our mission remains the same as always: to provide timely, insightful news and analytic which help to keep you, our loyal readers informed and updated, armed to conduct your business in a more efficient and cost-effective fashion.

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Training Tips for Ships
Tip #5 – The Simple Secret to Making Randomized Exams Fair

In last month's Training Tips for Ships, we made the important point that we must never give different people the same exam. If we use an exam over and over, our trainees will very quickly learn what questions are on the exam and share the answers with their friends. Suddenly exam scores begin going up, and time spent learning goes down – both for the wrong reasons. There are few better ways to destroy a training program. he remedy is to always provide different exams. This would be a lot of work, were it not for the exam randomization function found in most web-based Learning Management Systems (LMSs). Randomization in an LMS ensures that no two people get the same exam. But as we wrote last month, this may raise the concern that we lose consistency in our assessment practices. After all, it is critical that we measure everyone by the same standard. Changing the exams creates inconsistency, correct? Well, no – not if it is done correctly. Here's how.

Credits: Photo by J. Kelly Brito on Unsplash

Building Consistent Randomized Exams

The two primary exam variables that we want to deliver consistently are 1) the difficulty of the questions, and 2) the competencies or knowledge covered in the questions. Thus, even when exams differ, we want to ensure that they all cover the same material to the same degree, at the same level of difficulty.

In an LMS, all questions are organized into "question categories". The key to ensuring consistency across these two variables in your exams is careful organization of your question categories. In your LMS, each question category should be set up to contain a pool of questions which each cover the same competency at the same level of difficulty. Once we have this set up, the exam can be defined to always select a specific number of questions from each category to make all instances of the exam consistent.

A Simple Example

Let's consider a PPE exam. For simplicity, let's say the exam covers three competencies or knowledge: the protective equipment needed for firefighting, the equipment needed for welding, and knowledge of how to don basic protective equipment (clearly this is an incomplete exam, but is useful to illustrate). Let's also say that we want to ask questions at two levels of difficulty to separate those who understand at a basic level vs. those who have mastery of the subjects.Per our rules above, we will now create six question categories – each covering one competency at one level of knowledge. Thus we will have one category with questions all covering firefighting PPE at a basic level, one covering the same PPE at an advanced level, one covering welding PPE at a basic level, one at an advanced level, and so on. Now, we configure the LMS so that each time it generates an exam, it draws (for example) 5 welding PPE questions at a basic level, 3 at an advanced level, 4 firefighting PPE questions at a basic level, and so on – depending on the emphasis we want to place on the exam topics and how difficult we want the exam to be. From this point on, each time the LMS delivers our PPE exam, it will contain a different set of questions, but will always have the same number of questions for each tested competency and be of roughly the same overall difficulty. Now we have randomized exams to help solve the cheating problem but have not sacrificed fair and consistent assessment.

Thanks for reading! If you have any questions about this or other training tips – send an email to me at:

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Running on Reserves

The time is long overdue for Congress to fund and staff the Coast Guard at levels commensurate with the taskings it has assigned to this venerable service.

The US Coast Guard has a long history of working cooperatively with other maritime interests to accomplish its myriad missions. Over time, though, the Coast Guard has relied increasingly on these other maritime interests for the performance of core missions. This has, in my opinion, undercut the professionalism of the Coast Guard and been to the detriment of the United States and its taxpayers. The Coast Guard is comprised of a total of about 85,800 personnel, consisting of 44,500 active duty members, 8.600 civilian employees, 8,700 Reservists, and 24,000 Auxiliarists. Yet, its authorized strength has never kept pace with its mission-creep. As a result, reliance on others has become dangerously commonplace.

US Coast Guard Reserve

The Coast Guard Reserve was established by Congress in February 1941 in the build-up preceding the US entry into World War II. The purpose was to 'provide a trained force of officers and men which, when added to regular personnel of the Coast Guard, will be able to perform such extraordinary duties as may be necessitated by emergency conditions.' That original legislation envisioned the wind-down of the Reserves at the conclusion of the emergency conditions. The USCG Reserve did largely end after World War II, but the Korean War lead to its ramping up again. That was followed by the Cold War and other challenges. As a result, the USCG Reserve is now a permanent fixture, providing needed augmentation for matters such as major oil spills.

Over recent years, though, the Reserve, through the Extended Active Duty (EAD) program, has become a source of additional personnel for relatively routine, albeit important, matters. Under the EAD, selected personnel, primarily officers, may volunteer to engage in up to three years of active duty, serving alongside regular USCG personnel in a variety of locations and on a variety

Members of the U.S. Coast Guard's Gulf Strike Team rescue an elderly couple after floodwaters from the Waccamaw River took over their apartment complex in Horry County, South Carolina, Sept. 19, 2018.

U.S. Coast Guard photo by Petty Officer 1st Class Jon-Paul Rios.

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of missions. This program allows the Coast Guard to accomplish its ever-expanding tasks through the addition of up to 300 military personnel, making use of specialized skills or experience that the individuals may present.

US Coast Guard Auxiliary

The Coast Guard Auxiliary was established by Congress in 1939 to be comprised of owners of motorboats and yachts to assist in the saving of life and property and in the patrol of marine parades and regattas. Nowadays, they continue to perform those original missions, but also assist with administration of bridges, aids to navigation, inspection of vessels, management of waterways, marine environmental safety and protection, waterway security and safety, and recreational boating safety, among other things. Auxiliarists, working without pay, are estimated to save US taxpayers hundreds of millions of dollars each year, while releasing active duty personnel to perform other missions.

Third Party Organizations

The US Coast Guard increasingly relies on third party organizations (TPO) to perform many of its important missions, particularly as they relate to the commercial maritime sector. This is troubling because increased use of non-Coast Guard personnel to perform its traditional missions means that much less experience for Coast Guard members and employees in these areas.

- **Classification societies**

The American Bureau of Shipping (ABS) was first authorized to work with the Steamboat Inspection Service in 1920 through passage of the Jones Act. This authorization was transferred to the US Coast Guard in 1942 when the USCG assumed responsibility of marine inspection. Cooperation between the USCG and ABS has expanded over the years to the point that ABS is now authorized to perform the necessary inspections and issue official certificates for such subjects as tonnage, load lines, IOPPC, NLS, packaged harmful substances, air emissions, garbage, ISM Code, MODU Code, and anti-fouling systems. The other major classification societies (DNV-GL, LR, BV, RINA, and ClassNK) now have almost as many USCG authorizations as does ABS.

- **Grain ship examinations**

The National Cargo Bureau (NCB) performs inspections of grain ships loading bulk cargoes in the United States and, on behalf of the US Coast Guard, issues certificates of compliance with the Code for the Safe Carriage of Grain in Bulk. The NCB also surveys and certifies cargo securing, loading, and stowage gear.

- **Fishing boat examinations**

Third party organizations are authorized to conduct commercial fishing vessel (CFV) examinations on behalf of the Coast Guard. These examinations are, by law, much less rigorous than normal inspections because commercial fishing vessels are not subject to inspections. Regardless, such examinations performed by authorized TPOs are the functional equivalent of examinations performed by the Coast Guard.

- Towboat inspections

When Congress enacted the law making most tugs and towboats subject to inspection, it failed to provide for the substantial increase in authorized Coast Guard positions to actually perform the large number of new vessel inspections required by that law. As a result, the Coast Guard was left with no choice but to authorize additional TPOs to conduct these rigorous inspections. Thus, the optional Towing Safety Management System (TSMS) was born. Under TSMS, the towboat owner or operator develops a safety management plan for its towboats in order to comply with the requirements of Title 46, Subchapter M of the Code of Federal Regulations (CFR). An authorized TPO, retained by the owner or operator, reviews the safety management plan to ensure it adequately addresses the Subchapter M requirements. The TPO then surveys the covered towboats. If their condition and operation conform to plan, the TPO is authorized to issue survey reports to the owner or operator, and a TSMS certificate to the owner or operator. While the US Coast Guard can always conduct its own inspection of a covered towboat, the usual practice is for the Coast Guard to issue a Certificate of Inspection (COI) to a covered towboat that has successfully gone through the TSMS program. Currently, six classification societies and ten other TPOs are

While providing a security perimeter, a Coast Guard 25-foot response boat is flanked by two tugs as the Liquid Natural Gas tanker Berge Boston is moored to the pier at an LNG facility here.

USCG photo by PA2 Luke Pinneo

authorized to perform all the functions provided for in the TSMS program on behalf of the Coast Guard.

Streamlined Inspection Program

In response to the Maritime Regulatory Reform Initiative, the Coast Guard instituted the Streamlined Inspection Program (SIP). SIP is an alternative process for ensuring compliance with applicable vessel inspection regulations. Personnel of the owning or operating company conduct frequent, periodic examinations of the various vessel systems, document their findings, and take necessary corrective actions specified in the Coast Guard-approved plans when discrepancies are discovered. The Coast Guard will still conduct required inspections of the vessel(s); however the manner of conducting such inspections will be considerably different.

Summary

Due to the minimal funding of the US Coast Guard, coupled with limits on its authorized personnel strength, the service of necessity has adopted a variety of tactics to achieve its wide-spread and ever-growing missions. A number of these tactics are discussed above. Still, they are insufficient to allow all assigned missions to be performed in a timely and efficient manner.

While high-priority missions such as search and rescue (SAR), law enforcement (LE), and aids to navigation (ATON) are largely completed as assigned, others then to suffer. Of note, there are serious shortfalls with regard to merchant mariner documentation and vessel documentation.

During the lapse in funding for the federal government that extended from 22 December 2018 through 25 January 2019, non-essential functions of the federal agencies ceased to be performed. Among the Coast Guard functions that were halted were those of the National Maritime Center (NMC) which processes merchant mariner documents and the National Vessel Documentation Center (NVDC).

Both of these units are operated with the minimum number of personnel necessary for routine workloads. With those activities halted for over a month, the backlog grew enormously. A recent Senate report documents that the shutdown delayed the review and approval of 11,000 merchant mariner credentials, halted the testing and approval of nearly 650 mariner examinations, and delayed the review and approval of 220 courses. It took the NMC until August 2019 to fully recover from the lapse in funding. The NVDC is still struggling to eliminate the backlog. As a result, vessel documentation paperwork is not being processed in a timely manner.

In my opinion, the US Coast Guard is over-committed and under-staffed. It is forced to rely heavily on non-Coast Guard personnel to perform many of its important missions. For example, vessel inspections performed by third-parties are supposed to be regularly checked by Coast Guard personnel for completeness and accuracy.

Due to personnel shortages, these backstop checks are often not performed with the frequency and thoroughness required.

The time is long overdue for Congress to fund and staff the Coast Guard at levels commensurate with the taskings it has assigned to this venerable service.

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Advances in Electronic Recordkeeping

IMO is Moving Forward Despite the United States' Objections

Electronic logbooks have long been viewed as an effective and efficient means of shipboard recordkeeping. They take less time to complete, eliminate issues of legibility, and in some areas are capable of automatically logging information based on input from vessel equipment. They are easier to maintain, eliminating the need for spaces to keep completed records onboard and minimizing the risk of losing them, and reducing the risk of loss of records in a fire, flood, or shipboard emergency. Electronic records are also more environmentally friendly as they do not require use of paper books. A critical factor for vessel owners and operators in ensuring proper oversight and compliance, electronic records can be viewed by shoreside personnel at any time. That said, it is imperative that the electronic recordkeeping system is secure and cannot be manipulated – thus, all changes made to electronic records should be recorded and capable of being reviewed.

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The International Movement Towards Electronic Recordkeeping

After several years of consideration and debate, long awaited amendments to the International Convention for the Prevention of Pollution from Ships ("MARPOL") were approved by the International Maritime Organization ("IMO") during MEPC 74 in May 2019, explicitly permitting the use of electronic record books for certain MARPOL required logs. The amendments revise Annexes I, II, V, and VI to expressly allow electronic record books approved by the vessels' Administration for the Oil Record Book ("ORB"), Cargo Record Book, Garbage Record Book, and Annex VI air pollution prevention recordkeeping requirements. The amendments will enter into force on October 1, 2020 and IMO stated that the use of electronic recordbooks "should be encouraged as it may have many benefits for the retention of records by companies, crew and officers."

In approving electronic recordkeeping systems, the amendments require flag States to take into account the Guidelines for the Use of Electronic Record Books under MARPOL ("Guidelines"), MEPC.312(74), which were adopted along with the amendments.

The Guidelines specify software system standards that should apply and that "should be taken into consideration" by the flag States, such as the ability to automatically record revisions and attempts to manipulate data, role-based access control, and data recovery and power source standards, among others. Many of the Guidelines' recommendations incorporate specific standards published by the International Organization for Standardization and the International Electrotechnical Commission, including standards for audit logging, credentials, cryptography, data representation, digital signatures, role based access control, functional units, PDFs, and storage.

To accommodate port State inspections and investigations, the Guidelines state that electronic recordkeeping systems should be capable of printing out entries, pages, or the entire log, along with the name of the person that made each entry, a record of any amendments, date and time of printing, page counts, and the name and version of the system. Vessels using electronic recordkeeping systems should also carry onboard at all times a written confirmation from the vessel's Administration that the system meets MARPOL and Guidelines standards.

Despite the MARPOL amendments and Guidelines, a number of flag States believe the current MARPOL language affords flag States the discretion to allow the use of electronic record books. Major flag States such as the Marshall Islands, Liberia, Malta, the Bahamas, and the United Kingdom have been approving certain forms of electronic record keeping software systems for use on their vessels for years.

U.S. Resistance

Despite objections lodged at IMO about the MARPOL amendments and Guidelines, the United States has moved toward electronic recordkeeping in a number of areas. For example, the U.S. Coast Guard explicitly permits security records, ballast water records, and towing vessel records to be kept electronically. The U.S. Environmental Protection Agency also explicitly allows records required under the Vessel General Permit to be kept electronically. The goal in allowing electronic records for these logs was not only shipboard efficiency and being environmentally conscious, but also to allow both the vessel owner and operator and the government to streamline oversight and enforcement by facilitating faster identification of potential issues.

Unfortunately, the United States has not been as supportive of transitioning MARPOL records to electronic systems. When the MARPOL amendments to allow electronic recordkeeping were approved, the United States reserved its position on their adoption. In its statement, the United States asserted that "the

use of electronic record books should only be permitted after mandatory requirements for electronic record books are adopted and incorporated into the text of MARPOL...Without doing so, we would be reducing the level of care and environmental protection currently provided in MARPOL." In other words, the United States' view seems to be that the Guidelines should be mandatory, rather than having Administrations "take into account" the standards set forth in the Guidelines to provide sufficient assurance that electronic recordkeeping systems will be secure. That said, it is not apparent how electronic records, when allowed by the United States in numerous contexts, would reduce the level of care/environmental protection under MARPOL.

While the U.S. Department of Justice (DOJ) relies heavily on errors and omissions in handwritten paper ORBs for purposes of MARPOL criminal enforcement, prosecutorial objectives should not drive regulatory policy, especially when numerous other records to meet U.S. regulatory requirements are explicitly allowed to be kept electronically. Although electronic logs would provide a more efficient and effective means for vessel owners and operators to maintain real-time oversight of vessel operations, the United States is apparently concerned about the security of electronic logs and potential for concealment of illicit activities.

As the world moves forward with electronic recordkeeping, it is unclear how the United States' reservation on the MARPOL amendments will impact the industry as the effective date approaches. Until the United States expressly approves the amendments, they will not go into effect in the United States. Thus, U.S.-flag vessels will be required to continue using paper logs wherever they sail. In addition, although IMO conventions are based on a theory of reciprocity, it is uncertain whether the United States will respect authorizations by other flag States permitting electronic recordkeeping on their vessels. If not, foreign-flag vessels that operate in the United States may be required to maintain separate paper logs when operating in the United States, which is not in best interests of the vessel or crew, or any stakeholders.

Conclusion

The MARPOL amendments and Guidelines on electronic logs advance the efficiency and accuracy of shipboard recordkeeping, as well as facilitate improved vessel owner and operator oversight of vessel operations. Unfortunately, the United States still resists the movement with respect to MARPOL, even as it makes advances in electronic recordkeeping domestically in other regulatory contexts. At the very least, the United States should uphold international comity and respect the authorizations of other flag States when those flag States approve the use of electronic recordkeeping systems on their vessels consistent with the MARPOL amendments and Guidelines.

Matthew Bonvento is the newest Assistant Professor in the Department of Marine Transportation at the United States Merchant Marine Academy in Kings Point, New York. Professor Bonvento is a graduate from SUNY Maritime College where he holds both a Bachelor of Science in Marine Transportation as well as a Master of Science in International Transportation Management. He also holds an Associate in Applied Sciences in Maritime Technology.

Containership Fires

Incidents involving container ships, although not new, have made the news much more frequently of late. In 2011 the Container Incident Notification System (CINS) was established to allow container ship owners to self-report incidents that might be of concern the other members of the group, and today CINS has 17 vessel owner members.

The cases of the Yantian Express, Maersk Honam, MSC Flaminia, MSC Daniela, are some of the most recent examples of container ship fires. The rise in the rate of container ship fires, approximately one every 60 days according to a report by the TT club has highlighted an underlying issue that has been of industry concern for quite some time: misdeclared or improperly stowed cargo.

The National Cargo Bureau, a not-for-profit organization with a mission of safety of life at sea is a leading industry expert in Cargo stowage, inspection, and vessel stability. Since it's inception it has assisted vessel owners by ensuring that cargo is stowed on board properly and safely. The experts at NCB were the perfect choice to assist container ship owners in addressing the burgeoning problem. The project started with NCB agreeing to exam 100 containers free of charge for Maersk in the wake of the Honam disaster. How this was different than the standard NCB inspection is that these containers were being imported. Too often containers that have made it ashore, without any cargo damage, are ignored upon discharge. Despite the container discharging without incident it was unknown if the cargo was mis-labeled, mis-declared or improperly stowed. In order to get more meaningful data NCB expanded its offer to the other Board members of CINS to 500 containers. Members of CINS realized the value of this cargo inspection procedure.

The results were sobering. Of all the

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containers including HAZMAT and General Cargo (Non-HAZMAT) containers there was a 55% failure rate. Of that:

- **69% of the imported HAZMAT containers failed the inspection,**
- **44% had cargo that was improperly secured,**
- **39% of the containers were not properly marked or placarded, and**
- **8% had cargo that was mis-declared.**

Mis-declared or mis-placarded cargo runs the risk of being stowed improperly, not segregated according to the IMDG, or stowed in such a manner that the cargo may generate enough heat to auto ignite.

Other issues noted were the amount of documentation errors. Whether intentional or not these types of errors can mislead the carriers to improperly stow a container. Documentation errors can vary in severity from simple errors in information provided by the shipper, to miscategorized cargo, to quantity discrepancies. Any one of these items is a cause for a container failing inspection.

The response from carriers has been swift and just. In August of this year Hapag Lloyd announced that effective 15 September 2019 any mis-declared cargo may cause the shipper to be fined $15,000 in addition to any costs associated in rectifying the situation. From their website "To ensure the safety of our crew, ships and other cargo onboard, Hapag-Lloyd holds the Shipper liable and responsible for all costs and consequences related to violations, fines, damages, incidents, claims and corrective measures resulting from cases of undeclared or mis-declared cargoes." This is in direct response to the Yantian Express, that suffered a severe fire in January of 2019.

Evergreen shipping line has announced that it will fine anywhere between $4000 and $35,000 fines per container that is mis-declared. OOCL has also announced a fine scheme. Now that the shippers have started to realize the danger of mis-declared cargo, we can expect to see further fines from carriers and more stringent enforcement.

This enforcement may come from the U.S. Customs and Border Patrol. One reason that Customs may choose to inspect a container is for a Statistical Violation Hold, or when the goods and quantity listed does not match with the expected weight. Goods found with an incorrect manifest may also be held. Anything found that is out of the ordinary may trigger further delays in cargo delivery.

National Cargo Bureau customers have a significantly less rate of problem containers versus those who do not utilize NCB. NCB customers only have 7.4% of issues with containers being exported meanwhile other owners have a 38% chance of problems with containerized cargo. Having a second set of eyes is never a bad thing.

With the SOLAS requirement for carriage of Water Lance's on board, operators should consider the purchase of several portable water monitors to reach container fires that may start higher in the stack.

Once again, these tools, without proper training and drills the crew will not be ready to use them in the event of an actual on-board emergency. Part of this training should include the use of International Dangerous Goods Code as well as Material Safety Data Sheets to ensure that the crew knows how to utilize these resources to ascertain how a particular cargo fire is to be fought.

In an industry where ships are increasing in size, a fire on board can be much more devastating to more cargo owners than ever before. Shippers need to exercise diligence now more than ever and carriers unfortunately have to better prepare for the worst in the case that shippers fail to do their job.

Dr. Joe DiRenzo is the Director of Research Partnerships at the U.S. Coast Guard Research and Development Center. He is the former project manager for the service's AI/ML project involving disaster response planning, a retired USCG officer, and former cutter Commanding Officer. He is a frequent contributor to Maritime Reporter & Engineering News, and Maritime Technology Reporter.

Capt. Eric Johansson is a distinguished professor at Maritime College, recipient of the Chancellor's Award for Excellence in Teaching, Chancellor's Award for Excellence in Faculty Service, Plimsoll Award, Public Service Commendation (U.S. Coast Guard) and serves on the NYC Waterfront Management Advisory Board, Harbor Safety Committee, Energy Sub-committee, Suffolk County Maritime Industrial Advisory Committee and nominated by the Department of Homeland Security as vice chair of the Towing Safety Advisory Committee.

10th Annual
Maritime Risk Symposium
November 12-15, 2019 at SUNY Maritime

The State University of New York Maritime College, in collaboration with the U.S. Coast Guard, National Academy of Sciences, academic institutions, industry partners, and federal, state and local agencies, will host the 10th Annual Maritime Risk Symposium (MRS 2019) Nov. 13-15, 2019, at New York Maritime College located in the Bronx, New York.

MRS 2019 will bring together academics, government and commercial entities to discuss the threats, challenges and risks associated with the Marine Transportation System with a focus on current and future marine transportation challenges and threats. The symposium will assess threats – such as cyber security, vulnerabilities and recent advancements in research – to inspire ideas for innovative research that will help define the next evolution within marine transportation.

Why is this issue important? The idea of assessing and quantifying the various threat vectors associated with the Marine Transportation System is an issue that has come front and center since the horrific attack of 9/11. State and non-state actors understand the vulnerabilities within a global system that moves trillions of dollars of goods annually. Complicating this issue are growing threats to the system's cyber components, the dawn of autonomous shipping, electronic navigation, advances in fuel systems and the continued automation of the nation's ports.

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The 9/11 Boat Lift from Manhattan Island – completed predominately by tugs and ferries – is the largest marine rescue in history, rescuing 500,000 New Yorkers. Superstorm Sandy paralyzed New York in 2012 – and again, it was the Marine Transportation System that answered the call, delivering needed supplies when shore side transportation was shut down by the devastating storm. The Marine Transportation System continued its efforts for months following Superstorm Sandy, playing a major role in debris removal and infrastructure redevelopment. This system meets our nation's needs in peace and in times of peril. In order to be effective, though, the system requires safe and sound policies regarding navigation safety, anchorages, maintained and clear channels, port state control, traffic mix, intermodal connectors, and much more.

The issues slated for the 2019 event are as important in the United States as they are internationally. "It is perhaps more crucial now than ever before for us to look at the broad spectrum of risks to the maritime industry, from international relations to climate change," commented Canadian Capt.

Todd Bonner, currently stationed at Combined Joint Operations from the Sea COE in Norfolk, Virginia. "Any operational disruptions in maritime transportation have wider second and third order consequences for society, making the management of the associated risks a priority that should transcend industry and national boundaries.

Clearly, an increasingly connected world requires the comprehensive maritime community response to the many interconnected risks in the maritime commons that will be identified and discussed at MRS 2019."

According to Retired Coast Guard Vice Adm. Rob Parker, who has previously served as the Master of Ceremonies for this event and currently serves as the senior mentor to the symposium's Program Committee, "MRS has focused

on some critical issues since the first event at the University of Southern California back in 2010. It has also grown in scope and impact." The former Coast Guard Atlantic Area Commander continued, "I like the depth in which the symposium covers an issue. This has led to research questions in the academic community, articles, and injects into issues that policy makers consider."

This year's MRS will feature a wide range of leaders from the federal government, to academia, to think tanks and industry.

Keynote speakers include: Retired Rear Adm. Mark "Buzz" Buzby, who is the administrator of the Commerce Department's Maritime Administration, and Rear Adm. Andy Tiongson, commander of Coast Guard District One. Maritime College President Rear Adm. Michael Alfultis will also deliver an address on "Educating the Future Maritime Workforce in a Sea of Constant Disruptors and Change" and stated, "Considering the accelerated changes occurring in the maritime and transportation industries within the areas of digitalization, autonomy and data analysis, this symposium provides an essential venue for discussing threats, vulnerabilities, and recent advancements to marine transportation system risk research, and inspiring ideas for innovative research that will define the next generation of maritime risk."

The 2019 event features panels led by national thought leaders including the RAND Corporation's Dr. Henry Willis. The symposium's collaboration with the National Academy of Sciences (NAS) has enhanced the national prominence of the event. Scott Brotemarkle of the NAS will lead a panel entitled "Navigation Risk to the MTS."

Besides the symposium itself, the event will be host, for the second year in a row, to a Coast Guard "Evergreen" event. The Evergreen Program is the Coast Guard's Strategic Foresight Initiative, tasked with looking over the horizon to inform current planning and better prepare the Coast Guard for an uncertain and unpredictable future.

Through the use of scenario-based exercises and workshops involving a diverse group of stakeholders, common strategic needs or key success factors can be identified across multiple plausible scenarios to better inform long-term strategic planning efforts.

Evergreen results help shape the Coast Guard's strategy development. Noted Cmdr. Kate Higgins-Bloom, director of Project Evergreen at Coast Guard Headquarters in Washington, D.C., "Project Evergreen has been running for about 20 years, but last year's MRS at Oak Ridge (National Laboratory) was the first time that the focus was not Coast Guard, but the whole maritime industry. MRS brought together a unique cohort of academics, industry leaders and public servants. The diverse group produced some really rich insights, informed by the broad range of perspectives. In this iteration, we are building on the success of last year to bring together industry, academia and government to tackle complex 'collective action' dilemmas."

The event will also feature, for the fourth year in a row, a poster contest for both undergraduate and graduate students.

The MRS 2019 program includes a judged session the evening of Nov. 13 where posters developed by students are displayed, with the authors available to describe the reported work and answer questions from MRS attendees. Space for students and posters at MRS is limited, so selection to present in this session is competitive. In addition to best poster awards, after MRS 2019 there will be opportunities to develop and publish short papers based on the posters.

Posters may have only one author. An author should prepare a three-to-five-page proposal describing the proposed poster. The only programmatic requirement is that the proposal address the MRS 2019 theme of "Understanding and Managing Risks to the Maritime Transportation System"; the lens through which this theme might be approached could be economic, political, social or technical. Submissions may be made through the event web site:

www.sunymaritime.edu/MRS2019

BIMCO: Tanker Shipping, Fleet Growth

Rising geo-political tensions have led to disruptions to the tanker shipping industry and all other ships trading in the Persian Gulf. Tensions have risen following the expiry of waivers to the U.S. imposed Iran sanctions, as well as attacks and arrests of ships sailing through the Strait of Hormuz.

Despite the ending of waivers which the U.S. had hoped would lead to all countries stopping their imports of Iranian crude oil. This has not been the case with the Chinese in particular continuing; their crude oil imports from Iran totaled 11m tons in the first six months of the year. This is 30.1% lower than last year and imports have slowed throughout the year; averaging 2.3m tons in the first four months but subsequently slowing to 1.1m tons in May and 0.9m tons in June. Exact data for Iranian crude oil exports does not currently exist. Reuters has reported that a Trump administration official estimates that 50-70% of Iranian's crude oil exports are for China and around 30% go to Syria. The now renamed Adrian Darya 1 (formerly Grace 1) was arrested while believed to be sailing with crude oil from Iran to Syria, in breach not only of U.S. sanctions against Iran, but also EU sanctions against Syria. Tensions remain high in the Persian Gulf, where a US-led mission to ensure the security of international ships when transiting the Strait of Hormuz has so far been joined by the UK, Australia and Bahrain. Iran's President Rouhani has been quoted by Reuters as issuing a veiled threat that, should Iran's crude oil exports be forced to zero, security in international waters could not be guaranteed.

In reaction to the first attacks, on two tankers transiting the Strait of Hormuz in June, crude oil freight rates from the Persian Gulf to China doubled over the course of a few days, as BIMCO reported. They soon returned to previous levels as it became clear that despite the added risk, maritime operations would continue at close to normal levels and shipowners would have to absorb the higher insurance cost.

By the middle of August, the total tanker fleet has already grown by 4.3%. Growth in the crude oil tanker fleet is particularly high with BIMCO expecting full year growth of 5.3%. The higher fleet growth comes not only from increased deliveries, but also from slower than expected demolitions.

Only 2.1m DWT of crude oil tankers has been demolished so far this year, in response BIMCO has lowered its expec-

tations for crude oil tanker demolitions in 2019 from 9m to 4m DWT.

In contrast to the disappointing demolitions, ordering has picked up. New orders for the total tanker fleet have increased to 13.1m DWT. Since May 6 VLCCs of 300,000 DWT or more have been ordered as well as 30 Aframaxes. As BIMCO expects the total tanker fleet will grow by 5% this year, the already over supplied market has no need for extra ships, and further ordering will only worsen future market conditions.

With only 0.6m DWT having left the oil product fleet, deliveries of 6.4m DWT has meant fleet growth of 3.5% this year, with BIMCO expecting full year fleet growth of 4.4%. Even with a demand boost to the oil product tanker shipping sector expected to come, this high fleet growth will put pressure on earnings.

Outlook

In July OPEC+ ministers announced that they would maintain their current output restrictions, of 1.2m barrels per day (bpd), aiming at reducing high stocks in an oversupplied market. The U.S. has continued to increase its crude oil production and exports, with seaborne exports reaching a new record high of 11.9m tons in June. South Korea became the largest importer of US seaborne crude oil exports, after China all but disappeared from the market as its relationship with the US soured.

Chinese crude oil imports from the U.S. fell by 76.2% in the first six months of the year. Over the same period, total Chinese crude oil imports are up 8.8% reaching 244.6m tons. Saudi Arabia has overtaken Russia as the largest supplier of crude oil to China, the two nations sent 37.8m and 37.7m tons respectively in the first half of the year.

The increase in volumes from Saudi Arabia of 10.5m tons is good news for the shipping industry, as most Russian crude oil exports to China are through pipelines, and therefore have no effect on the crude oil tanker market.

Although Chinese imports from Saudi Arabia boost the shipping industry more than those from Russia, a resolving of trade tensions and a return of Chinese buyers to the US crude oil market would provide an even larger boost for crude oil shipping, as it would increase ton mile demand. Another boost to the industry comes from the ramping up of refined oil product exports around the world as the traditional Autumn maintenance season will be shorter, and volumes won't fall as much as usual. As refineries start producing and selling low sulfur fuel, oil product tankers will be employed to transport the product to where it is needed.

Any further escalation of the situation in the Persian Gulf would have a severe impact on the tanker shipping industry as around half of all seaborne crude oil is transported through the Strait of Hormuz.

Ship Operating Costs Drop Again

The total annual operating costs in the shipping industry fell by an average of 1.8% in 2018, compared to the 1.3% fall for 2017, according to a recent report – OpCost 2019 –from international accountant and shipping consultant BDO.

All categories of expenditure in 2018 were down overall on those for the previous 12-month period, with the exception of repair and maintenance.

On a year-on-year basis, the tanker index was down by 4 points, or 2.4%, compared to the 3 points (1.7%) fall the previous year. The bulker index, meanwhile, fell by 4 points, or 2.6%, compared to the 3 points (1.9%) fall recorded in last year's OpCost. The containership index was down by 2 points, or 1.3% – identical to the fall recorded for the previous 12 months.

There was a 1.1% overall average decrease in 2018 crew costs, compared to the 2017 figure of 0.1%. By way of comparison, the 2008 report revealed a 21% increase in this category.

Tankers overall experienced a fall in crew costs of 1.8% on average, compared to the 0.5% fall recorded last year. All categories of tankers reported a reduction in crew costs for 2018 with the exception of Panamax Tankers, which recorded an increase of 0.1%, compared to a reduction for 2017 of 0.7%. The most significant reduction was the 2.7% recorded by Aframax Tankers, which also recorded the biggest reduction in 2017 at 1.7%.

For bulkers, meanwhile, the overall average fall in crew costs in 2018 was 1.1%, compared to 0.6% recorded for the previous year. As was the case in 2017, there was zero overall increase in expenditure on crew costs in the container ship sector in 2018.

Expenditure on stores was down by 4.9% overall, compared to the fall of

3.5% in 2017. Mirroring the results in the previous year, all vessels in all categories recorded a fall in stores costs for 2018, none bigger than the 7.6% recorded by container ships of between 2,000 and 6,000 TEU. In the tanker sector, the most significant fall was the 6.4% posted by Aframax Tankers. Panamax Bulkers and Capesize Bulkers led the way in the bulker sector, each recording a 6.7% reduction in stores expenditure.

For tankers overall, stores costs fell by an average of 4.8%, compared to the 4.5% recorded for 2017, while in the bulker sector the reduction was 6.1%, compared to a fall of 3.6% in 2017. In the container ship sector, meanwhile, there was a 5.7% fall in stores expenditure, compared to a drop of 3.4% the previous year. There was an overall increase in repairs and maintenance costs of 0.6% in 2018, compared to the reduction of 1.7% in 2017. There were also significant increases in the container ship sector, most notably in the case of ships of between 1,000 and 2,000 teu and between 2,000 and 6,000 teu (3.1% and 2.9% respectively).

In the tanker sector, Suezmax owners spent 2.3% more on repairs and maintenance in 2018 than they did in the previous year, while increases were also posted for Tankers 5,000 to 10,000 dwt (1.2%) and Handysize Product Tankers (1.1%). Repairs and maintenance costs were also up in the bulker sector for Capesize Bulkers (1.5%) and Handysize Bulkers (0.3%). Product Tankers, meanwhile, recorded the largest fall of 1.6% across all categories.

For tankers and bulkers overall, there was zero overall increase in repairs and maintenance costs in 2018, compared to the falls of 3.4% and 1.5% recorded in 2017. In the containership sector, however, there was a 3.2% overall increase in repairs and maintenance costs in 2018, compared to zero movement the previous year. The largest overall drop in operating costs in 2018 was the 7.1% fall recorded for insurance, compared to the 4.1% fall in 2017. Ro-Ros were the only category of vessel to record any increase in insurance costs (1.7%). Everywhere else, there were sizeable reductions in insurance outgoings, none bigger than the 9.9% posted for Handysize Product Tankers.

"This is the seventh successive year-on-year reduction in overall ship operating costs recorded by OpCost. The solitary overall increase across all categories of operating costs in 2018, that in respect of repairs and maintenance, should be regarded as encouraging news on a number of levels. It indicates an ongoing commitment to the increasing imperative of regulatory compliance, to maintaining safety and protecting the environment, and to continued operation."

Richard Greiner, Partner, Shipping & Transport at BDO

Protective **Coatings** *by Design*

Nigel Shewring is Hempel Group's new Research & Development Director. He provided Maritime Reporter & Engineering News insights on the future pace and direction of coatings technology.

By Greg Trauthwein

Nigel Shewring has spent his professional life on the R&D side of the coatings industry, starting in 1996 as a bench chemist developing liquid coatings for general industrial applications, moving later into the research and development of foul release coatings. For the last 15 years he has been leading international teams engaged in the research and development of powder coatings.

A UK citizen who studied chemistry at the University of Durham with a PhD from Sheffield Hallam University, he is truly a 'global citizen', married with three children two born in the U.S. and one in China.

His move toward a career in coatings started with his PhD, which involved investigating the interactions at the clay/polymer/water interface for the oil well drilling industry. "There are many similarities between such colloidal dispersions and with coatings and so there was a natural connection at a technology level," said Shewring. "On a personal level, the coatings industry is about engaging with people (whether it be customers or front line employees) in a pragmatic way and that fits well with my personality."

His career most recently led him to Hempel, as he found it "an exciting place to be" on many fronts. "Hempel is a growing company with the ambition to double in size in the coming years; Hempel is an innovator in coatings and a truly globally thinking, working and collaborating organization with strong technical competencies and skilled researchers."

Perhaps most importantly to Shewring, and really to anyone on the research side of business, is Hempel's commitment to "invest heavily" in R&D. "Hempel already has a unique network of 17 R&D centers around the globe to ensure the right solutions can be proposed to our customers but in addition we are currently constructing a new R&D center, which will house around 100 international researchers in Copenhagen where we have also recently opened a new rain erosion test facility. Hempel is the first coatings supplier capable of testing innovative coating solutions for wind blades to the latest and most challenging standards."

Finally, for the global citizen and his family, he reckons "it was an excellent opportunity for me and my family to live and work near the wonderful city of Copenhagen."

R&D in marine coatings is a particular challenge as ships and rigs operated in one of the most hostile and inhospitable atmospheres on the planet for metal structures. But Shewring leads a team of approximately 350 R&D employees, 10% which have a PhD and cumulative an average industry experience of 11 years.

The business side of the equation, and in general the cyclical nature of the business, presents perhaps the bigger challenge. "It is a huge challenge that there are few newbuilds, but we cannot control that," said Shewring. "We are focused on helping our customers and ourselves in a difficult market. We do this by developing and delivering what our customers demand, and by helping our customers to be competitive by contributing to lower their cost of operations. And by collecting data from our customers to deliver the optimal solutions. The marine market is extremely cyclic. Hempel is aware of this and do well in times of challenge. One of the reasons is that Hempel is focusing on maintenance as well as newbuilds."

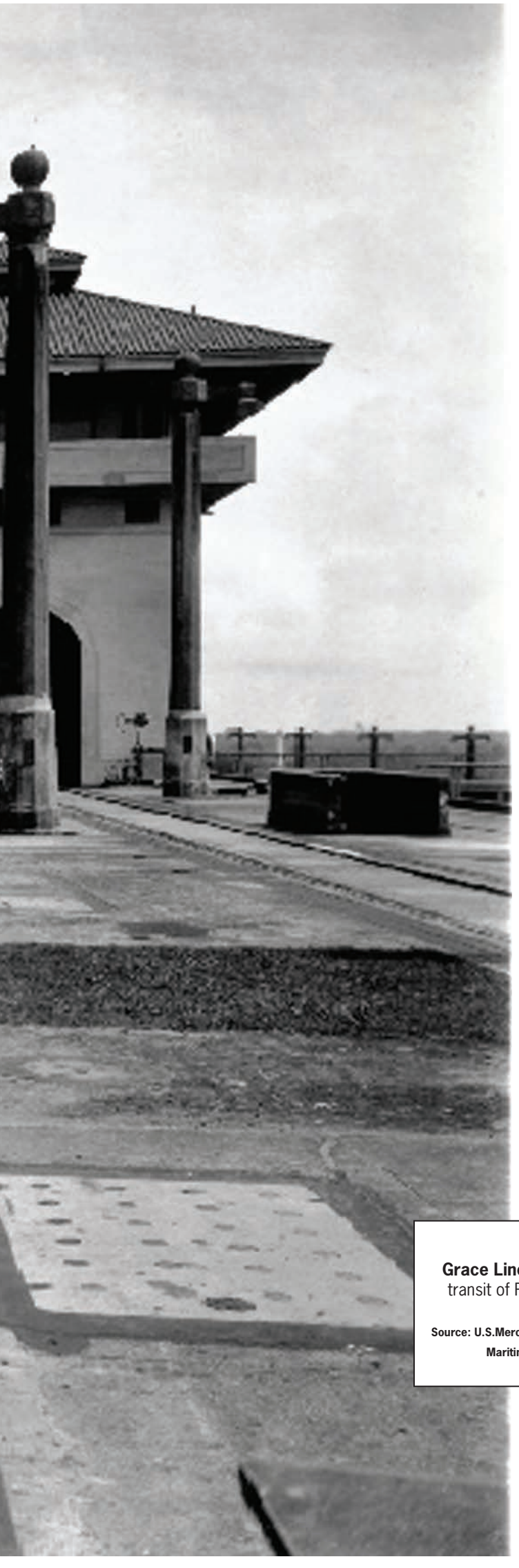
As with many other technical sector of the maritime industry, emerging and

COATINGS: NIGEL SHEWRING, DIRECTOR R&D, HEMPEL

ever-more-stringent emission reduction rules are creating opportunities for Hempel as well. "Our customers look for solutions that minimize speed loss thus reducing fuel consumption and improve operational efficiency. Slow steaming, though not a new concept, is being adopted more and more by shipowners across the world as it means vessels burn less fuel by moving at a slow speed. We have developed trusted solutions to suit such operating patterns," said Shewring. As an example, he said that "our 1,400 vessel track record with Hempaguard has saved more than 10 million tonnes of CO2."

Hempel's New R&D Center

Hempel is adding two new buildings to its HQ in Denmark: a new R&D and test center and a new office building, in total 12,000 sq. m. "The R&D and test center will be the workplace for approximately 100 people, among them around 40 scientists from outside of Denmark," said Shewring. In addition to the open office environment in the new office building, it will include a new auditorium with room for up to 300 people – many of them will be students from the neighbouring DTU, the Technical University of Denmark. The entire Hempel Campus is scheduled to be finished in 2021.



Grace Lines COLOMBIA
transit of Panama Canal.

Source: U.S.Merchant Marine Academy Maritime Museum

Panama Canal

The Panama Canal is a strategic crossroads for maritime traffic, and is arguably one of the most important maritime developments in the past century. Here we take a deeper dive into the history behind that famous strip of wateray.

By Barry Parker

The present canal, which saw its first vessel transits in 1914, along with possible alternatives through Nicaragua and Mexico, had actually been on the minds of merchants, explorers and military/political strategists since the Age of Exploration in early 1500's. The precursor to the actual Canal was a railway across the Isthmus, conceived in the 1830s but actually built in the 1850s; the impetus for its construction, and an important attraction to its financial backers, was the California Gold Rush of the late 1840s.

Shares in the Pacific Mail Steamship Company (benefiting from U.S. government contracts) flourished. The stock price for railroad and mail steamer shares boomed. The year 1869 was a pivotal year, events elsewhere loomed large. In North America, the trans-Continental Railroad was completed that year, which drastically cut into cross-Panama rail traffic (prompting a collapse of the railroad's stock price). Nearly half a world away, the Suez Canal, linking the Mediterranean with the Indian Ocean, was completed, reviving thoughts of a canal linking the Atlantic and Pacific. Coming off their successes in Egypt with a sea level canal, the French canal builders tried a similar design in Panama, which was then a part of Colombia.

With more difficult topography (with the Continental Divide) and the tropical conditions (giving rise to disease), the investor backed French effort failed. The United States, a burgeoning power, picked up the pieces starting in the 1880s; eventually buying out the French company (which had acquired the defunct railroad along the way). After the Spanish American war of 1898 (and lengthy voyages around Cape Horn for U.S. naval vessels stationed in California), geopolitical considerations dominated the landscape. Panama broke free from Colombia (with some American help) in 1903. When the dust settled, the U.S. controlled a 10-mile swatch of territory across the Isthmus, i.e. the Canal Zone. Military considerations influenced the design of the original canal. The Panama Canal Authority's history of the pre-construction phase notes: "At the request of the U.S. Navy, locks chambers were enlarged from 95 to 110 feet to accommodate vessels then on the drawing board."

Concerns about Canal security, and redundancy


CERRO PANDO
PD
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PANAMA R.P.
CERRO PANDO
CANAL DE PANAMÁ
COSCO SHIPPING PANAMA

Inauguration of the Panama Canal expansion
with the transit of the "COSCO SHIPPING PANAMA" (June 26, 2016)
Courtesy of the Panama Canal Authority. Maritime Museum

in the event of military activity, drove an effort at Canal expansion, in the early 1940s, with dredging actually begun on a third set of locks suitable for battleships on the drawing board (but never actually built). This work, subsequently abandoned in 1942 (with World War II underway), was not in vain; it provided a head start on dredging at the new Pacific locks.

The U.S. merchant marine flourished in parallel with the U.S. expansive military might, climaxing in the late 1940s and into the 1950s, years predating the rise of intermodalism and the U.S. highway network- both of which began to take shape in the mid-1950s. Imports of steel from Asia and Europe were in nascent stages. Long gone names Isthmian Lines (established by then powerhouse U.S. Steel prior to the Canal's opening) later amalgamated with States Marine regularly transported steel from the East Coast mills through the Canal, returning with general cargo, or with nitrates. Calmar Steamship, formed by competitor Bethlehem Steel, in response to Isthmian's freight cost advantages, and Lykes Lines took steel outbound, and lumber from the Pacific Northwest, back to ports in the Gulf and Atlantic. Transits by other well known, but long gone, U.S. carriers including Grace Line, Great White Fleet, Farrell Lines (also with ties, originally, to U.S. Steel) and Pacific Panama Line, were commonplace.

In 1979, the U.S. and Panama agreed that the Canal Zone would be handed over to Panama at the end of 1999. For the maritime business, the trends towards larger vessels meant that major trades were bypassing Panama; with then maximum dimensions for vessels of approximately 960 x 105 ft. with a 39 ft. draft.

In 2007, after much study and a nationwide vote, Panama decided to go ahead with the massive expansion project, and vessels with dimensions of 1,200 x 161 ft. with a 49 ft. draft are now able to transit utilizing newly constructed locks and widened entrances on the Atlantic and Pacific sides. As a result both the containership and LNG trades have enjoyed dramatic, positive impacts.

With the expanded Canal finally opened in 2016. Drewry, a leading maritime consultant, wrote at the time, "The new set of locks at the Panama Canal opened for business on 26 June and it was the fittingly renamed Cosco Shipping Panama (9,472 teu) that won the draw to be the first ship through the widened canal, sailing westwards. Five days later, in the opposite direction and reportedly paying a toll fee of some $830,000, the 10,000 TEU MOL Benefactor was the first neo-Panamax unit to perform a commercial transit through the canal enroute for a berth slot at New York on 8 July, where she would become the largest containership the port has been asked to handle in its history."

Drewry added, in the same report, "Without doubt, the ability of the canal to handle much larger ships is a groundbreaking event and heralds a new era in which a large swathe of US importers will have a much wider choice of options routing goods from the Far East. However, it will not all change overnight – the migration of seaborne cargo from the West Coast to the East Coast will continue to be a steady evolution." The consultants also pointed to shifts in Liner alliances' routing dynamics, commenting that: "New alliance service networks for Asia- ECNA favour the Panama Canal routing ahead of the Suez Canal."

The Canal widening coincided with sea changes in LNG moves; with the first U.S. LNG exports moving out of Sabine Pass in

IMO2020, impacting all aspects of shipping, has the potential to bring about a backslide in the East Coast's traffic gains. Joshua Hurwitz, Senior Consultant at port designer firm Moffaft & Nichol has made the case that increased fuel costs due to IMO2020 could prompt 1.2 million TEUs inbound to the U.S. to swing back to West Coast discharge, with shorter transit times from Asian ports.

The inaugural LNG transit of the new and improved Panama Canal came courtesy of the Maran Gas Apollonia in July 2016.

Courtesy of the Panama Canal Authority.

early 2016. By 2019, multiple export facilities had already come online, with additional LNG trains to follow. U.S. Department of Energy data reveals exports of 840 cargoes through June 2019, with top recipients including South Korea (#1, with 144 cargos), Japan (#3 with 74 cargos), China (#4 with 65 cargos) and Chile (#5 with 46 cargos). When smaller off-takers are considered, more than 40% of U.S. LNG export liftings were to Pacific Rim receivers.

The new locks have had little impact on conventional dry bulk and tanker trades. On the dry side, larger Capesize vessels, laden with Brazilian ore, are too deep to transit the Canal. Brokers at Poten & Partners, writing in a mid-2018 Tanker Opinion piece (two years after the expansion), said that "So far, crude oil tankers make up only 3% of the total transits." Many of these have movements have been repositioning voyages, as Poten explained that "… more than half of the transits were for oil tankers travelling in ballast…" typically after discharging on the U.S. West Coast and moving towards Caribbean load ports. The Canal has not been a factor in the burgeoning U.S. crude oil export trades (which began in late 2015); these move on Very Large Crude Carriers (VLCCs), like the big ore carriers, they are far too big for the Canal.

IMO2020, impacting all aspects of shipping, has the potential to bring about a backslide in the East Coast's traffic gains. Joshua Hurwitz, Senior Consultant at port designer firm Moffaft & Nichol has made the case that increased

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MARITIME REPORTER AND ENGINEERING NEWS

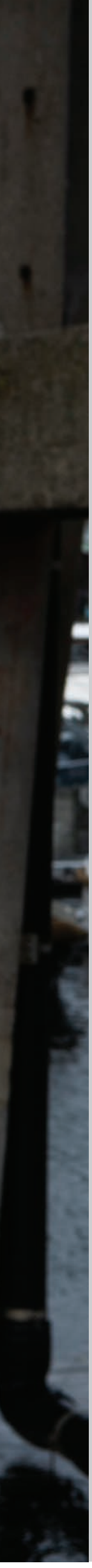
fuel costs due to IMO2020 could prompt 1.2 million TEUs inbound to the U.S. to swing back to West Coast discharge, with shorter transit times from Asian ports.

Trans-shipment terminals on both the Atlantic and Pacific sides have grown into mega cargo handlers; Hutchinson Whampoa, through its Panama Ports Company (both sides) and SSA Marine (Atlantic side), are leading terminal operators. Trans-shipments along the coasts were 7 million TEUs in 2017, according to Georgia Tech Panama Logistic Innovation and Research Center. The railroad across the Isthmus, which had been effectively abandoned, has been rekindled, part of a "Logistics Platform" (as termed by the eminent geography professor Jean-Paul Rodrigue) as a link for trans-shipping containers between Colon (on the Atlantic side) and Balboa (on the Pacific).

In 1998, just prior to the handover of the Canal to the Panamanians, the U.S. based Kansas City Southern railroad (NYSE- "KSU") along with Mi-Jack, a leading producer of rubber tired gantry cranes (RTGs) and provider of intermodal terminal services to the major railroads (through what is now called ITS Conglobal), was granted a 50 year concession to operate the railroad, following an investment of $80 million. Railroad container traffic across the Isthmus, a closely guarded number, was reported to be 400,000 TEUs in 2014.

Panama Canal Authority, now deriving a large proportion of its toll revenues from the container trades ($2.5 billion total in 2018, of which 159 mm out of total 441 mm Panama Canal Universal Measurement System or PC/UMS tons, were from container vessels), has seen economics and change with the times. In 1965, in the already waning glory days of its merchant marine, U.S. flagged vessels transits numbered 1678; decades later, 126 U.S. registered vessels made the transit in 2018. But old patterns linger. In early 2017, the first tug barge transit through the widened Canal saw New Orleans-based Tradewinds Towing's tug Hollywood pulling a beamy barge westbound from the Gulf of Mexico to the U.S. West Coast.

Any look at history always begs the question of what's ahead. The ACP told Maritime Reporter & Engineering News that "The Panama Canal, always considering the competitiveness of the waterway, included the possibility of a Fourth Set of Locks in designing the Third Set of Locks, should additional access later be required due to demand from the global maritime industry to grow further. If this need does arise, the Panama Canal will conduct in-depth analyses of current and future demand, as well as water sources. Currently, the Panama Canal has no immediate plans to execute a fourth set of locks."



C-Job CEO & Cofounder

Basjan Faber

Born to Design

Born and raised on the water by entrepreneurial parents, Basjan Faber knew from a young age that his future and fate was in maritime, specifically ship design. Today the CEO leads a vibrant, diverse and fast-growing naval architecture firm that he co-founded with partners in 2007. Headquartered in Amsterdam, C-Job has a unique approach to its business and is expanding its international footprint, as Maritime Reporter & Engineering News discovered when we visited with him in The Netherlands last month.

By Greg Trauthwein

"I have always been inspired by ships, and I knew by the end of grammar school that I wanted to be a naval architect. In fact, I remember going with my parents to a university to explore naval architecture at the age of 11, and I'm sure the professors at that time were thinking 'what is this young boy doing here,'" said Basjan Faber, co-founder and CEO of C-Job.

But Faber did indeed know his place and his heading, and in 2007 he and two partners founded C-Job, which today is a growing force in the world of maritime design, evolving from a trio 12 years ago to more than 160 employees worldwide today. Most recently it opened an office in Houston, Texas, a move that Faber sees as a stepping stone to growing his business in the Americas, with an eye on Asia and Australia in the future. "But we can't do everything at once," said Faber.

The Man, The Plan

Faber grew up on the water, on boats personally and professionally as his parents were entrepreneurs, owning their own inland cargo vessel operation, and when not working the family could be found sailing.

"I know it's cliche, but it all starts with your own parents. They gave me a kick-start, direction and they were entrepreneurs," said Faber in assessing how he came to love the maritime business. "Other than that, I really don't have one specific mentor. In general, I am very open and receptive to ideas, I'm a good listener, and I like to learn from others and take different ideas to help form future direction."

Per his 11-year-old career ambitions, Faber graduated with a Bachelor's degree in Naval Architecture in 2002. But at the time, the maritime business in The Netherlands was in a slump. Realizing his ambition to be an entrepreneur, he opted to get his Master's degree – a "technology management MBA" – before entering the workforce full-time with another naval architecture firm.

But the young man with the big dreams could not be confined under the employ of another, so Faber and two classmates ventured to create C-Job, opening shop officially in December 2007.

From the outset, the C-Job founders had a plan to grow substantially and internationally. When Faber and his partners started C-Job, their mandate was not centered on the design of a certain type of vessel or market segment, rather they saw an opportunity to focus on the client and their needs as well as change the

C-Job Naval Architects Offshore Wind Installation Vessel 'Orion' Render

Photos: C-Job

process and approach of how a design comes together (more efficiently); ships and boats that were purpose designed and built in tandem with the customer. "From the beginning we were thinking about how we can do things differently," said Faber. "The maritime industry is rather traditional with many family owned and long-existing businesses, and we simply said 'we think we can do better and bring it to the next level.'"

The C-Job DNA

One of the biggest differentiators in the C-Job model is the fact that, when a project is developed and delivered, it is the client, not C-Job, that owns the intellectual property of the final design. "We don't have a library of common solutions and vessels, we work closely with our clients to co-create our designs," said Faber. While he admits that "this is completely different than what is traditional," he said the business model demands mutual trust among all parties, and is popular with C-Job clients and prospects. "The most important attributes of C-Job (to our clients) is that we are an independent office, we're a knowledgeable, innovative and we have a passionate team."

While nearly every corporate leader will insist that 'the team' is the cornerstone of success, in Faber's case the statement is genuine.

"We are not managed from the top down," is how Faber easily describes his company, explaining that the DNA and culture of C-Job is one that inspires free-thinking and entrepreneurship, much like he learned from is parents. "We give a lot of responsibility to our team to talk to the industry, develop their skills and to help develop new solutions."

To that end, in the never-ending quest for technical talent, C-Job is not looking merely to hire employees, it is constantly on the search for innovative individuals that are ready, able and enabled to develop and create solutions on their own, seeking and delivering business opportunities to the company.

The C-Job DNA flows beyond the company walls and throughout industry, as Faber is an ardent supporter of collaboration to foster strength and growth. "You can achieve more by collaboration. If you're throwing up fences to protect yourself, I don't think it gives you the best future," said Faber. "We believe in open source so outsiders can help to optimize the solutions. But there must be some caution, too, as this is idealistic. We need to have a return on investment, and we can't have people simply taking our ideas and making them their own."

The key in Faber's reckoning is trust, as he seeks insight from anywhere he can find it, including potential competitors. An example of this is a Memorandum of Understanding signed in November 2018 with Glosten. "In Glosten we found a partner with mutual trust and chemistry and an atmosphere of collaboration," said Faber. "The main focus of our collaboration is to prepare for the offshore wind energy business in the U.S."

The Path Ahead

The maritime industry is in the midst of transcendent transformation, as a host of increasingly stringent emission regulations coupled with the accelerating advance of technology in general, digitalization in particular, is literally changing the look and performance of ships and boats at sea. Faber said that C-Job is increasingly engaged in Research and Development projects, with an eye on where the industry will be moving in the next 10 to 20 years. He said the investment is valuable on a number of levels, least of not which is developing future technology to raise not only his business, but the industry as a whole. "Perhaps most importantly, it inspires our team and inspires the atmosphere for new hires; they see that you are investing in the company and the future."

While the opening of the Houston office was a strategic point for the company in an opening of the Americas in general, the physical opening was the culmination of working in the market for years, getting to know the client base, the projects and the opportunities.

"We have been building our business and contacts in the U.S. for three years," said Faber. "One of the focus markets we have here (in the Netherlands) is dredging, so that's where we started. But the opportunities in the U.S., and throughout the Americas, go far beyond dredging. There is offshore wind, the cruise and ferry industries, and super yachts. The Houston office is simply a spin-off of all the business that we already have in the U.S. It's logical to make that step." While expansion in the U.S. was a logical one, Faber assures us "it will not be the last!"

While the need for emission reduction solutions gains steam throughout the maritime world, Faber and C-Job were pioneers. "When we started the business in 2007, there were no projects for LNG (as a fuel), for example. Things have quickly changed with pressure to lower emissions. Since 2011/12, LNG became a hot topic, and nowadays in every project, LNG is considered or applied." (See sidebar on the Texelstroom ferry project on page 38).

Though LNG is growing in popularity, C-Job sees it as a transition fuel, and is investing research dollars in the future tech and fuels that will power maritime's future. "Our R&D efforts are focused on how we will do things in 10 years, 20 years from now. For example we've just finished a study on the application of ammonia as a future fuel," said Faber. He, like most, agree that there is no single 'silver bullet' to answer the decarbonization challenge, rather a mix of technologies including fuel, battery tech and innovations in sail and renewable energies. "We've done a study on the implication of Rotor Sails (wind power), which is an easy-to-use solution, but it's very route specific, it's not for every vessel. In the Baltic and certain Atlantic routes it is very applicable. The use of the Rotor Sails goes hand in hand with better route planning to optimize."

Optimizing the route is what Basjan Faber and his growing team do best, navigating the ups and downs, ins and outs of the ever-changing maritime landscape. But today the young, confident CEO has his hand on the throttle and it's 'Full Steam Ahead.'

DESIGN PROJECT REPORT

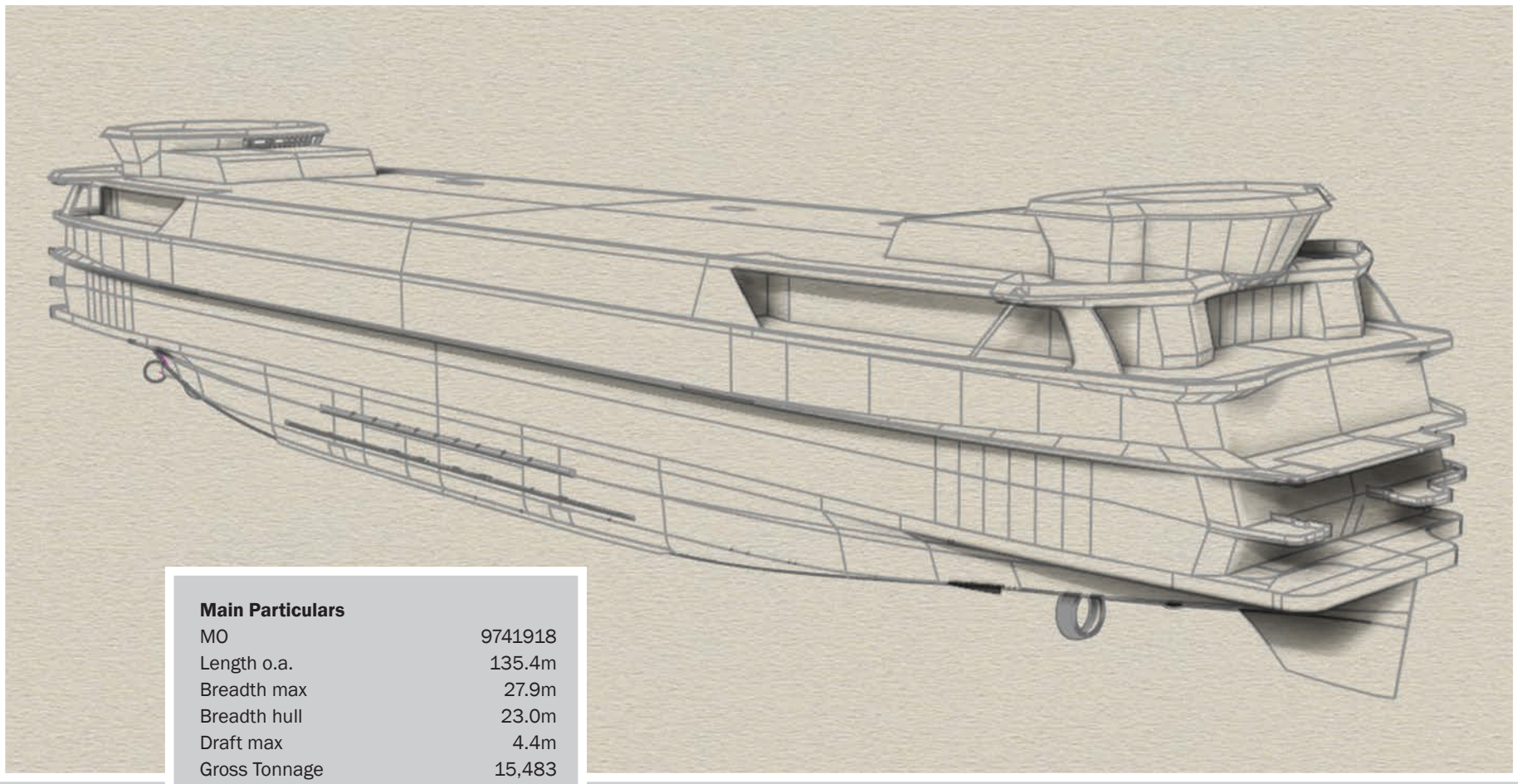
TESO'S FERRY TEXELSTROOM

With C-Job's broad portfolio of vessel design projects, one might assume that Basjan Faber, CEO, would have difficulty selecting just one that best embodies the capability of his company. But when asked the question the answer was quick and sure: TESO's Texelstroom Ferry Project. "It was a vessel with technology ahead of its time," Faber said. The ferry is operated by locally owned organization TESO, and Texelstroom was designed five years ago and built three years ago. C-Job was responsible for the Initial, Concept & Basic Design for the double-ended ferry which has been in operation since 2016 between the Dutch island of Texel and Den Helder. When the project started in 2014, the initial thought was to use LNG, but at the time the fueling infrastructure was not well developed. But in the Netherlands the use of Compressed Natural Gas (CNG) is common for vehicles and buildings, providing an abundant fueling infrastructure capability. The only problem: CNG was not approved yet for maritime use.

"It took many meetings and close cooperation with class (Lloyd's Register) throughout the project, but we made it happen," said Faber.

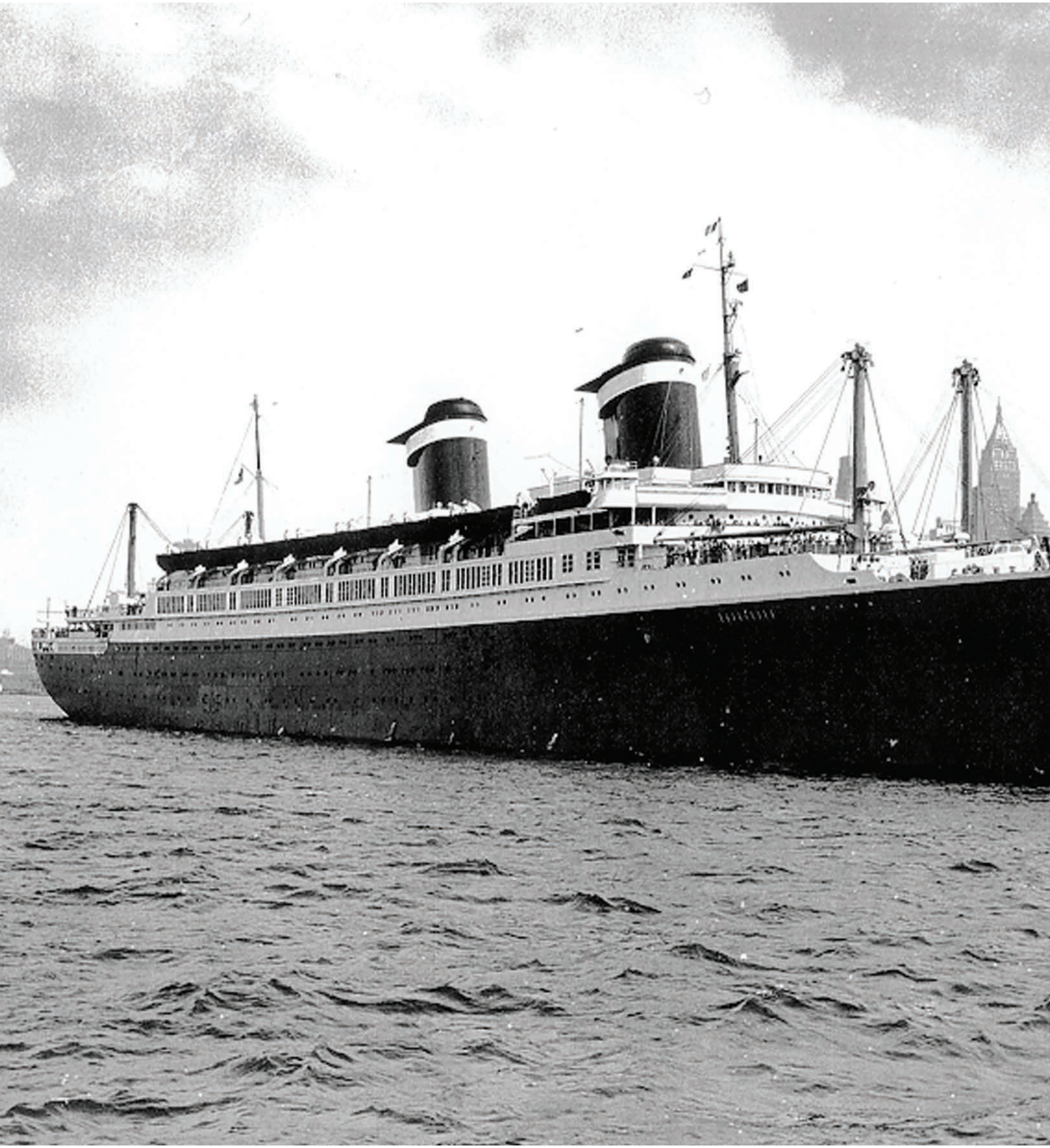
Eventually, TESO decided on a "Dual Fuel System" with CNG. Furthermore, there is a Hybrid propulsion system with Battery Packs to shave of the peaks in energy demand on board. Solar panels are responsible for about one half of the hotel function.

C-Job performed many more studies and consultancy tasks like: Windflow/CFD Analyses, hull shape optimization, Intelligent Ventilation study, FEM Analysis, Stability calculations, and much more. Also, C-Job assisted TESO during the build of this vessel at LaNaval Shipyard in Spain.



Main Particulars

MO	9741918
Length o.a.	135.4m
Breadth max	27.9m
Breadth hull	23.0m
Draft max	4.4m
Gross Tonnage	15,483
Net Tonnage	5,566
Deadweight	1,451 t
Main engines	2x ABC dual-fuel 12DZC and 2x ABC diesel 12DZD
Output	4 x 2,000 kW
Speed max	15.4 knots
Pax capacity	1,750
Capacity	34 trucks + 261 cars or 380 cars
Class	Lloyd's Register



The iconic and much beloved SS United States is a signature design project from Gibbs & Cox.

Source: Gibbs & Cox

Looking Back, Forging Ahead

Hindsight, they say is 20/20, and in this regard renowned design house Gibbs & Cox has nine decades in the rearview mirror on which to lean. We recently caught up with Chris Deegan, President and CEO of Gibbs & Cox, celebrating its 90th anniversary in 2019, to discuss the organization's rich history and promising future.

By Greg Trauthwein

When you took the top spot at Gibbs & Cox in 2016, what were your goals for the organization?

As a company that designs everything from yachts to work boats to destroyers, I wanted to reassert G&C as the global leader in the naval architecture and marine engineering industry. Our Board of Directors challenged us with growth in a flat market, and we have exceeded the target each year, needing new benchmarks along the way. Our success is honestly easy to understand: provide a superior product to our customers, and treat our people well. I want every person in the company to feel valued and recognized as an important contributor to our success. If we take care of the people, the people take care of the customer.

Please give a "By the Numbers" overview of Gibbs & Cox today.

This year we celebrate our 90th year of incorporation, and less than one tenth of one percent of companies reach 90! At 400 people and seven domestic locations, G&C today is the largest independent, privately held ship design firm in the world. Ships are all we do. Nearly 7,000 vessels have sailed to our designs, including 30 classes of combatants for 44 nations. In 2015 we acquired Donald L. Blount & Associates (DLBA) bringing us an innovation center in the commercial, workboat and recreational markets. Domestically, we augment government program office and engineering teams in the US Navy, Missile Defense Agency and USCG. Our role as a shipyard Design Agent spans many shipyards needing surge engineering and design services. Internationally, we support shipyards in Halifax and Vancouver; and in 2017 we opened our Canberra, Australia office to align us with the Australian naval expansion program. We remain aligned with customers via expertise in important and emerging markets such as polar ice breakers, autonomous surface programs, and regulatory changes in ballast water treatment and Tier 4 emissions.

As one of the few ISO 9000 certified naval architecture and marine engineering firms, we welcome annual site audits of our processes and consistently record excellent results. We have a robust quality assurance system unmatched in our sector of the industry, supported by a library of management and technical guidelines built from lessons learned of previous classes which we tailor to each project based on customer preference. In the past three years we have recorded our highest Customer Sat-

-isfaction ratings, our highest quality recordings and the highest Employee Satisfaction scores in the 15 years of these surveys. In an extremely tight job market, our attrition rate remains well under 10% per year. New employees have referred to us as a "destination" employer…once again proving if you take care of the people, the people take care of the customer.

The manner in which ships are designed has evolved mightily since G&C opened its doors in 1929. When you look at the evolution of ship design, what do you count as the most influential/important technical advance?

Computer Aided Design (CAD) continues to be the most influential and transformational technical advance in the field of naval architecture. We were an early adapter of CAD and helped advance its evolution since the late 1970's. Since those early days we have seen various CAD programs mature, and the ability to model production information directly into plate cutters, pipe bending machines and other production tools has been the most influential technical advance in the industry. In looking to the future CAD firms are developing Augmented Reality applications, and within the next decade we can see data being accessed by Artificial Intelligence applications.

Gibbs & Cox has had a long-standing relationship with the U.S. Navy, a customer with high demands and expectations. What's the secret for building and maintaining a strong relationship with this demanding customer?

I don't see it as a secret, but a detailed understanding of the specification, past performance and expert knowledge goes a long way. The Navy has done an excellent job rebuilding its internal world class capability since its engineering workforce was gutted 25 years ago. NAVSEA is respected worldwide for its depth and breadth of talent, capabilities and facilities. Our niche with our Navy customer are peer-level discussions. Since we support the shipbuilding industry around the world, our detail design and production support capabilities offer a unique perspective to Navy programs and other government teams as well.

The U.S. Navy is unique in that it must project decades in advance its operational requirements, while maintaining a focus on today. What is the trick for a Gibbs & Cox to help design vessels that are – from cradle to grave – efficient and successful in their mission.

No tricks, it is always about customer alignment. Like any industry, listening to the customer is critical. For the Navy and future combatants, energy loads and how to most efficiently supply that energy to future weapon systems (lasers, directed energy and electronic attack systems) is influencing today's concepts. Even for the Navy's nascent surface ship autonomous missions, relating specifications our commercial and recreational markets provides fresh insights to warfighting specification tradeoffs. Naval architecture is very much an evolutionary business, and our breadth and depth offer a unique perspective for creative design and support alternatives. As such, we'll have a number of 30+ year employees say "we did something like that in 1999,

"Computer Aided Design (CAD) continues to be the most influential and transformational technical advance *in the field of naval architecture. We were an early adapter of CAD and helped advance its evolution since the late 1970's."*

Chris Deegan,
President and CEO, Gibbs & Cox

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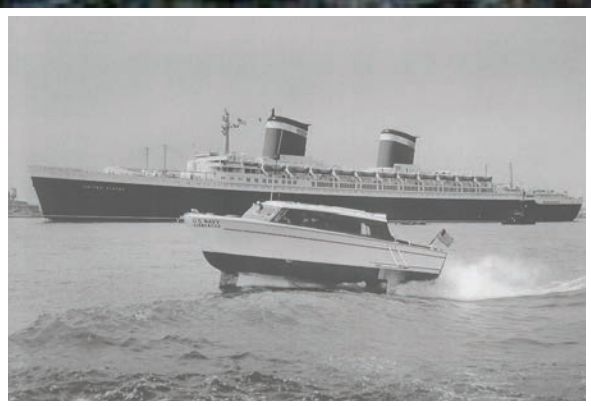


The Arleigh Burke design has been the workhorse of the US Navy for over 20 years, and will be for another 40-50 years.

or for NOAA, Coast Guard, or for Taiwan or Australia."

Please discuss your Navy business projections for the coming decade.

The near term is promising for the government-based ship design and marine engineering industry. I qualify with "government" because 90% of the Navy's five-year SCN portfolio targets HII and General Dynamics, each possessing their own in house engineering and design workforces, with little room for third party design and engineering competition and innovation (e.g. submarines, big deck carriers, destroyers, amphibious ships, etc). We targeted FFGX and successfully staffed 2 of the 5 Concept Design teams, Lockheed Martin's Freedom and Fincantieri FREMM-class variants (LM recently opted out of the Detail Design and Construction bidding). Beyond FFGX, the Navy's FY 2020 President's Budget includes more auxiliary ships and a growing autonomous ships portfolio. G&C is well positioned to support the Navy in many of these programs and particularly the autonomous market.

Ship design, particularly ship design for the U.S. Navy, requires continual investment. Please share with us how G&C is investing today.

Our recent growth has been organic, as such we find it necessary to have a robust dialogue with our customers to understand where they are headed to remain aligned. In the past five years, we have lead the industry in low cost 3D modelling supporting not only ships, but aviation assets and AEGIS Ashore as well. In 2017 we purchased our first 3D printer, and this fall we will be introducing Virtual and Augmented Reality at the International Workboat and Fort Lauderdale International Boat Shows. We've also invested in autonomous HM&E solutions, cyber security and top side integration capabilities.

Given Gibbs & Cox's history, the Navy focus is warranted. But let's look outside the Navy for a moment. Can you give update and insight on your business today and prospects for everything that is not a grey hull?

Gibbs & Cox continues to expand outside of our naval market, following a decent amount of ship design opportunities in NOAA, MARAD, USCG, as well as those at the state and city level. This market is very competitive with no Jones Act protections, and there is an increasing dependence on parent designs, which are often sourced overseas. Outside of the government focus, our DLBA business has been a tremendous addition to the company. The production boat market has been an increasing amount of business for DLBA, as has the sportfish market with some outstanding builders in the Carolinas. Though the yacht design market has shifted to Europe in recent years, we are still pursuing interests here and abroad.

I know there are many, but if you were forced to select just one ship, one design, one project that you feel best defines G&C's history, what would that be and why?

The Arleigh Burke design has been the workhorse of the US Navy for over 20 years, and will be for another 40-50 years. We were aligned with the Navy and industry from the onset in the mid-1980s to develop the most capable warship, introduced Computer Aided Design along the way, were teamed with the Navy and industry for each flight upgrade, and today actively support the PMS 400 program office on Flight III integration. Were there warts along the way? Absolutely! But that is how a 90-year-old company continues to excel, learning and adjusting, applying lessons learned to each subsequent vessel.

Every position has its challenges. What do you consider to be your greatest challenge in leading Gibbs & Cox, and how do you address this challenge?

I am truly excited about autonomous vessels and the growth in design opportunities around the globe. This adds incredible variety to our staff as they work on interesting projects throughout any given year. Contrary to market trends, we've done a great job finding the design and engineering talent to meet our demands. (Niche skills such as cyber remain difficult to fill). Though our attrition remains far below the industry, we are a people business and retaining staff is my biggest concern. Ship design is heavy on maintaining quality and deadline driven projects. It is demanding field, and the number one reason people leave us is to leave the maritime industry. To address this, G&C is improving our initial interviewing filters. Once on board, we perform annual skills surveys of our staff to measure the talent we have onboard, and includes a personal skills assessment of nearly 400 categories. With this, we tailor each employee's aspirations to our projects, and in turn we see what skills we need to acquire corporately. We also have developed 19 career management guidelines to aide an employee's self-development.

Rik van Hemmen is the President of Martin & Ottaway, a marine consulting firm that specializes in the resolution of technical, operational and financial issues in maritime. By training he is an Aerospace and Ocean engineer and has spent the majority of his career in engineering design and forensic engineering.

The Inevitability of Change

At one time the most powerful lighthouse in the United States was Twin Lights in Highlands New Jersey. Today it is a wonderful little museum and right now it has a very interesting show of paintings by Maarten Platje on the War of 1812. One painting is called the Great Chase and it tells this amazing story of the US Frigate Constitution being becalmed off the New Jersey coast and becoming engaged in a rowing race to keep out of range of a powerful British Squadron. The Constitution escaped and went on to have her amazing victories that year, but if she had been caught, today we would have never heard of her.

What really struck me as interesting is that, while this rowing race was taking place offshore, Robert Fulton was running his steamboat up and down the Hudson not even 100 miles away. If that steamboat had been out there to tow the Constitution, she could have outmaneuvered the entire squadron and really put a hurt on the British, and navy steam would have been adopted overnight.

Instead, we know that steam did not become a feature of naval warfare until the Civil War half a century later.

What is less well known is that during the War of 1812 Robert Fulton built a steam gunboat and even delivered it to the US Navy, but the Navy never quite figured out what to do with it.

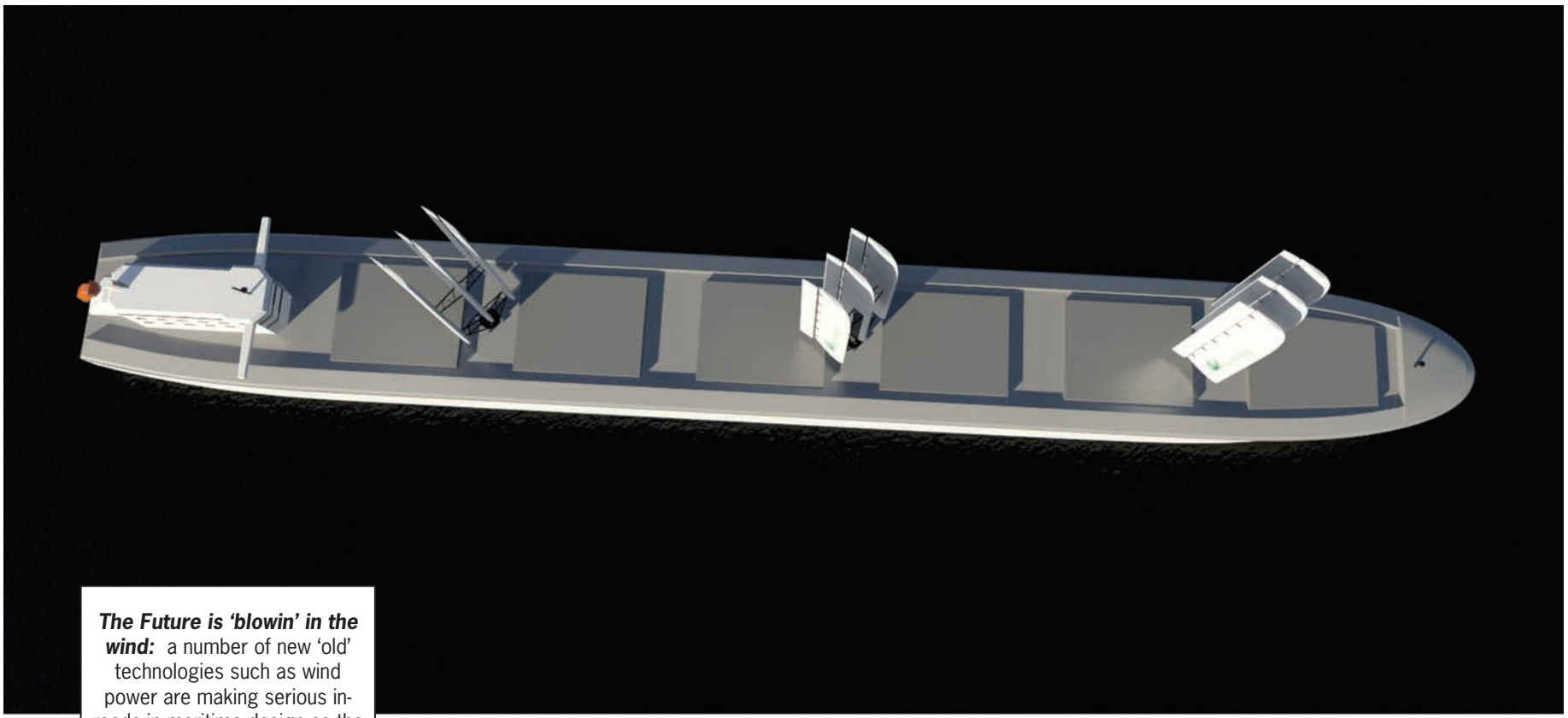
Why did it take so long for the technology to be accepted? There are too many reasons for this column to discuss that, but in this 80th anniversary issue of Marine Reporter you are probably reading about things that may appear strange today, but will be commonplace in the 100th anniversary issue. (Maybe I will still write an occasional column at that time and can check back how wrong I was today.)

As far as predicting the future is concerned, I am not interested in things that

The Great Chase tells the amazing story of the U.S. Frigate Constitution being becalmed off the New Jersey coast and becoming engaged in a rowing race to keep out of range of a powerful British Squadron.

Credit: Maarten Platje

Credit Maarten Platje



The Future is 'blowin' in the wind: a number of new 'old' technologies such as wind power are making serious inroads in maritime design as the industry plots a course toward decarbonization.

Credit: Windship

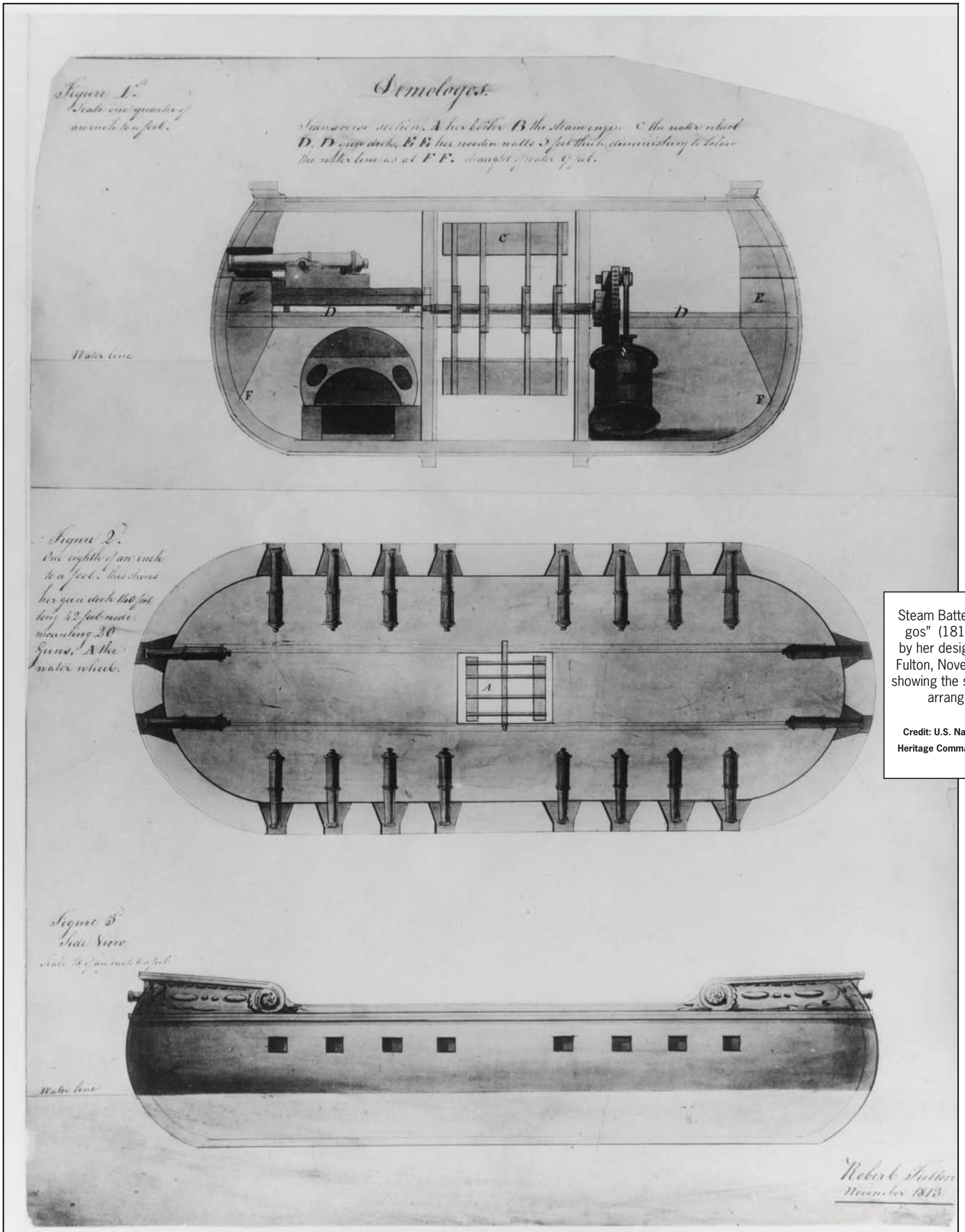
are simply the march of technology like ship autonomy. For my prediction I am reaching back to that painting. I am betting that, in 20 years, commercial sail will have found a new footing in commercial maritime.

I don't think that sail will become a dominant means of propulsion, but with the pressures of carbon reduction, and a combination of parallel innovations, I am starting to think that there will be a place for commercial sail in long haul bulk transportation.

I see quite a lot of sail propulsion proposals out there and, on a technological level, some proposals make sense to me, and others make no sense at all, but what I rarely see is a system analysis of the use of sail in bulk transportation.

The combination of incredibly improved communication methods, vastly better weather and current predictions, and emerging sail technologies, inherently will make sail propulsion much more reliable and will vastly improve the transit times between distant ports over the early 20th century transit times.

The improvement is not just marginal; it is momentous. While I am not for a



Steam Battery "Demologos" (1814) Drawing by her designer, Robert Fulton, November 1813, showing the ship's general arrangement.

Credit: U.S. Naval History and Heritage Command Photograph.

second suggesting that sailing bulkers will go as fast as today's fastest sailboats, it should never be forgotten that the fastest waterborne circumnavigations have been achieved with sailboats. Not steamships, not diesel ships, not nuclear ships, not even nuclear submarines; the fastest waterborne circumnavigation was accomplished by the trimaran IDEC 3 in 2017 at 41 days. This boat's inherent top speed of 33 knots (that is average speed over 24 hours!) was needed, but speed means nothing if you can't keep the wind, and weather routing allowed this record to be set. Unfortunately, it is mathematically more difficult to take advantage of weather routing if your vessel is slower (it is more difficult to route the vessel into the optimal winds and to keep it there), but longer term accurate predictions and big oceans with lots of alternatives help a lot.

Today it is not unrealistic to assume an average transit speed of 8-10 knots on long voyages for big sailing bulkers.

That is zero emissions at speeds that are not far away from slow steaming bulkers!

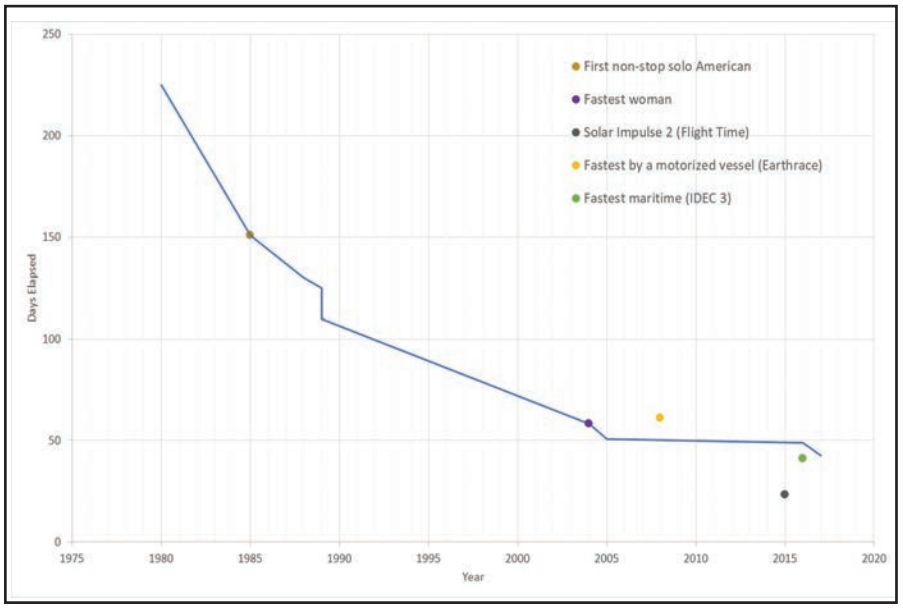
Unfortunately, the logistics customer today wants predictability and average speeds are not the same as actual speeds, and therefore the cargo may arrive a little late, or a little early.

There are two ways to fix this issue. One is to generate a little energy underway with solar or trailing propeller systems. This energy can be managed to keep the vessel in the wind zones by running under power for relatively short distances when needed.

The other way to fix it is to think in logistical system terms. If we think of sailing bulkers as both transport and storage devises, a fleet of sailing bulkers can simply be loaded and sent on their way to deliver the cargo at some distant location. Once the flow starts, the vessels can be scheduled to arrive earlier and simply keep station under sail until the berth is available. Two or three vessels in the proverbial pipeline can ensure, to a very high degree of certainty, that cargo will be delivered when required.

Most likely sailing bulkers will use a combination of both approaches and other technological advances that will come down the pike in the next few decades.

I am pretty sure it will happen, unless there is a renewed interest in nuclear propulsion. Newer nuclear technologies show a huge amount of promise, but while an individual shipowner can elect to invest in sail, the investment in nuclear needs to be driven by government investment. And government investment in maritime is as rare as a young nation with a small Navy being able to teach the largest Navy in the world a lesson or two.



For each column I write, *Maritime Reporter & Engineering News* has agreed to make a small donation to an organization of my choice. For this column I nominate **Twin Lights Historical Society**, the co-organizer (with NMHA) of Guns Blazing! The War of 1812 exhibit at Twin Lights Museum in Highlands, NJ. The show will run through November 22, 2019. www.twinlightslighthouse.com/about-us.html

Ken FitzGerald is a Principal at Glosten, a full-service marine consulting and design firm headquartered in Seattle, Washington. Ken has nearly 30 years of international marine experience, with broad engineering and design expertise, extensive field survey work, and offshore experience.

Evolving for Efficiency & Compliance

The evolution of marine design is increasingly influenced by three drivers: New three-dimensional design tools, the increasing complexity of power systems, and new access to high-latitude shipping routes. While new digital design tools are a natural progression of the current Information Age, new propulsion energy requirements and Polar shipping routes are reactions to the legacy of the ebbing Industrial Age.

Three-Dimensional Design Workflows

A young naval architect recently stated that we have a fair ability to predict the development of new tools in the maritime industry because our industry seems to always be lagging behind others. She was speaking about the steady shift of three-dimensional design software from digital modeling of final shipyard production packages towards earlier efforts in the feasibility and concept phases of vessel design.

We find ourselves emerging from the awkward adolescence of 3D modeling. Until recently, ships were designed by naval architects under an ancient set of standard two-dimensional views and then converted by marine designers into digital models of systems and structure with incredible levels of detail. These new 3D skills arrived with the newest designers using tools developed for the digital arts, automotive, aerospace, and architectural sectors. The adaptation of these tools by naval architects working in the early phases of design feasibility has been breathtakingly fast when measured against hundreds of years of standard two-dimensional views in paper drawing packages.

2D drawings for regulatory review are increasingly derived from 3D models; the large-format printed booklet of drawings is giving way to the spinning, rendered surface. While it is hard to give up the experience of palming the pages of a general arrangement from hand to hand, there are clearly new benefits in design workflow efficiency, real-time collaboration, de-risking early design decisions, and easing the interface with robotic fabrication methods.

Green Power

The arrival of low-carbon power in the marine industry coincides with an earlier trend of increasing complexity in diesel-electric propulsion options, interfaces, and interconnections. Traditional well-defined interfaces between the propulsion system and the rest of the vessel have become integrated systems pushed to levels of complexity that were previously unimaginable. The adoption of these complex systems was propelled by

Alternate fuels such as liquid hydrogen are already well-served by existing supply chains.

Credit:Glosten

many requirements including reduced tug handling, dynamic positioning, competitive fuel efficiency, and increased safety in design codes.

The height of the current diesel-electric age has been a period of hard lessons in systems integration. Without systems-wide optimization and interface control, vessel projects with multiple interconnected electrical and data systems from an army of siloed vendors become fractured battlefields. Many owners, shipyards, designers, and vendors have been unprepared for this new age of systems complexity while operating in a commercial shipbuilding model from a simpler time. This has bred a new subdiscipline of marine engineering. Marine electrical systems designers are tasked with optimizing the entire electrical and control system to develop clear interface requirements.

New initiatives for carbon reductions and efficiency improvements have added even more complexity to the systems of the near-future and have led to a blossoming field of renewable power concepts. The outlook of the marine power generation landscape includes a wide set of options ranging across hydrocarbons, renewable electricity, hydrogen, ammonia, and wind. Each of these options carries an intimidating set of new systems and interconnections for controls, alarms, and automation that will need to be optimized.

Polar Shipping

Increased access to Arctic shipping routes is illuminating a need for new navigational tools, infrastructure, and vessel designs to close operational gaps and meet environmental requirements. Current ice forecasting and voyage planning methods are frozen in a venerable system that was intended for a limited number of vessels active in ice impacted waters. Advanced methods and new technologies will be required for widespread commercial application in new northern routes. New Polar environmental regulations together with existing requirements will require additional engineering and vendor capacity as maritime activity in Polar waters increases.

Vessel operations in and near ice-covered waters add new daily burdens to vessel crews operating in high latitudes. Many of these new requirements are focused on estimating real-time and near-future ice conditions in the immediate areas of operations and along navigational routes. In the simplest terms, ice navigation can be thought of as coastal navigation with an ever-changing and ever-moving coastline. In an age where most risks have been mitigated by digital information, the timeless practice of watch-stander vigilance is still the primary tool for ice navigation. Site-specific ice predictions covering the immediate vessel environment over an hours-to-days interval is currently within technical reach by combining real-time metocean data with high definition digital models. The commercial adoption of these tools by further development and packaging is a dawning challenge for active weather routing and voyage planning service providers.

Search and Rescue (SAR), salvage, and spill response in Polar waters is another risk management gap for shipping in high latitudes. New methods and standardized monitoring and response practices are required to manage marine casualty risks and normalize commercial terms for Polar water operations.

New and unfamiliar environmental requirements for vessels operating in Polar waters will be increasingly implemented in newbuild and modification design packages to provide vessels with the flexibility for work in high latitudes. Designs and treatments to reduce underwater radiated noise are already under consideration for existing harbors and high-concentration shipping corridors. Vessels designated for Polar routes and operations will need new levels of specialized design to minimize vessel noise impacts in the Arctic habitats of protected marine mammals. Similarly, new systems and engineering should be expected to provide compliance for reduced vessel emissions. Zero discharge zones are an existing driver of such treatment systems. Black carbon emission controls for main engine and auxiliary systems are another likely area for engineering evolution in high latitude vessel design.

New Methods, New Responsibilities

It is the nature of designers, engineers, and builders to see themselves as innovators who are bringing disruptive and exciting new solutions to their technology sectors; digital tools are changing marine design just as the propeller disrupted the paddle wheel. While these are exciting and positive tends building on the exponential trajectory of earlier technology leaps, we also have new challenges which come with the aging of all things. In 2019, these are the challenges of maintaining environmental health and adapting to unintentional changes from our earlier industrial lifestyle.

Roland (Rollie) H. Webb is Senior Vice President, Robert Allan Ltd. He has more than 40 years of experience in marine engineering and shipyard experience, starting out in ship operations as a Marine Engineer at sea, followed by 32 years of shipyard experience in Canada and the US in ship repair and ship construction Rollie graduated from the Canadian Coast Guard College in 1974.

The Evolution of Marine Design

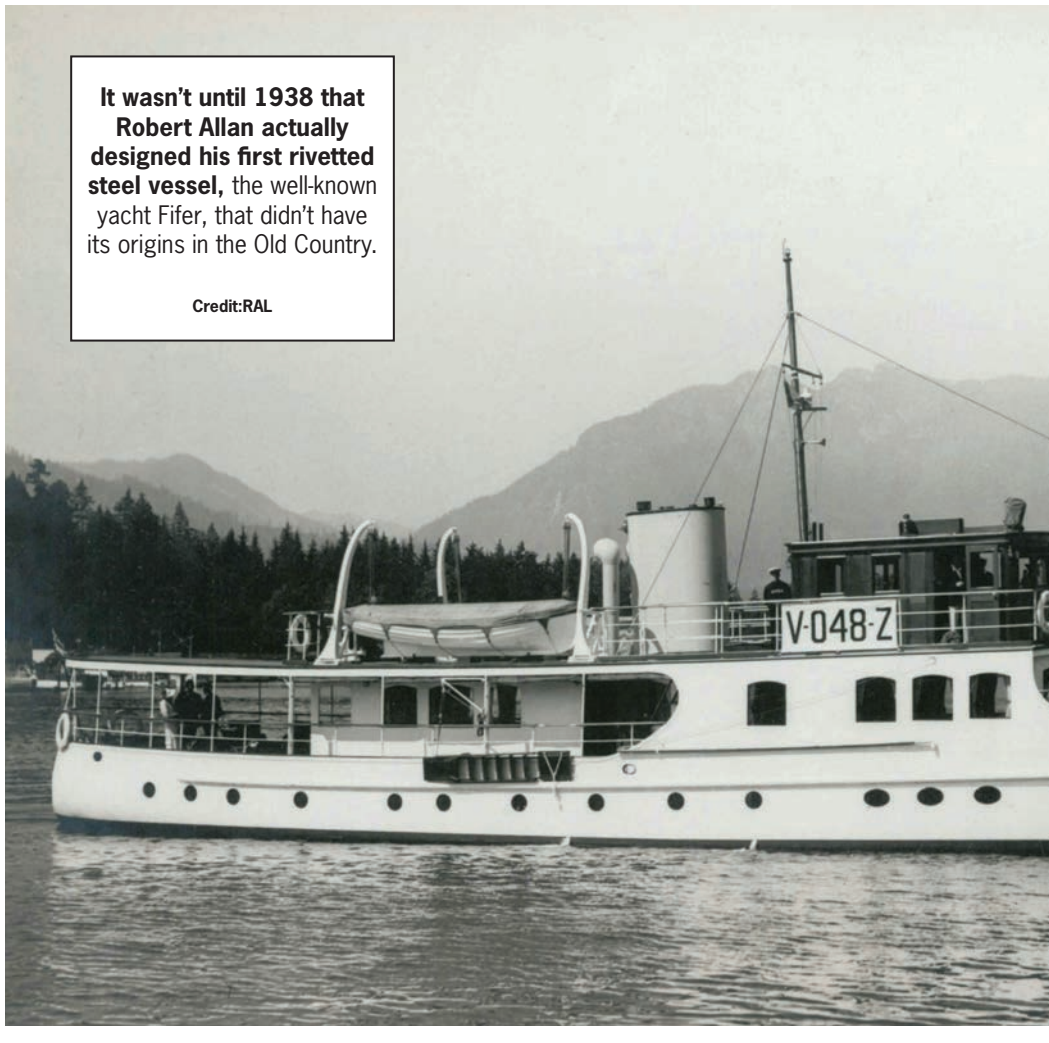
As the 90th anniversary of Robert Allan Ltd. approaches it is quite timely to address the development of Robert Allan's designs as the years passed by and technology changed. When the first Robert Allan came out to Canada at the end of the First War he was a trained naval architect experienced in the design of rivetted steel ships. With the end of the war and the curtailment of Government support of shipbuilding new steel ships built in BC became very rare. Wood was the material of choice, used in the design and construction of all sorts of commercial and government vessels. It wasn't until 1938 that Robert Allan actually designed his first rivetted steel vessel, the well-known yacht Fifer, that didn't have its origins in the Old Country.

The Second World War started and brought with it the widespread use of welding and mass production techniques. While Robert Allan Senior continued to primarily design small wooden vessels for the Navy and certain commercial customers during the war years his son, Robert Allan II, spent his war in the large shipyards of North Vancouver where steel warships and steel merchant vessels dominated.

With the end of the war the experience gained with welding changed the design business forever. Initially, steel was used in the design of vessels for the inland waters of BC and northern Canada, allowing prefabricated vessels to be shipped from Vancouver to spots north and then assembled and launched. The widespread use of steel in the construction of coastal vessels took a bit longer to catch on, first with relatively small barges and tugs and then later with fishing vessels.

By the 1960s steel construction was dominant and the skills required to design and build wooden vessels slowly died out. The very age steel tug Ocean Master was designed for a local firm but built in Holland in 1961. Larger and larger steel tugs and barges were designed by Robert Allan Ltd and other local Naval Architects and built in local shipyards. The more capable designs included many unique features; from the self loading, self dumping log barges, to the application of steerable Kort nozzles for tugs and fishing vessels. Good ideas, whether developed in BC or imported from elsewhere were incorporated in all new designs.

The spike in shipbuilding design work continued uninterrupted throughout the 60s only to face a major change by the end of the decade. Tragedy struck the towing industry with tugs disappearing in bad weather, with lives being lost. A significant change in the design of tugs was required and the answers emerged from the fertile minds of Robert Allan Ltd. and other West Coast



It wasn't until 1938 that Robert Allan actually designed his first rivetted steel vessel, the well-known yacht Fifer, that didn't have its origins in the Old Country.

Credit:RAL

designers. As the redesign cycle wound down the Canadian Arctic heated up. Ice class vessels were in demand and unique designs appeared on the drawing boards of many Vancouver companies. Concurrently, Robert Allan Ltd began working for Singapore shipyards and owners designing unique vessels for the offshore industry in Asia.

Then computers arrived and the drawing boards put in storage. New design processes had to be developed to make the best use of the new tools. This was easier for the young designer than for some of the old hands, but the change was made. When the skeptics finally accepted the new tools, the boards were taken from storage and sent to the dump.

Then came the global expansion of the Vancouver naval architects into the world market. Prior to the 1990s Robert Allan Ltd. stayed close to home. At first some design products were sold for American service and then almost overnight the global marketplace became to only marketplace to focus on.

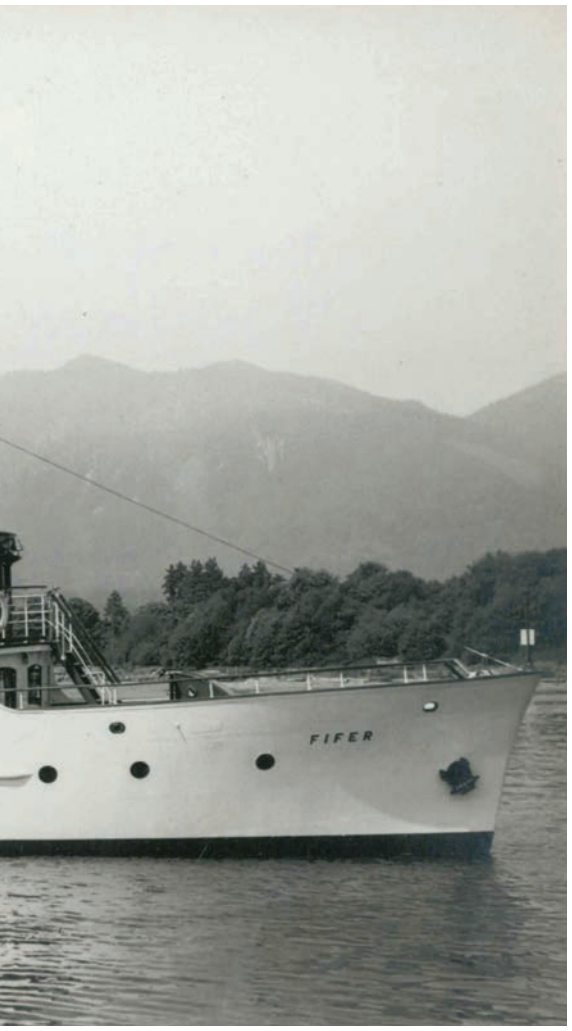
The advent of the azimuth drive in tugs arrived just as the size of deep-sea ships took off, making the docking and ship assist business the major user of towing vessels.

Today the focus is on the challenge of generating high performance while enhancing safety in an environmentally safe and minimalist footprint. The use of LNG fuel and hybrid drives gets just as much attention as the stability and inherent safety of our designs

Robert Allan Ltd. employs almost 90 people, in a healthy mix of Canadian born and trained architects and engineers alongside people of similar skills from all corners of the world. We are larger now than we have ever been. The great majority of our work is for non-Canadian customers and our vessels are sought after by customers from all corners of the globe.

We have always recognized the importance of quality and innovation as well as speed and responsiveness and will continue to use every tool available to us to maintain our company while improving our designs and our reputation in the years to come.

Credit:RAL



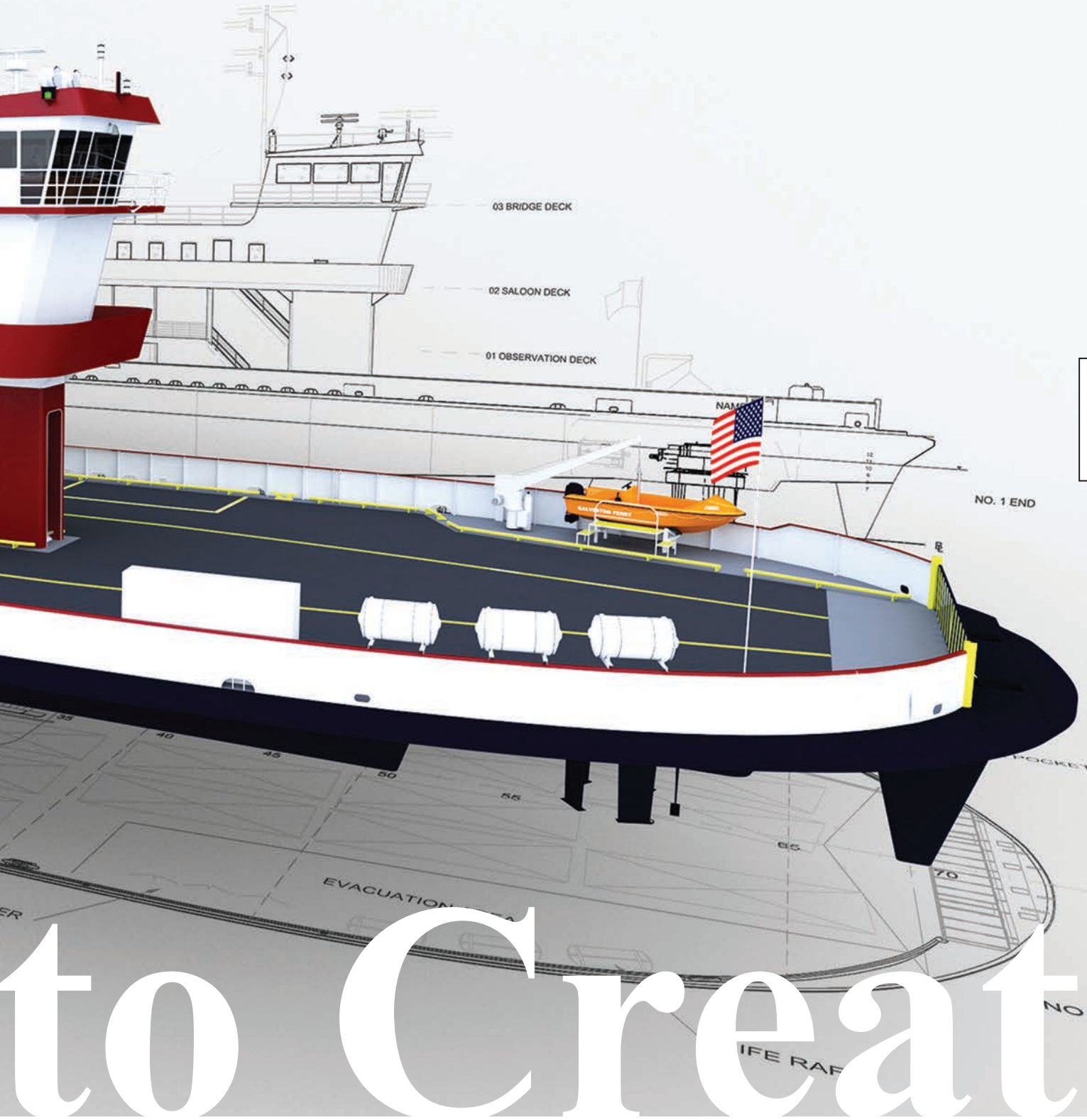
"We Love

Born at the University of Michigan in the early 1990s, Bristol Harbor Group (BHG) has grown into a diverse and widely respected naval architecture and marine engineering firm. Cory Wood, Vice President and one of the four co-founders of BHG, discusses the companies past and design drivers to power its future.

By Greg Trauthwein

The University of Michigan runs one of the most prestigious naval architecture and marine engineering programs in the country, but when Cory Wood entered U of M, he did so with the intent of becoming an aerospace engineer. But as luck may have it, he opted for the maritime "fork in the road", a decision he credits with helping to shape his personal and professional life. "At the time the department was maybe 150 people, so you got to know everybody. In hindsight it is the best thing that ever happened to me because I met a lot of people that are good friends and business partners to this day."

The idea for BHG was literally conceived on a plane ride back from the Society of Naval Architects



An Innovative Double-Ended Ferry Design for Texas.

Credit: Bristol Harbor Group Inc.

to Create”

Credit: Bristol Harbor Group, Inc.

and Marine Engineers (SNAME) conference in 1993, an event attended by a group of about a dozen U of M students. “On the flight back, I was sitting next to Greg (BHG co-founder Greg Beers) and we were talking about how cool it would be to be your own boss. I think our first idea was designing luxury submarines,” said Wood. Originally there were four friends that started the company, with Wood and Beers the two remaining today. “At that time the internet was around but nobody was using it; email was around but few people were using it. So we looked at all the sailing, commercial and business magazines to build a database and we sent out about 300 mailing cards to offer our engineering support services.”

The company founders settled on Bristol, Rhode Island, as its headquarters, as the original plan was to become renowned yacht designers, as at the time there were more than a dozen fiberglass yacht builders and 10 yacht design offices within 20 miles of BHG’s current office. “Rhode Island was a hub at the time,” Wood remembers. “In hindsight, if we knew where our careers were going to take us, we probably would have picked something closer to the Gulf of Mexico, because nearly everything we design is built in or for that area.”

Humble Beginnings, Diverse Growth

The team earned its first “paying gig” from a gentleman in Saugatuck, Mich., that wanted a stern wheel paddle wheeler – a real paddlewheeler – designed for use as a dinner/excursion boat. “That was a challenge because no one was really building these anymore, and it’s not the type of thing they teach you in school.” The boat, the Star of Saugatuck II, is still in operation for Star of Saugatuck Boat Cruises.

The company set up permanent shop in Rhode Island in 1995 and incorporated. “We put up our sign, we opened our doors and we quickly realized that nobody was going to beat a path to our doors to design the next beautiful sailing yacht,” said Wood. “But the tug owners, the ferry owners, the barge owners, they all needed a lot of engineering support, and it’s the same engineering: it has to float; it has to be strong; it has to be built on-time and on-budget. We quickly started to do a lot of commercial engineering support, which was always the vision that Greg had.”

"You still have to come up with a concept, and literally it can come to us on the back of a napkin. *Wherever the idea starts, it must then be boiled down to the specifics. CAD has obviously helped to speed that process along, but in my mind, the implementation of 2D and 3D CAD hasn't really shortened the entire design process, but it's allowed us to get a better product."*

Cory Wood, Vice President
Bristol Harbor Group, Inc.

Today there are 23 employees under the employ of BHG and Houston-based sister company The Shearer Group, both companies jointly owned by Wood and Beers. The companies are able to share resources, with BHG focused on the blue water side of the business; and The Shearer Group focused on brown water projects. Wood credits Beers with being the visionary, always looking at trends to determine where the industry and the company should be moving, a key factor he reckons in the company's diversity of the projects, "many more than I ever would have expected." Today the company's portfolio includes tugs, barges and passenger vessels, but also a number of designs with LNG, diesel/electric hybrid as well as a growing and vibrant business in government support for the U.S. Army Corps of Engineers, Coast Guard, and the Navy.

In fact, much of BHG's bandwidth is being soaked up by government support, engineering that is "light years beyond the commercial work we're doing," said Wood.

The more things change …

While the computer tools available enable and optimize design have changed mightily, Wood contends that the basics haven't changed.

"You still have to come up with a concept, and literally it can come to us on the back of a napkin. Wherever the idea starts, it must then be boiled down to the specifics. CAD has obviously helped to speed that process along, but in my mind, the implementation of 2D and 3D CAD hasn't really shortened the entire design process, but it's allowed us to get a better product. We still take the same amount of time to design something – whether we're drawing it by hand or whether we're doing it on the computer. CAD does allow us to dial in a better solution earlier in the process then detail the drawings to spec."

BHG focuses on concept preliminary and regulatory packages, with detailed production support handled by the dedicated firms. Like its peers, environment and emission regulations are changing the game … rapidly.

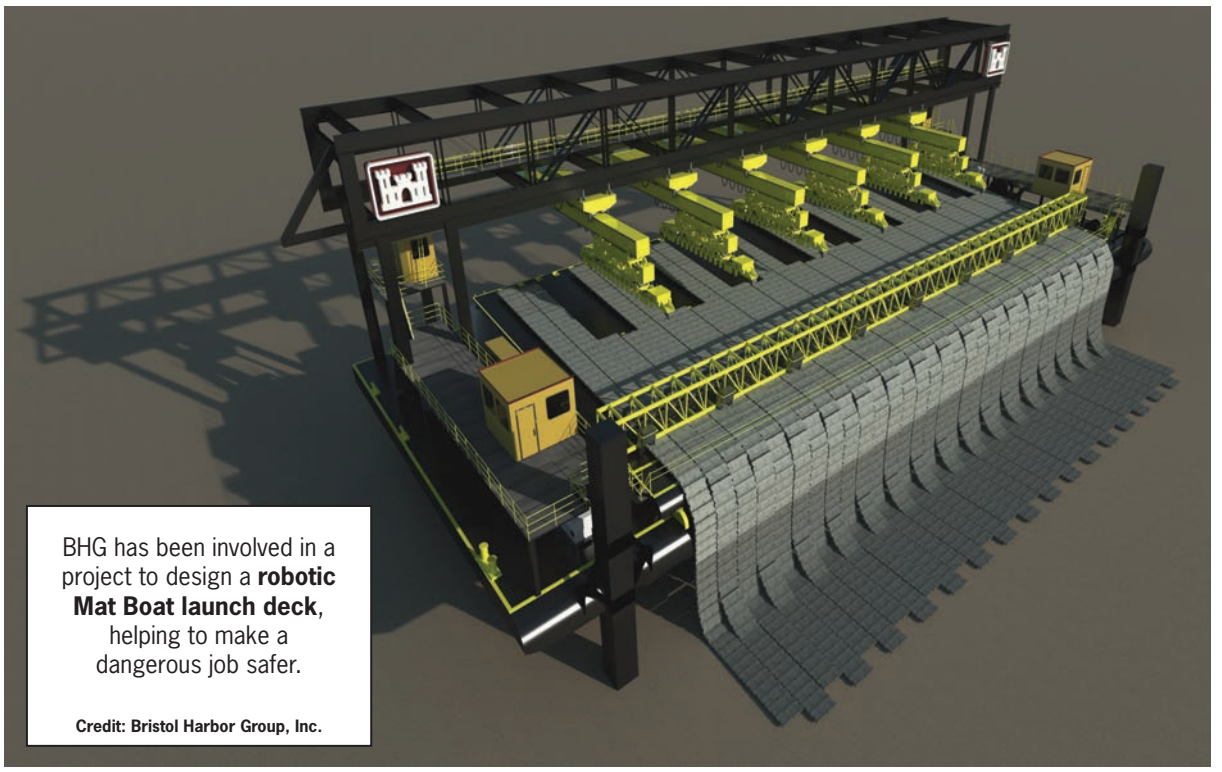
"Companies looking to stay under Tier 4 requirements have a lot of interest in the diesel electric hybrid side," said Wood, saying that it has been within the last year or two where clients have really started to "open their eyes to it. They knew it was there, they knew it was expensive, but now they're really interested, because the environmental issues are not going away, and they are pushing us in directions I would have never expected 10 years ago."

Some unique projects of note include the project to incorporate Z-Drives for propulsion on river towboats, a solution that has exhibited demonstrable fuel savings. Wood also notes a marked increase in recent inquiries regarding diesel/electric, diesel/electric hybrid solutions and LNG, a significant advance given the general conservative nature of vessel owners in adopting new technologies.

"We thought LNG was going to be the next gangbuster," said Wood. "It still is going to be, but to a degree it is still a chicken and egg scenario regarding where they are going to fuel."

But that that's changing too, as BHG worked to help design and deliver the innovative new LNG bunker barge built and delivered last year by Conrad. LNG: "The design effort is a time-consuming process and in some ways it's more like rocket science than naval architecture because of the cryogenic nature of the fuel and the complexities that entails."

As the company has grown and gained traction in multiple markets, Wood said that while much has changed, to this day the company maintains a core tenant that has been present since the beginning: "We love to create." It's not just about putting out paper drawings. We are in the business of creating designs with our clients. Early in our history, we had projects on the yacht side where we would get paid for the design, it was a beautiful yacht, and then for some reason or another it wouldn't get built. That's frustrating. We would much rather design something like a deck barge; it's not fancy or complicated, but we know it's going to get built and I get more of a kick out of seeing our designs on the water than on the screen."



BHG has been involved in a project to design a **robotic Mat Boat launch deck**, helping to make a dangerous job safer.

Credit: Bristol Harbor Group, Inc.

Maritime Forecast to 2050:

Decarbonization challenge requires industry uptake and flexibility

By Øyvind Endresen & Magnus S. Eide, DNV GL

The International Maritime Organization (IMO) greenhouse gas (GHG) strategy signals a true game changing moment for the shipping industry. External pressure was building, but the IMO strategy sets a time line and goals for shipping to tackle one of the great challenges of our time. The GHG strategy gives our latest Maritime Forecast to 2050 its focus, and with this publication we attempt to set out the different strategies and pathways the industry can take to reach these goals.

The first conclusion from the report is a sobering one. Although awareness of the issue is growing and the pace of alternative fuel adoption is increasing, without changes in the policy background – we will not meet the goals of the IMO strategy. In the deep-sea segment, which accounts for 80% of the global CO2 emissions from shipping, the majority of new vessels are still planned and built to use traditional fuels. These are decisions being made with long-term implications, as shipping moves to a less carbon intense future.

Taking the long view in shipping is important, vessels are long term assets and a ship ordered today will compete with vessels coming onto the market 10 to 15 years from now. This means that today's plans must include not only today's fuels and standards, but tomorrow's. To fail to do so, risks stranding a major asset, especially when we are talking about the deep-sea segment.

To see how the industry might change under different scenarios, we have looked at three different transition pathways:

- **A business-as-usual scenario,** where no further decarbonization policies are put in place.
- **A gradual tightening** of operational requirements.
- **A slower transition** with strict requirements for newbuildings introduced abruptly towards the end of the 2050 deadline.

Under all of these scenarios, improving vessel efficiency is essential. Today, we already have technologies commercially available that can reduce per ship emissions by 20-30 %, depending on the ship type, (e.g. hull-line optimization, trim optimization, route planning, waste heat recovery, hybridization, machinery improvements, etc.). This does not include vessel speed reduction. There are also solutions, that have not yet reached full maturity, broad adoption, or cost effectiveness that promise further efficiency gains, (e.g. wind assistance, air cavity lubrication, etc.).

Alongside technologies which can improve vessel efficiency, operational changes can have a large impact on shipping's GHG emissions, for example by reducing vessel speed. We have already seen significant speed reductions, but further reductions will be necessary. A moderate to extensive speed reduction (20-50% reduction), is technically feasible today, but would require some changes to current logistic models as well as acceptance in the market.

Digitalization can reduce the cost of shipping while contributing to improved safety and energy efficiency. Operators will generate cost savings through advanced data analytics, process digitalization, robotic process automation, and connecting and sensing technology.

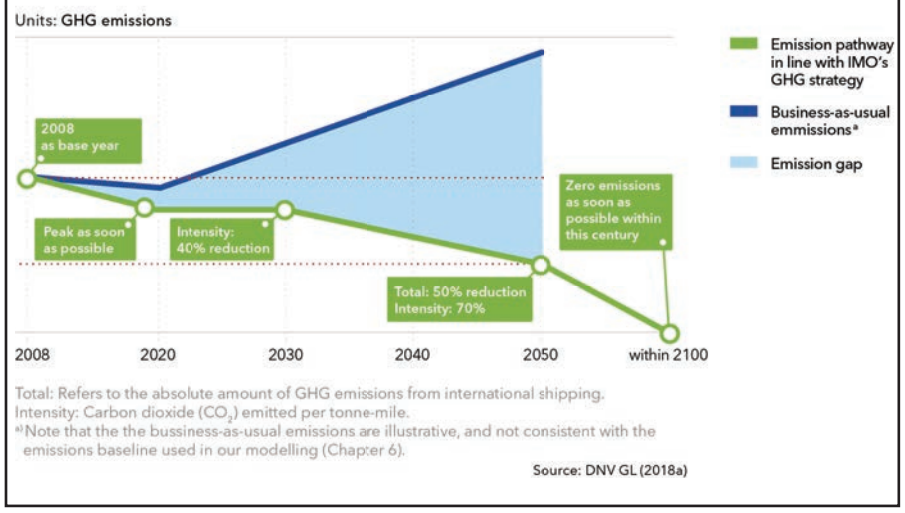
Digitalization will boost shipping efficiency and improve utilization of the current fleet by improving logistics and planning, port operations, and enhance voyage performance through optimizing operations, including speed optimization, better weather routing and autopilot use.

It is in the uptake and development of alternative fuels that policy will have the greatest impact, and this is reflected in our projections under the three different scenarios. Under the "business as usual" pathway, we see limited transition to other fuels, the energy mix in 2050 being 93% based on fossil fuels, specifically 50% liquefied natural gas (LNG) and 43% liquid fuels. Under a gradual tightening path, LNG dominating the fuel mix, with liquid biogas or electrofuels becoming more popular from 2040 onwards – and would be one way of meeting the 2050 deadline. A later introduction of strict requirements, our third path, sees the potential for the rapid introduction of other fuel options with ammonia emerging as a potential carbon neutral option. And for these different pathways, we must consider the implications for the maritime ecosystem and the consequences for ship design, fuel supply and bunkering infrastructure, and research and development.

In all three pathways, liquefied methane is a dominant 40%–80% of the fuel mix in 2050. The primary energy source of the methane varies between fossil, biomass and other renewables. Under any scenario, carbon-neutral fuels having to supply 30%–40% of the total en-

FIGURE 2.1

IMO strategy for major reductions in GHG emissions from shipping

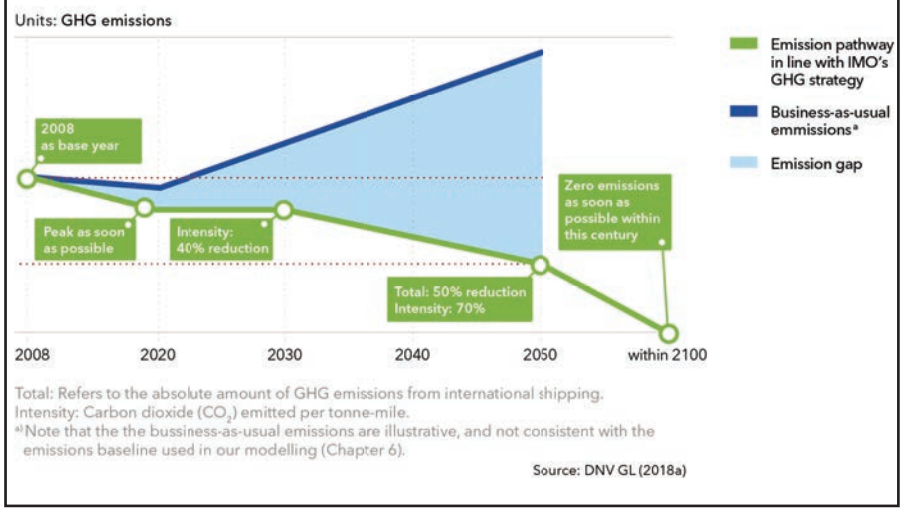


Total: Refers to the absolute amount of GHG emissions from international shipping.
Intensity: Carbon dioxide (CO_2) emitted per tonne-mile.
[a] Note that the the bussiness-as-usual emissions are illustrative, and not consistent with the emissions baseline used in our modelling (Chapter 6).

Source: DNV GL (2018a)

FIGURE 2.1

IMO strategy for major reductions in GHG emissions from shipping



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Source: DNV GL (2018a)

ergy for international shipping in mid-century if IMO GHG ambitions are to be achieved. For all pathways, shore-based electricity provides about 5%–7% of total energy for shipping in 2050 through batteries and shore-to-ship power. The service and passenger segments have the highest share, almost 18% of their energy being provided by grid electricity.

We have lower and potentially carbon neutral options in use today, with LNG, electric, biofuels, and biofuels for example. But in the context of ship fuel, what does it mean to be carbon neutral? This is an important concept for the industry to meet the 2050 goal

The term carbon-neutral refers to a variety of energy sources or energy systems that have no net GHG emissions, or carbon footprint. Either a fuel can be 'naturally' carbon free. This is the case for electricity, hydrogen and ammonia, if produced from renewable energy or fossil energy with carbon capture, for example. Or, the fuel can contain some carbon, but the carbon is sustainably sourced and part of the natural carbon cycle. This category includes sustainably produced biodiesel and liquid biogas and carbon based electrofuels. Electrofuels is the term for synthetic fuels like diesel, methane and methanol, when they are produced from hydrogen and CO2 (carbon based) or from hydrogen and nitrogen (nitrogen-based fuels such as ammonia), using renewable electricity to power the production.

Making this transition presents many challenges, especially in the deep-sea segment, where a decision to back a new fuel requires a massive investment. For example, without any infrastructure and distribution, it is difficult for shipowners to commit to a new fuel. But suppliers will not develop the infrastructure before they are certain of demand. Being forced to pick a winner among many options, is a risk that can be a barrier to adoption. Here, short sea shipping can be an important test ground for new fuels and a valuable stepping stone for getting both technology and infrastructure ready for bigger deep-sea vessels.

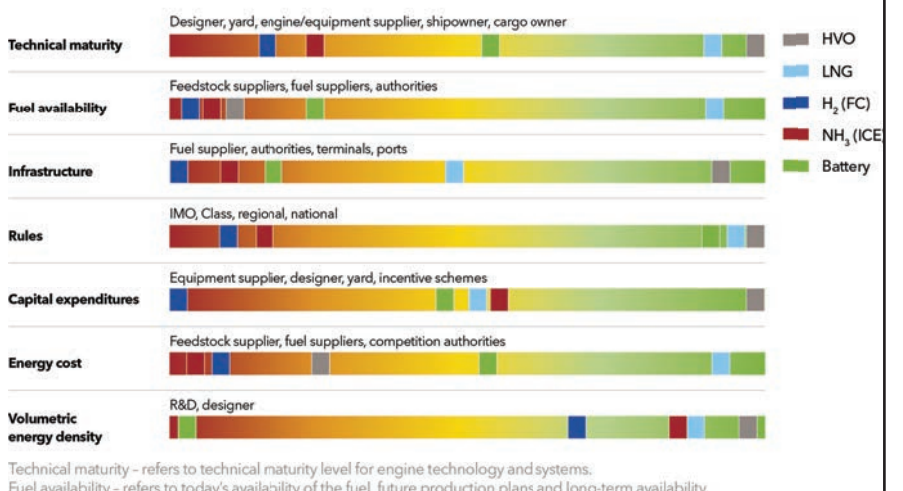
Because, without the required infrastructure and distribution, it is difficult for shipowners to commit to a new fuel. Suppliers will not develop the infrastructure before they are certain of demand. However, big liner companies have the potential to shape the fuel mix. They trade large volumes on fixed routes – offering suppliers reliable fuel demand. But most operators will have to be more flexible in their fuel choice.

In the transition phase, investing in fuel flexibility and bridging technologies is a good way to prepare for a low carbon future. In deep sea segments, dual-fuel combustion engines and alternative fuel ready solutions could help reduce future retrofit costs. In addition, bridging technologies such as fuel-flexible energy converters, fuel storage tanks, onboard systems and shore-side fuel infrastructure can help ease the transition from traditional to carbon neutral fuels.

At DNV GL we are working with our customers to help facilitate the transition towards a low carbon future. By developing and updating our rules and standards to ensure safety, researching new technologies and efficiency measures, and offering tools and information to assess new fuels and technologies we hope to build a basis for the industry in this new future. The Maritime Forecast is a part of this, providing guidance, highlighting trends, and offering valuable insights for maritime stakeholders. The transition to a lower carbon future will be a great challenge for the industry, but we are committed to supporting customers on this journey. But with flexibility and perseverance, we believe shipping can meet this challenge and continue to thrive in the years ahead.

FIGURE 3

The Alternative Fuel Barrier Dashboard: Indicative status of key barriers for selected alternative fuels



Technical maturity – refers to technical maturity level for engine technology and systems.
Fuel availability – refers to today's availability of the fuel, future production plans and long-term availability.
Infrastructure – refers to available infrastructure for bunkering.
Rules – refers to rules and guidelines related to the design and safety requirements for the ship and onboard systems.
Capital expenditures (capex) – Cost above baseline (conventional fuel oil system) for LNG and carbon-neutral fuels, i.e. engine and fuel system cost.
Energy cost – reflects fuel competitiveness compared to MGO, taking into account conversion efficiency.
Volumetric energy density – refers to amount of energy stored per volume unit compared to MGO, taking into account the volume of the storage solution.

HVO, hydrotreated vegetable oil; LNG, liquefied natural gas; H_2 (FC), hydrogen in fuel cells; NH_3 (ICE), ammonia burned in internal combustion engines; Battery, full-electric with batteries

Source: DNV GL, this study

ABS & the Future of Classification

By Greg Trauthwein

Photo: ABS

The discussion of the 'future of class' seems more relevant today than ever, as the maritime industry navigates a transcendent period, with digitalization, decarbonization and a long list of related safety and risk concerns occupying the attention and budgets of shipowners globally.

"There are many things going on in the industry, and in fact the world, and looking ahead I think we're looking at a 'new norm'," said Christopher J. Wiernicki, ABS Chairman, President and CEO. "It's a norm where everyone in the industry is going to have to make uncertainty our friend."

The course toward greenhouse gas emission reduction is set, but the path is anything but certain as shipping companies wrestle with the best means and methods to not only achieve new standards, but to achieve them while still maintaining a solid business model. "There are many sign posts that are helping to guide us, but how we choose as an industry to connect these sign posts will really make a difference," said Wiernicki. Along with increased market uncertainty and unpredictability, Wiernicki counts the impact of regulation on shipping cycles and the impact of technology – not just technology itself but the increasing speed of technological change – as the "three tectonic shifts" impacting the maritime industry for the coming generation. From these shifts come five opportunities and challenges, including:

- The effect of digitalization & automation,
- Cyber security,
- The continued focus on performance optimization,
- The course toward low-carbon shipping, and,
- "The last one, which is nearest and dearest to my heart, is safety." While the convergence of new technologies offers tremendous promise and business opportunities, it also comes with challenges, from selecting the best new tech for your fleets profile to recognizing and addressing unintended consequences brought on with the digitalization, automation, decarbonization. "These will have impacts on how vessels are designed, built and operated going forward," said Wiernicki.

The Business of Technology

While it can be easy to get caught up in the glamor of new technologies, Wiernicki said that the future is not simply about adopting new technology in a vacuum, rather assessing how it impacts maritime operation wholistically, from emissions to performance to risk profile to the business of maritime.

"You are beginning to see that (technology) creep up into things like The Poseidon Principles, which essentially brings the shipping technology and finance worlds together as you look at the next generation of vessels and the banks start benchmarking the conditions of finance," said Wiernicki. "You are going to see the technical side become as important as the commercial side of decision making."

Hand-in-hand with the pace of technology will be the pace of regulation, arguably one of the taller hurdles in the equation as the technology and business/finance communities have a commercial impetus to proceed at pace.

"Regulations are going to have to accelerate their pace to be technically feasible and economically viable. In fact I'm about to send a personal letter now to Kitack Lim at IMO encouraging him to take a hard look at SOLAS," a regulation that was not only created before the internet and iPhone, "in fact it was created before the fax machine," said Wiernicki. "It's a regulation that needs to be upgraded, and this is a challenge to regulation overall to be able to allow for the rapid rate of technological change."

Looking at the ISM the safety management code, Wiernicki sees this as potentially being a framework for the industry as we move into the digital 4.0 world.

"It is built from a systems perspective and built to be indifferent to the technology, it recognizes that future safety is synonymous with security and reliability," said Wiernicki. "You are starting to see evidence of that as flag states start to put their cyber security requirements into ISM. But I think ISM in general is going to move from a compliance check-off to an important management tool."

“You are beginning to see that (technology) creep up into things like The Poseidon Principles, which essentially brings the shipping technology and finance worlds together as you look at the next generation of vessels and the banks start benchmarking the conditions of finance.”

Christopher J. Wiernicki
ABS Chairman, President and CEO

The Future of Fuel

With ever stricter emission mandates comes discussion and research on future maritime fuels.

“You can get to 2030 (and the 40% CO2 reductions for cargo transport) by focusing on LNG as a fuel, speed optimization and ‘just-in-time shipping’ which is improving the utilization of the voyage,” said Wiernicki. But hitting aggressive targets for 2050 is another matter.

“When we talk about the fuel choices of the future, it’s not LNG, Methane, Ethane or Ammonia … it is ideas. It’s being able to collectively take ideas and pull them together,” said Wiernicki. A collective challenge is moving forward it’s not going to be a single, obvious fuel solution. “It’s going to be a hybrid solution, it’s going to be a combination of things with a greater focus on operational performance, which is where digitalization comes in to help ship owners make better informed decisions.”

ABS’ Future

As the industry changes, naturally class must change too. “We at ABS are going through a digital transformation,” said Wiernicki. “We are progressively moving toward the future of class that is evolving from a calendar-based survey cycle to a condition-based cycle,” citing its large pilot project in progress today with Military Sealift Command, taking that entire fleet and switching it from a calendar-based survey to a condition-based survey cycle.

Speaking of digital, he said ABS’ leadership is particularly evident in the case of fast-emerging cyber security threats.

“ABS was the first classification society to really embrace the importance of cyber security. Cyber is the safety system that you can’t necessarily see,” said Wiernicki.

“Historically we work well in the structures and the equipment areas, based traditionally on things that you can see. In the digital world safety and security is based on things you can’t necessarily see … the software and the data.”

With the cumulative issues, challenges and complex technological discussions for the industry today, in Wiernicki’s mind it all boils down to safety.

“Technology is interesting, I’m a technologist. But the purpose of technology is to unlock economic value. Technology has no sense of humor, it has no common sense and it has no instincts. It’s people,” he said. “The challenge for this industry going forward is being able to marry traditional skill sets with non-traditional skill sets. It’s people. As a class society we have engineers and surveyors sitting side-by-side with a whole new breed of people we’ve never recruited before: data scientists, systems engineers, computer scientists, risk engineers.”

Shipping companies in general in this industry traditionally have been organized vertically; going forward they are going to have to be organized horizontally. You are going to see connectivity between vendors, yards, class and others. You are going to need people to do this.”

How Should Classification Evolve

to meet the needs of a modern maritime industry?

By Arun Sharma, Executive Chairman, Indian Register of Shipping (IRClass)

Arun Sharma is Executive Chairman of the Indian Register of Shipping (IRClass) and Chairman of IACS.

Courtesy Indian Register of Shipping

New technology has revolutionized the shipping industry bringing a huge digital revolution that is changing the way maritime companies are doing business. Even the more traditional shipping companies have realised the benefits of improved operational efficiencies gained by electronic interaction.

There has also been an increase in major regulatory changes which affects the ship operating fraternity with the ballast water management convention, the 2020 sulphur cap which comes into force on the 1st January next year and the challenge set by the IMO of shipping reducing its GHG emissions by at least 50% by 2050. So, significant research and work needs to be done towards developing zero carbon fuels to prepare the groundwork for the future.

Against this background of change, classification societies have been investigating how they should evolve to meet the demands of shipping in the future.

As Executive Chairman of the Indian Register of Shipping (IRClass), an international ship classification society, I have always championed the necessity of continual improvement to keep pace with the changing needs of our clients.

Having held C-suite roles in leading Indian shipping companies such as the Great Eastern Shipping, Varun Shipping and India Steamships, I am aware of the tough challenges facing ship owners and managers and the type of support required from a class point of view to help them with all aspects of compliance whether it is legislative, regulatory, statutory or procedural.

In recent years, IRClass has enhanced its focus in Europe by strengthening its geographical footprint in the region with offices in Turkey and the Netherlands in addition to its existing offices in the UK and Greece with representative offices in Malta, Cyprus and Bulgaria.

We also plan to set up an office in Germany and our strategy has been to initially focus on small and medium sized owners and vessels. We have secured some business in this sector through the classing of ferries in the Greek market.

IRClass organizes frequent multi-stakeholder seminars to discuss key industry regulatory positions such as the impending 2020 IMO fuel sulfur regulation and the initial IMO Strategy on reduction of greenhouse gas (GHG) emissions from ships.

The company is increasingly gaining global recognition from maritime flag administrations worldwide and has recently received RO authorization from Denmark and Cyprus. Our growth is consistent in key markets like the Middle East and Asia Pacific with a continuous increase in fleet strength.

On the 1st July this year I was elected to take over the Chairmanship of the International Association of Classification Societies (IACS). I propose to bring in a number of initiatives which will help make IACS more proactive, leading to faster decision making.

One of my priorities as the IACS Chair is to engage more deeply and frequently with industry partners through a structured program of engagement including detailed technical and high-level policy meetings with shipbuilders, owners and marine insurers. This will ensure that industry concerns and aspirations are properly reflected in the IACS work programme. I hope this will develop into a mutually beneficial feedback mechanism so that progress can be shared and, where possible, common positions taken.

IACS is also developing a data-driven policy in its decision-making. The importance of objectively justified, scientifically evidenced positions are crucial

to provide a framework of cooperation and understanding to further facilitate collaboration towards ensuring the considered development, adoption and uniform implementation of IMO treaties, guidelines, codes and regulations. Expanding class society's verification fields into the new and emerging areas of data quality assurance and sensor equipped systems is also an important aspect. Class needs to be involved in the validation of new emerging technologies and the certification of new age vessels.

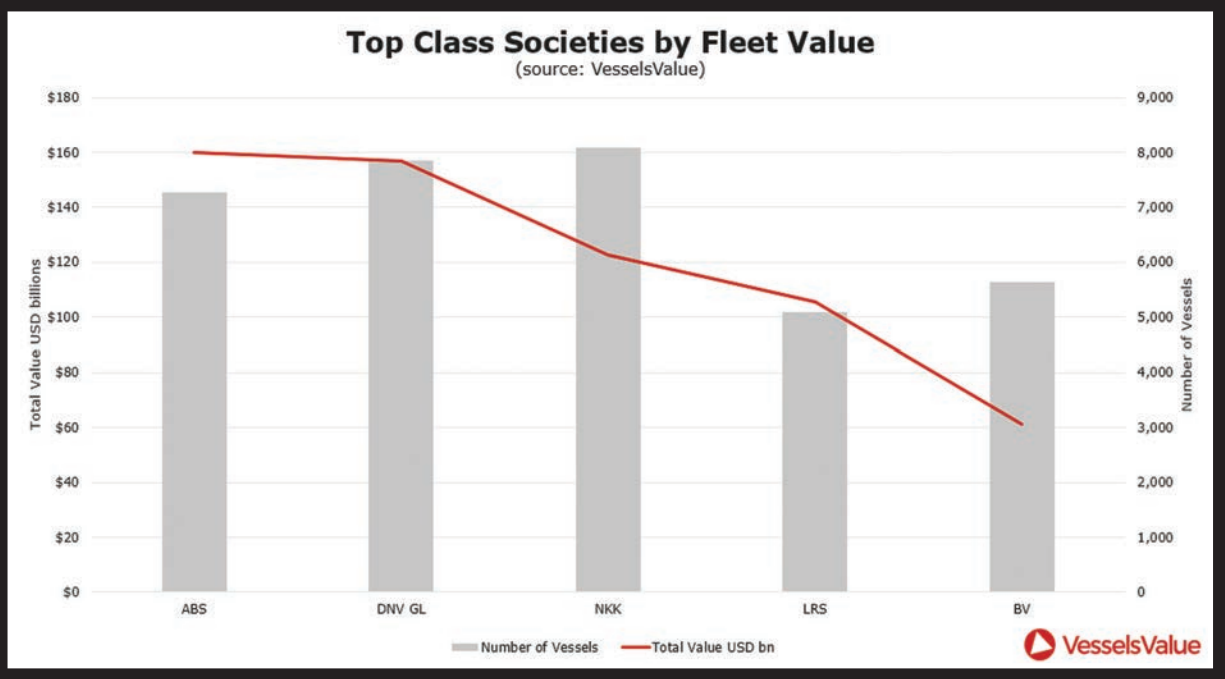
The human element is important and IACS needs to help the industry upskill and reskill its workforce to prepare it for the ever more sophisticated technological advancements in onboard equipment.

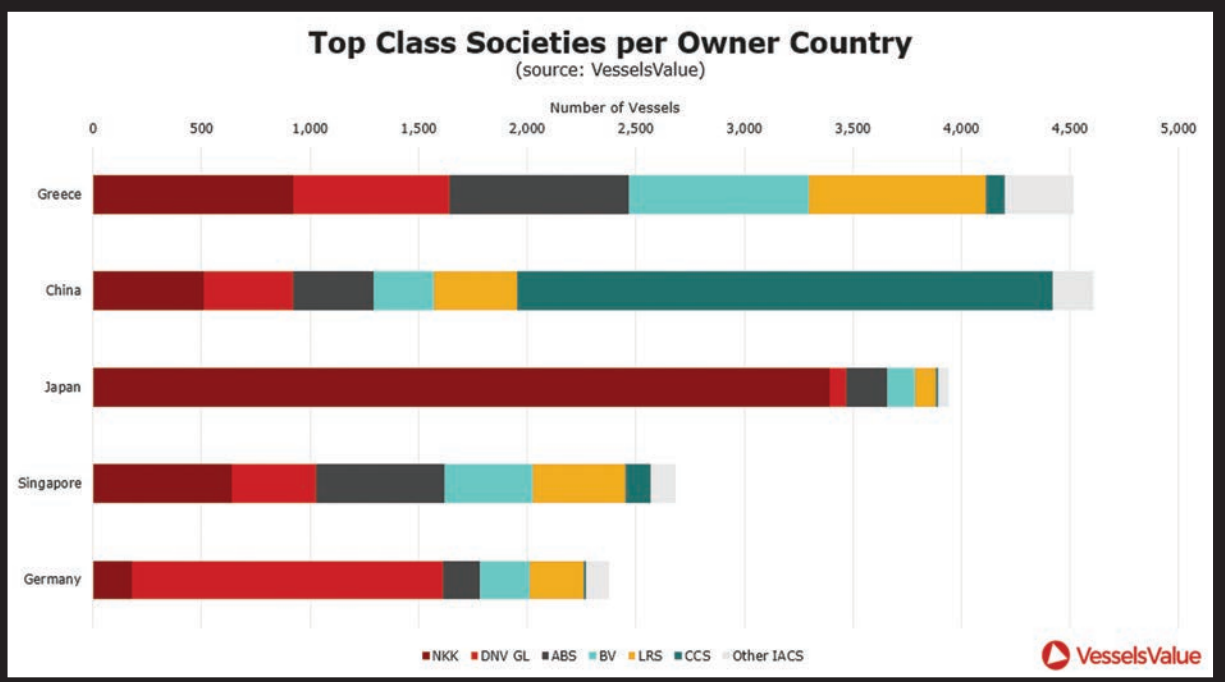
After all, a ship is only as safe as the sailors onboard. As the majority of shipping accidents can be attributed to human error, it is imperative that our crew are trained on the technology that they will be using onboard, otherwise they will find it increasingly difficult to keep up.

Crew welfare is a major issue in the industry. IACS can reinforce the fact that to maintain good mental health, crew need to have proper rest periods, eat healthy, take plenty of exercise and ideally have easy internet access to stay connected.

IACS also supports the IMO's work on the regulation of emerging technologies such as digitalisation and automation while helping to adapt or remove impediments that hinder technical advances.

We are committed to review IACS membership criteria, quality systems and performance measurement with the goal of maintaining IACS as a badge of quality which will continue to be respected throughout the maritime industry.





VT Halter, Q-LNG Name First LNG ATB

Photo: VT Halter

VT Halter Marine held a vessel naming ceremony for America's first offshore Liquefied Natural Gas Articulated Tug and Barge unit. The Q-LNG 4000 (barge) and the Q-Ocean Services (tug) were officially named in a ceremony that included U.S. Senator Roger Wicker, U.S. Senator Cindy Hyde-Smith and U.S. Rep. Steven Palazzo, along with Shane Guidry, CEO of Q-LNG, and Tom Vecchiolla, President and CEO of ST Engineering North America. Over the last four years, Jones Act ship operators have taken steps to transition their fleets to use cleaner burning fuels, including LNG. Designed and built by VT Halter, the barge is designed to provide ship-to-ship transfers of LNG to vessels that use LNG as a fuel source and also ship-to-shore transfers to small scale marine distribution infrastructure in the U.S. Gulf of Mexico and abroad. The ATB tug will have 5,100 horsepower, GE 6L250 MDC EPA Tier 4 main engines, with Wartsila Z-drives, and dimensions of 128' x 42' x 21'. The barge is designed to carry 4,000 cubic meters of LNG, and will have dimensions of 324 x 64 x 32.5 ft. The LNG ATB Unit is designed to meet the requirements of American Bureau of Shipbuilding and the International Gas Carrier code as an LNG bunkering barge. Anticipated delivery of the first unit is in the Q1 2020.

Sharktech Autonomous Vessel

Metal Shark

Metal Shark and Sea Machines have partnered to debut a new 29-ft. autonomous vessel which is now being offered through Metal Shark's "Sharktech" autonomous division. The Sharktech 29 Defiant welded aluminum monohull pilothouse vessel features OEM-integrated Sea Machines technology offering a full range of advanced capabilities including active control and collision avoidance. The system allows for either traditionally manned, reduced-crew or unmanned autonomous operations to deliver "human-in-the-loop" navigation capabilities during both line-of-sight and over-the-horizon operations.Through Sea Machines' SM300 autonomous control and monitoring system, the Sharktech 29 Defiant and all onboard systems are commanded via a direct wireless PC-based user interface. An industrialized remote control with joystick provides manual control for situations when autonomy mode is not required, and an available belt-pack remote allows for vessel, systems and payload control within a 1- to 2-kilometer range.

The system frees the operator from the helm to allow manned, technology-assisted control from anywhere onboard the vessel. Alternately, when unmanned operations are required, the vessel and its onboard systems may be monitored and controlled via network connections from a shoreside station or second vessel.

Coastal Passenger Ferry for China

Photo courtesy of Cummins

The Zhoushan Islands are just off shore of east China's Zhejiang province, and lie south of Shanghai on Hangzhou Bay. The main island is home to a naval base, shipyards and a port. It is a busy island with a well-developed ferry system carrying both people and vehicles back and forth to the mainland. A fine new 690-passenger ferry, Zhoushan Islands Prosperity, has recently been added to this fleet of vessels. It is the largest ferry to date from the Hunan Xiangchuan Shipbuilding Industry Co., Ltd. Operated by a 20-person crew the sleek new twin-screw vessel will make the crossing at speeds up to 18 knots. WUT Ship Co. of Wuhan City designed the fine mono-hulled ferry. It is 65 x 10.6 m with a 4.3-m molded depth. Tankage includes 8000 liters for fuel, 318 liters for water and 416 liters of lube oil. This gives the vessel a continuous operating time of 12 hours. Propulsion power is provided by a pair of Cummins QSK60-M engines rated for 2700 hp at 1900 rpm and turning into an Advance Gearbox HCD1600 with a 4.75:1 reduction. Noise and vibration is reduced with the installation of a Vulkan/Wuxi flex coupling between the engine and the gear. Engine controls are by Morse Electronic Control. The QSK60 was selected for this vessel as it meets the new Chinese emission standard GB15097. Auxiliary power is supplied by two sets of Cummins CCEC QSN-D(M) powered Marathon MP-H-200 Kw at 50 Hz generators. A DCEC QSB5.9 50 Kw generator set supplies harbor power.

NYK: World's Largest LNG-Fueled PCTC

NYK placed an order for what it dubs the world largest pure car and truck carrier (PCTC) capable of navigating oceans with only LNG as the main fuel.

A keel laying ceremony was held on September 20 at Shin Kurushima Toyohashi Shipbuilding Co. Ltd., and NYK managing corporate officer Takaya Soga and other related parties were in attendance. The ship is scheduled to be delivered in 2020 and will be the first large LNG-fueled PCTC to be built in Japan.

To minimize a reduction in vehicle loading capacity caused by the installation of LNG fuel tanks, in addition to optimizing major items such as ship width, several designs for maximizing the cargo loading space will be implemented, and the new vessel will be able to transport approximately 7,000 units (standard vehicle equivalent) per voyage.

With the support by Japan's Ministry of Environment and Ministry of Land, Infrastructure, Transport and Tourism for its model project to reduce CO2 emissions by using alternative fuel, the vessel will be installed with the technology to reduce further CO2 emissions and the experimental verification in its actual voyage will be scheduled. The ship will be about 40% more energy efficient (reducing CO2 emissions per unit of transport), exceeding the International Maritime Organization (IMO) EEDI phase 3 requirements that become effective in 2025. The vessel is additionally expected to reduce sulfur oxide (SOx) emissions by approximately 99% and nitrogen oxides (NOx) by approximately 86% compared to conventional heavy oil–fired engines. Air pollution by ship exhaust gas has become an important challenge, and environmental regulations surrounding the shipping industry are being strengthened year by year as environmental awareness increases.

Vessel Particulars	
Length o.a.	199.95 m
Breadth about	38 m
Total car capacity	7,000 units
Gross tonnage	73,500 tons
Flag J	apan

NYK

During the keel laying ceremony, second from left; Takaya Soga, managing corporate officer of NYK.

LNG fuel can be expected to significantly reduce emissions of air pollutants and greenhouse gases compared to C heavy oil, which is a common marine fuel, and thus meet the SOx Global Cap regulations set by the IMO, scheduled to become effective in January 2020.

ESG Launches Z-Drive Tug for Bisso Offshore

Eastern Shipbuilding launched C.D. White for Bisso Offshore LLC, the first of two 80-ft., 5,100 hp Z-Drive Tugs. A RAL RApport 2400 Z-Drive Shiphandling Tug design was provided by Robert Allan Ltd. C.D. White is currently under construction at Eastern's Allanton facility, along with a sister vessel, the A. Thomas Higgins, the former scheduled for delivery in December 2019.

Connie Sandras, Chief Administrative Officer of E.N. Bisso were present. christened the C.D. While as the vessel's sponsor, and Father Kevin McQuone of St. John's the Evangelist Catholic Church of Panama City blessed the vessel and Father Luke Farabaugh from St. Dominic Catholic Church attended the ceremony.

E.N. Bisso is one of Eastern's long term customers and has taken delivery of four Z-drive Ship Assist Tugs from starting in 2007. These two new Robert Allan RApport 2400 design tugs were customized by the designer, the builder and owner to provide specific operational features including 63+ ton bollard pull, enhanced maneuverability and escort performance, better fuel economy, crew comfort, safety under the new USCG Sub-M requirements and reduced emissions meeting the new EPA Tier 4 emissions regulations.

The boat is named after Cornelius Dee "Jack" White, Jr. Jack White was an owner of E.N. Bisso and was married to the company's then President Beverly Bisso White. White was instrumental in the management and growth of the company in its early days. It is the second boat to be named for Jack White in recognition of his place in the company's history.

Image: ESG

C.D. White Main Particulars

Length	80 ft.
Breadth	38 ft.
Depth	13.2 ft.
ESG Designation:	Hull 225
Fuel Oil:	28,000 USG
DEF/Urea:	(2) x 850 USG
Potable Water:	8,750 USG
Total HP:	2 x 2,549 HP @ 1,800 RPM
Bollard Pull (Predicted):	63 Metric Tons
Main Engines:	2 x Caterpillar 3512E Tier 4
Main Propulsion:	2 x Rolls Royce Z-Drives
Main Generators:	John Deere
Firefighting:	Counterfire ES-125-400
Winch:	Markey Machinery, Inc.
Aft Capstan:	Markey Machinery,
Tow Hook:	Washington Chain & Supply
Regulatory:	USCG Sub-M, Certificate of Inspection (COI) (Oceans), Designed and Built to ABS Class standards (but not classed under ABS rules)
Flag:	United States of America

Blockchain, Big Data, IoT

What's it all about ... really?

By Lars Fischer, Managing Director, Softship Data Processing Singapore Ltd.

Go to any shipping industry network event or conference, and you will no doubt hear someone question whether new digital technologies like blockchain, big data or the Internet of Things (IoT) are "just fads?" The answer should be a resounding "no"; but it is not that simple. Blockchain, big data and IoT – considered to be the three key technological developments driving change in the software solutions industry – will be here for the long-run. Of that we can be quite sure. In a rapidly evolving technology environment, we will continue to see new solutions and systems develop at pace, with tools and applications that have innovated other major industries finding new uses within the maritime space. This evolution should of course be welcomed, but there must be a caveat – as an industry we need to manage this change, and not let change manage us.

This is why it is important to ensure that we understand how these technologies work, and recognize that unless we lay solid foundations across our digital ecosystems now, the global shipping industry will never be able to realise the potentially significant benefits of blockchain, big data or IoT. So how do these technologies work, at their most simple?

Big Data

For the maritime industry, big data will define our future. We already rely upon the ability to communicate a limitless amount of data worldwide in order to move cargoes from origin to destination. From getting consignments off the factory floor to tracking their transit, through a myriad of administrative and digitalised processes we can engage a wide range of distant partners and third-parties engaged in the process.

This granular data can be leveraged to understand the impact of every aspect of the supply chain; every influence and variable analysed to identify latent efficiencies, overcome problems and mitigate risk. This is where big data analytics can deliver real value for shipping companies using intelligent software systems and processes designed to manage the flow and archiving of data, and to create actionable outcomes for improving operations. But often, shipping companies are simply documenting information, rather than analysing.

Without software systems specifically designed to manage administrative processes in the shipping industry, we rely on individuals to mine through data, create reports and calculate actionable outcomes. This is an extremely time consuming and unreliable way of managing data. It can take the in-house IT team or analysts an entire day or more to scrub data by removing superfluous information and manage variables. It is also very difficult to ensure that this happens in a systematic, incorruptible way.

There is also the issue of data safety and cyber risk. If a company has to manage, maintain and archive all of the data collected across its operations, there is a significant risk that this information cannot be stored safely, given the pace at which digital threats adapt and change. We've seen this happen time and again across major industries, and shipping is now a hot target. While there is no foolproof solution, using third-party software instead of in-house solutions, reduces this risk significantly, as they have dedicated resources for ensuring systems are continuously updated and improved to manage cyber risk.

With so much focus on being able to operate from efficiently onboard and ashore, big data is certainly not just a fad. However, actors across the shipping industry must work together to develop big data solutions and applications which will benefit the entire industry long into the future. By creating networks of information that seamlessly link vessel, cargo, port and provider, and which focus on real-time (and standardised) data transfer and intelligence sharing, the benefits that big data can to shipping supply chains bring are limitless.

Big Data

@ a speed of 2 Quadrillion processes per second, this Super Computer at Oak Ridge National Laboratory was the named the world's fastest at the time of MR's visit last year. That's big ... and fast ... data.

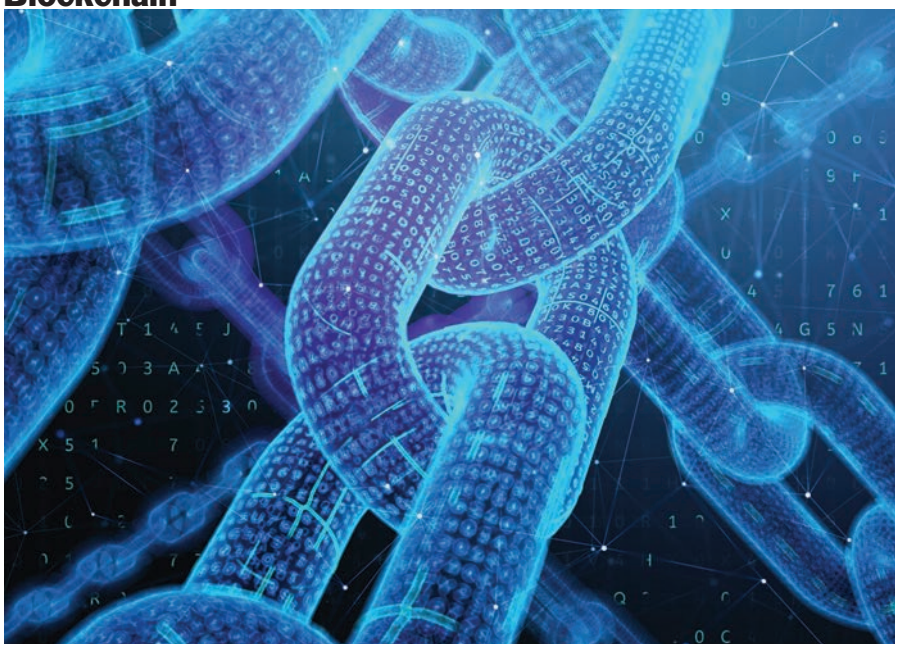
Photo: Greg Trauthwein

Blockchain

A 'blockchain' is a decentralized peer-to-peer ledger system with records distributed across many computers (referred to in IT terms as 'nodes'). The blockchain functions across a network of computers, and no one party or computer takes control – blockchain is entirely collaborative and cooperative, and in theory, provides a democratic approach to sharing information. But like all democratic processes, it is not without its flaws. If we focus on the creation of a Bill of Lading document as an example, we can explore the process, the positive outcomes, and the pitfalls.

Every blockchain system is made up of 'blocks' which contain a set of data – a

Blockchain



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timestamped record of information. Each blockchain system starts with a 'genesis block', or initial record. This would be the original Bill of Lading, which is created by one computer (known here as a 'node'). This block is confirmed with a unique digital fingerprint or 'hash', which identifies the block and all its contents. This hash is a completely unique identifier. Each time an update is made, or a new node enters the chain, a new block is added to the chain instead of overwriting the original. We can think of this as each new record being appended, rather than amended on a Bill of Lading.

This means that each time a transaction occurs (the vessel arrives at port, or a cargo is checked, for example) the blockchain allows every node in the chain, each computer/user ever involved in the transaction, to check the accuracy of the new information.

This happens automatically, through a verification process known as cryptography.

If the information is correct, the new block is accepted and connected to the previous ledger. It has its own unique hash, as well as the hash from the original block. Every time this happens, the blockchain is shared across every computer that has ever been involved in the chain; maintaining an accurate, permanent and completely transparent archive of information. This means that if an old record is changed, it will notify the entire network. The benefits of using a blockchain system to manage a Bill of Lading are obvious. We can keep accurate, real-time records of transactions. This will minimise errors and provide traceability, which is currently a big problem in shipping supply chains. However, blockchain solutions will not necessarily reduce delay, as the vetting process can take time because the technology for blockchain systems is still in its infancy. This issue also becomes increasingly problematic as the chain grows.

Then there is the issue of accountability and control, given that no single authority or third-party regulates a blockchain system. Within the maritime industry, which is inherently complex and open to risk, this is a difficult circle to square. There are no standards or regulations in place as yet, and although harder to manipulate, blockchain systems are still penetrable to interference. This will likely change in time, but we are a long way off; given that the base-level of IT use across global maritime chains remains low. While there is significant potential, we should understand blockchain as an emerging trend in maritime (particularly outside the liner shipping segment), but not one that is going to disrupt most of our industry just yet.

Internet of Things (IoT)

The term 'Internet of Things' or 'IoT' refers to physical devices which are connected to the Internet, usually through WiFi or 3 (4 or 5)-G data. These physical devices fitted with digital sensors and controlled remotely are increasingly common in everyday life, and within the maritime industry – particularly in port. We can communicate with these devices over the internet, and these devices can be programmed to automatically communicate with each other, meaning there is a constant flow of data and information in real time.

In the shipping industry, the development and use of internet-enabled devices is expanding at pace and delivering tangible benefits to shipping companies. Onboard remote monitoring systems allow for real-time monitoring and maintenance on board, improving operational efficiency, reducing risk and lightening the burden on crew, while automated cranes move cargoes more efficiently and reliably in port. Yet, an over reliance on digitized, automated devices is incredibly risky.

Each of these systems is developed by a different manufacturer, and there are significant issues in standardising data management as well as ensuring reliable back-up systems and procedures are in place for when – not if – these systems do fail or are interrupted by Internet network issues.

There is also the significant problem of integration between software systems and sensors, and the ongoing update and maintenance of IoT-enabled devices. Hackers can also penetrate these systems and cause significant disruption and worse.

The Essentials

Like blockchain technologies, the Internet of Things is more than a fad; but neither of these technologies can radically change how the shipping industry functions until shipping companies, their agents in port and partners across the supply chain get the IT-houses in order. The fact remains that much of the day-to-day administration of shipping supply chains still happens offline, much of it in paper-form and transacted in an inefficient way.Making sure that shipping companies have the right software solutions in place to manage their back-office is an essential hurdle that must first be crossed.

There are purpose-built software solutions available to do this, including Softship's solutions, which manage all of the essential administrative processes through a single suite of software, which connects every department and process to eliminate error, duplication and delay. Only once these systems are in place, connected and integrated, should any shipping company consider big data, blockchain or IoT applications.

Internet of Things

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e5 Lab aims to build Zero-Emission Tanker by 2021

Prompted by a bevy of new international rules aimed at slashing emissions from ships at sea, a consortium of four Japanese companies – Asahi Tanker Co., Ltd., Exeno Yamamizu Corporation, Mitsui O.S.K. Lines Ltd., and Mitsubishi Corporation – recently struck an agreement to create a strategic partnership to provide new infrastructure services in the marine shipping industry that focus on electrically powered vessels.

The new company, dubbed e5 Lab. Inc. (e5 Lab) will work to develop and promote the greater use of these relatively clean modes of marine transport.

There are a number of challenges facing Japan's shipping industry which e5 Lab will seek to address by consolidating the technologies, know-how and networks of its four major shareholders. The new company will develop a platform to provide a lineup of services that takes advantage of electrically powered vessels and other cutting-edge technologies. The aim is to leverage this platform to encourage sustainable growth and development within the marine shipping industry.

The Seven Challenges

1. Control greenhouse gas (GHG) emissions and help to combat the adverse impacts of climate change by converting vessels to electric propulsion.

2. Improve working environments and mitigate crew shortages by upgrading onboard communications systems.

3. Leverage sophisticated sensor technologies to improve ship maintenance and management, thereby ensuring that aging vessels can be operated as safely as possible

4. Leverage autonomous sailing technologies and big data to provide onshore support for crews and contribute to safe, reliable and efficient ship operations.

5. Offer an electric-vessel platform to all stakeholders in the marine shipping industry (including shipbuilders, equipment manufacturers, ship owners and operators, and cargo owners), standardize vessels and otherwise help to develop a sustainable growth model within the industry.

6. Propose standards on the swift and broader application of **next-generation technologies.**

7. Leverage large-capacity, re-**chargeable batteries** to provide emergency backup power and otherwise assist with the business continuity planning of local communities.

The first objective for e5 Lab will be to build the world's first zero-emission tanker by mid-2021. The tanker will be a coastal vessel powered by large-capacity batteries and will operate in Tokyo Bay. The company will also develop other kinds of electrically powered vessels to address the above mentioned challenges.

Furthermore, e5 Lab will actively promote the electrification of both coastal and ocean-going vessels, and pool the technologies, human resources and operational know-how needed to achieve the 50% GHG reduction target of the IMO as soon as possible (the IMO wants to see annual emissions drop to half of their 2008 levels by the year 2025).

Photo: Mitsubishi Corporation

Ashtead

Portable Analyzer Certified for Marine Emissions

A portable analyzer designed for monitoring emissions from ships is now available for sale or rent from Ashtead Technology. The Testo 350 MARITIME is touted by Ashtead as the world's first portable analyzer certified for the measurement of marine diesel engine exhaust gas emissions according to MARPOL Annexe VI and NOx Technical Code 2008. It also complies with the directive on marine equipment and has the MED mark of conformity 0098/2018.

It is designed to measure a wide range of the most important gases simultaneously, including NO, NO_x, SO_x, CO, CO_2 and O_2. In addition, it can be employed for official monitoring measurements to check the NOx limit values prescribed in MARPOL Annexe VI, and in special regional zones relating to the NOx tax in Norway, for example.

www.ashtead-technology.com

ZF Retractable Thruster for R/V Roger Revelle

The research vessel Roger Revelle is currently going through an extensive mid-life refit. One of the upgrades to the vessel is the installation of telescoping thruster technology from ZF Marine.

The R/V Roger Revelle is a globally capable oceanographic research vessel, designed as a platform to support many different facets of ocean-based scientific research. The vessel is owned by the US Navy and operated by the Scripps Institute of Oceanography under a charter agreement with the Office of Naval Research.

In the pursuit of its mission, the crew of the R/V Roger Revelle depends on world-class navigation and station-keeping systems on a daily basis. To meet this need the vessel was built with a powerful propulsion system designed to keep it in position anywhere around the globe, in varied weather and sea states.

Currently undergoing a major dry dock period as part of a mid-life upgrade, the vessel is receiving an 1100 horsepower ZF Marine ZF AT 5011 RT TT-FP L-Drive Retractable Thruster. The telescoping design allows it to extend downward from the hull, where it can operate as an azimuth thruster, rotating 360 degrees. When retracted, it operates as a standard tunnel thruster. The result is a multi-functional solution that provides traditional bow maneuvering in port while increasing station-keeping performance of the vessel when on station at sea.

Damen "Goes Solar"

While much of the focus is on ship-based technology, shipyards too, as good community citizens, aim to reduce their carbon footprint.

Photo: Damen

Damen Shipyards Group is having solar panels installed at a number of its Dutch yards, collectively delivering almost 12 MW of clean electricity per year. "At Damen, we always take a long-term view," said Project manager, Gerard Kornet. "It's part of our culture as a family company, we want to ensure the sustainability of the business for the next generation. This means that what we do has to be both profitable and in tune with the environment in which we operate. We have a very strong focus on this and are continually considering initiatives that can contribute to a sustainable maritime industry."

The project will see 42,000 solar panels installed on the rooftops of production facilities at eight Damen shipyards in the Netherlands. Collectively, the panels will cover some 75,000 sq. m. and generate 13% of the energy required by Damen's annual operations in the country.

The first yard to be installed with the panels is Damen Shipyards Gorinchem West. It will be followed by Damen Dredging Equipment Nijkerk and Damen Shipyards Hardinxveld by the end of August. By the end of the year Damen Maaskant Shipyard Stellendam and Amels will also follow, with Damen Verolme, Damen Shiprepair Rotterdam and Damen Shipyards Gorinchem East both undergoing installation before the end of 2020.

This is just a start.

"We are further developing the program with the intention of assessing the viability of rolling out more solar panels – as well as wind energy – to our other shipyards, not only in the Netherlands, but also internationally," said Gerard. "Wherever we are working in the world, we are committed to making sure our operations are as clean as can be."

ABB

ABB Digitial to Cut Fuel Costs

ABB secured its first contract for ABB Ability Tekomar XPERT for fleet of 55 vessels with Hamburg based ship manager CPO Containerschiffreederei (CCPO), which offers ship management for 111 of own and third-party ships. The latest Tekomar XPERT for fleet web application was launched in June 2019. Tekomar XPERT for fleet, features an easy-access web application interface, which provides insight into engine performance from fleet to vessel level through key performance indicators (KPIs) such as engine health, optimization potential and fleet performance benchmarking. less of engine make, type and age. Ships and fleets are listed according to current performance and provide the technical management with an immediate indication on their status. Tekomar XPERT can be used with any diesel or gas engine, irrespective of manufacturer, type, age or size. There is no hardware to install and the application can be dropped into the shipping company's normal IT system. It is subscription-based solution. More than 1,500 vessels have been equipped with the software to date.

New Online Marine Insurance Program

360 Coverage Pros poised to modernize the professional liability insurance buying experience for mariners.

360 Coverage Pros launched a new Marine License Insurance Program for mariners that offers an online buying experience, low monthly payment options and instant proof of coverage.

With the new Marine License Insurance Program from 360 Coverage Pros, U.S. Coast Guard licensed mariners can put "A+" rated coverage in place in minutes "Before I entered the marine insurance industry, I myself was a licensed mariner and continue to maintain my license today," said Brian Murphy, SVP and Head of Marine at Berkley Offshore Underwriting Managers. "In today's increasingly litigious society, I see this product as an important tool for mariners to protect their livelihood and careers."

"For a long time, the insurance solutions available to professional mariners have been limited," said Jason Rogers, head of Business Development for 360 Coverage Pros. "The challenge mariners have faced in the past is the time-consuming process of searching for the best coverage and price only to struggle with a cumbersome quoting and application process. Using our online technology, professionals in the marine industry can now easily select their coverage, complete an application and have proof of insurance in literally minutes. Additionally, vessel operators, either directly or through their insurance broker, can place coverage on a group basis for their licensed officers, often at discounted rates." The program offers mariners up to $2 million in protection with premiums starting as low as $25.83 per month with a down payment of $65.87.

Coverage options are available for: Blue Water Officers; Brown Water Officers; Great Lakes Officers; and, Passenger Vessel Officers

Coverage is also available for deck department and engine department professionals for the following license grades: Master, Chief Mate, Second Mate, Third Mate, Mate, Chief Engineer, Second Engineerand Designated Duty Engineer

This Marine License Insurance Program is underwritten by Berkley Offshore Underwriting Managers, a member company of Berkley, whose member insurance companies are rated A+ (Superior), Financial Size Category XV by A.M. Best Company.

360 Coverage Pros is administered by Gallagher, a global insurance brokerage, risk management and consulting services firm.

For more information visit:

www.360coveragepros.com/marine-license-insurance

Track Cargo Movements with Ocean X

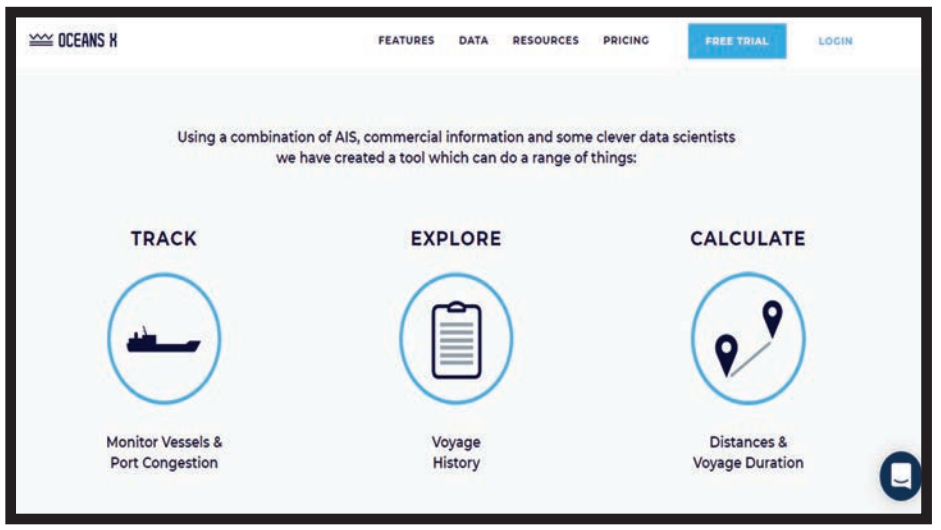

Photo: Ocean X

Oceans X enables users to monitor vessel activity in real-time, view port arrivals and port congestion, see voyage history, calculate distances from vessels to ports and forecast short-term vessel movements. Oceans X is a new web-based platform that allows a wide variety of users such as port agents, bunkers suppliers, port chandlers, port authorities, banks and others to track and monitor tankers and dry cargo vessels globally and in real-time. Oceans X's sophisticated vessel monitoring technology utilizes a combination of automatic identification system (AIS), artificial intelligence (AI) and predictive data analytics to provide a superior and enriching user experience.

Using Ocean X's powerful Distance tool feature, which is available to all users for free, users can calculate distances based on a vessel's current location, ports, or coordinates. Users can also determine voyage duration by adjusting speed, routing points, SECA and piracy paths.

In addition, subscribers of the full platform get access to premium features where they can:

- Track and monitor Vessels' movement,
- View Vessels at Port and port congestion,
- See which vessels are expected at ports and when,
- Check Bunker Prices at key ports ,
- Predict a vessel's near future voyage,
- Analyze vessels from start to load to discharge port including their corresponding dates, jetties and ship-to-ship (STS) operations.

For a free 14-day trial or to subscribe to Oceans X, go to www.OceansX.com


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EDITORIAL CALENDAR

JANUARY

Ad Close: Dec 31

Ship Repair & Conversion Annual

- Drydock & Shiplift Equipment
- Hull, Deck and Tank Coatings
- Sanitation / Wastewater Systems
- Welding & Cutting Equipment
- Engine Conversion & Repower

Event Distribution:

- EuroMaritime - Marseille
- FPSO Europe - London

FEBRUARY

Ad Close: Jan 27

Green Ship Technology

- Fuels & Lubricants
- HVAC & Compressors
- Emission Scrubbers
- Autonomous Ship Systems
- Coatings, Corrosion Control

Event Distribution:

- Sea Japan - Tokyo
- Asia Pacific Maritime - Singapore
- Green Ship Tech - Copenhagen
- NACE Corrosion - Houston, TX
- Intermodal Asia - Shanghai

MARCH

Ad Close: Feb 27

Cruise Shipping Annual

- Passenger Vessels / Ferries
- Bridge Electronics: Comms, Navigation & Controls
- Fluid Handling & Filtration
- Desalination & Reverse Osmosis Systems
- Interior Design and Finishes

Event Distribution:

- Seatrade Cruise Global - Miami, FL
- Ferry Safety - New York, NY
- CMA Shipping - Stamford, CT
- Sea-Air-Space- Baltimore, MD

APRIL

Ad Close: Mar 27

Offshore Energy Edition

- Offshore Wind Support Vessels
- Deck Machinery - Winches & Cranes
- Pumps & Valves
- Water Jets & Thrusters
- Surface Preparation - Water Jets & Scrapers

Event Distribution:

- OTC- Houston, TX
- MegaRust - San Diego, CA

MAY

Ad Close: Apr 24

Fleet Management

- Classification Societies
- Crew Training & Maritime Simulation
- Salvage
- Telemedicine
- Vessel Monitoring & Operation Software Solutions

Event Distribution:

- Posidonia - Athens
- Maritime Week Americas - Miami
- Marine Money Week - New York

JUNE

Ad Close: May 27

2020 Yearbook

- LNG & Hybrid Drives
- Luxury & Expedition Cruise Ship Building
- Navigation: Radar, ECDIS & Collision Avoidance
- Ballast Water Technology
- Lighting

Event Distribution:

- Electric & Hybrid Marine World Expo - Amsterdam
- Ballast Water Management - Houston, TX
- Cruise Ship Interiors Expo - Miami

JULY

Ad Close: Jun 16

Maritime Power Edition

- Piping, Valves & Fittings
- Emission Scrubbers
- Engine Room Ventilation
- Bearings, Seals and Couplings
- HVAC & Compressors

AUGUST

Ad Close: Jul 27

The Shipyard Edition

- Heavy Lifting: Cranes, Winches and Hoists
- Welding and Cutting Equipment
- Fuels and Lubricants
- Transmissions, Gears & Thrusters
- SMM 2020 New Technology Showcase

Event Distribution:

- SMM - Hamburg
- BWMTech North America - Ft Lauderdale, FL
- FMMS - VA Beach , VA

SEPTEMBER

Ad Close: Aug 28

Marine Design Annual

- Vessel Conversions
- Naval Architecture
- Design Software: CAD/CAM
- Anti-Vibration & Noise Control Equipment
- Ship Roll & Pitch Control Solutions

Event Distribution:

- SNAME- Houston, TX
- Interferry 2020 - Hobart, TS
- Seatrade Maritime Middle East - Dubai

OCTOBER

Ad Close: Sep 25

Shipping & Port Annual

- Satellite Communications
- Training and Simulation
- Cargo, Container & Material Handling Equipment
- Tank Gauging & Alarm Systems
- Rope, Wire & Cable

Event Distribution:

- Shipping Insight - Stamford, CT
- Commercial Marine Expo - Providence, RI
- Danish Maritime Days
- Breakbulk Americas

NOVEMBER

Ad Close: Oct 27

Workboat Edition

- ATBs
- Workboat Propulsion
- Deck Equipment - Winches & Cranes
- Fire Suppression and Safety Equipment
- Autonomous Workboats

Event Distribution:

- Int'l Workboat Show New Orleans, LA
- INMEX China - Guangzhou
- METS - Amsterdam

DECEMBER

Ad Close: Nov 25

Great Ships of 2020

- Fluid Filtration & Separation
- Gensets
- Surface Navy Shipbuilding
- Electrical Systems & Components
- Windows, Gaskets, Hatches & Doors

Event Distribution:

- Surface Navy Association 2021, Crystal City, MD

BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mark O'Malley at momalley@marinelink.com

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Marine Exhaust Systems of Alabama, 757 Nichols Ave. Fairhope, Alabama 36532 , tel:(251) 928-1234, mark@mesamarine.com

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NAVAL ARCHITECTS, MARINE ENGINEERS

Bristol Harbor Group, Inc., 99 Poppasquash Road Unit H, Bristol, RI , USA , tel:(401) 253-4318, kribeiro@bristolharborgroup.com

The Shearer Group, Inc, 3118 Harrisburg Blvd., Suite 100, Houston, TX , USA , tel:(281) 532-2080, gbeers@bristolharborgroup.com

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Tube-Mac Piping Technologies Ltd., 853 Arvin Ave. Stoney Creek, Ontario Canada L8E 5N8 , tel:(905) 643-8823 Ext. 119, chris.peitchinis@tube-mac.com contact: Chris Peitchinis, www.tube-mac.com

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BAE Systems - HybriDrive Solutions, 1098 Clark Street, Endicott, NY 13760 , tel:(607) 770-2083, carol.gorenflo@baesystems.com contact: Carol Gorenflo

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Aussie Pumps, 7 Gladstone Road, Castle Hill 2154 , Australia , tel:+61 (2) 88653500, marketing3@aussiepumps.com.au contact: Melinda Jansen, www.aussiepumps.com.au

SURFACE PREP TOOLS

Water Cannon, 4300 West Lake Mary Blvd. Units 1010-424 , USA , tel:321-800-5763, sales@watercannon.com , www.watercannon.com

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Hart Systems, 4911-71st ST CT NW, Gig Harbor, WA , USA , tel:(253) 858-8481, fax:(253) 858-8486, hartsystems@centurytel.net

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Jets Vacuum AS, Myravegen 1 6060 Hareid , tel:47 700 39 100, fax:47 700 39 101, post@jets.no , www.jetsgroup.com

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WINCHES & FAIRLEADS

JonRie InterTech, LLC, 982 Whispering Oak Circle, Manahawkin, NJ 29501, USA , tel:(609) 978-3523, fax:(609) 978-4959, BJDME@marinewinch.com

Jr. Sales Manager – Engines for North American Workboat Market

MAN Engines and Components Inc.
Full Time , Mid Career
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Skills: Location:
Pompano Beach, FL Functional Area:
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· Visits OEMs, distributors, dealers & end users on a regular basis.
· Assists with the development of assigned area and account responsibilities from a total sales support perspective.
Must possess strong interpersonal skills and have the ability to work effectively with different cultures.
Possess a willingness to learn Ability and willingness to travel, domestic and international (50%) Candidate must be willing to relocate to the Ft. Lauderdale area Preferred: Knowledge of boating, naval engineering Knowledge of marine engine products or comparable diesel products and their applications Bilingual, Spanish, (strongly preferred)

Refrigeration Engineer

Military Sealift Command
Salary: $ $48,735 , Full Time , Mid Career
Category: Engineer / Naval Architect
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Contact
Email: civmar@sealiftcommand.com
Work Phone : 757-341-4610
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 United States
Description:
Announcement #: 19-323-01EX
Title, Series, Grade (Code) Refrigeration Engineer, WM 9945-15 (323)
Base Salary: $48,735 Per annum
Type of Appointment: Excepted Service Career-Conditional
Opening Date: December 3, 2018
Closing Date: January 2, 2019
Location: Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted. Relocation expenses are not authorized for this position.

Vessel Manager

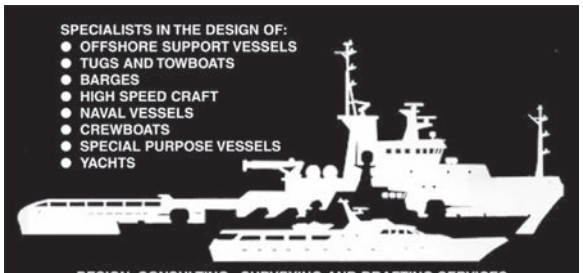
Wilhelmsen Ships Service
Full Time , Mid Career
Category: Shoreside Operations
Job Location: Pasadena, Texas, United States
Contact
HR Manager, North America
Email: MEGAN.HUMPHREY@WILHELMSEN.COM
Pasadena, Texas, United States
Description:
Wilhelmsen Ship Management is currently looking for a Vessel Manager in our Pasadena, TX office. Reporting to the Fleet Manager, the Vessel Manager is responsible for the safe, efficient and environmentally conscious operation of the vessels assigned, typical 3-5 vessels. This include compliance with statutory and industry recommended rules and regulations, giving particular attention to the ISM/ISPS/MLC codes, flag and class requirements and all technical engineering matters.
This position requires attending dry dockings, repairs and surveys as necessary, and to carry out a minimum of 2 onboard vessel inspections per year. You will have budgetary responsibility for the vessels' operating expenses, including crewing costs, stores, Lubes, R&M and dry-dockings. You will be required to produce technical reports to clients in accordance with their requirements.
In addition, you will provide technical support to the Fleet Manager and act as back-up to the other Vessel Managers as required.

Third Assistant Engineer

Military Sealift Command
Salary: $ $61,016 Per annum , Full Time , Engineer
Category: Engineer / Naval Architect
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Contact
Email: civmar@sealiftcommand.com
Work Phone : 757-341-4610
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 United States
Description:
Announcement #: 19-308-01EX Title, Series, Grade (Code) Third Assistant Engineer (W) WM-9934-25 (308) Base Salary: $61,016 Per annum Type of Appointment: Excepted Service Career-Conditional Opening Date: August 28, 2019 Closing Date September 30, 2019 Location: Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.

Administrative Assistant- Mariner Training & Travel

Full Time , Entry level
Category: Shoreside Operations
Job Location: Willow Pass Road Concord, California, 94520
Contact
HR Manager
Email: arubin@hroptions.com
Willow Pass Road Concord, California, 94520
JobDescription: Support Marine Personnel Department in tracking, qualifying and vetting personnel and documentation primarily specific to training and travel necesities. Includes assistance to departmental personnel for all crewing related activities to include travel and training arrangements, report submission, correspondence and maintaining customer and company requirements.
Required Education: H.S. Diploma or equivalent.
Key Responsibilities:
Support training needs identified by Crewing Coordinator and Manager of Marine Personnel. Knowledge of arrangements for training facilities, schedules, contacts, and contracts as well as course requirements. Coordinate all logistical aspects required for crew to attend specific location of training.



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21,67	Autoship Systems Corp.	www.autoship.com	(604) 254-4171
49	Blue Seal Inc.	www.bluesealinc.com	(360) 568-2098
58	Boatlife	www.info@boatlife.com	(800) 382-9706
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25	Class NK	www.classnk.com	Please visit us online
20	Creative Systems Inc.	www.ghsport.com	(360) 385-6212
9	Damen Shipyards	www.damen.com	(713) 471-7274
21	DCL Mooring and Rigging	www.dcl-usa.com	(800) 228-7660
23	Delta Polymers, Inc.	www.deltapolymers.com	(877) 605-0234
52,53	DELTA T SYSTEMS	www.deltatsystems.com	(561) 204-1500
15	DNV GL	www.dnvgl.us/maritime	(281) 396-1000
50,51	DonJon Marine Co., Inc.	www.donjon.com	(908) 964-8812
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57	Hydrocomp	www.hydrocompinc.com	(603) 868-3344
11	Hydrogenics	www.hydrogenics.com	(905) 361-4574
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3	KVH Industries, Inc	www.kvh.com/getagile	Please visit us online
42,43	Liebherr USA, Co	www.liebherr.com	(305) 817-7500
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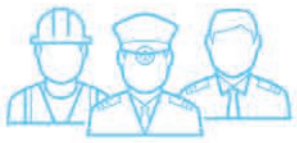

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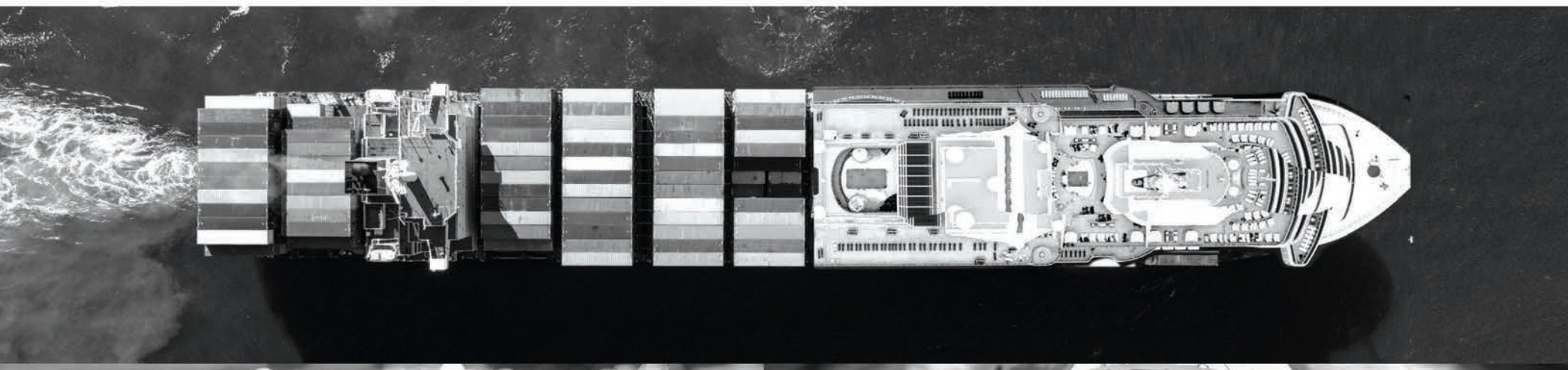

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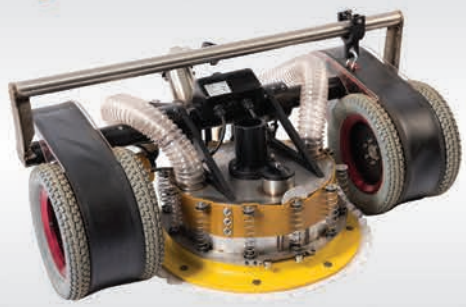

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