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MARITIME REPORTER AND ENGINEERING NEWS

SINCE 1939

August 2019

SHIPYARDS

Emission regs drive newbuild & repair

Interview:
Ron Baczkowski
President & CEO, VT Halter Marine

Heavy Lifting:
Associated Terminals & MidStream Cargo Ops

Future Fuel:
The Age of Hydrogen

Region in focus:
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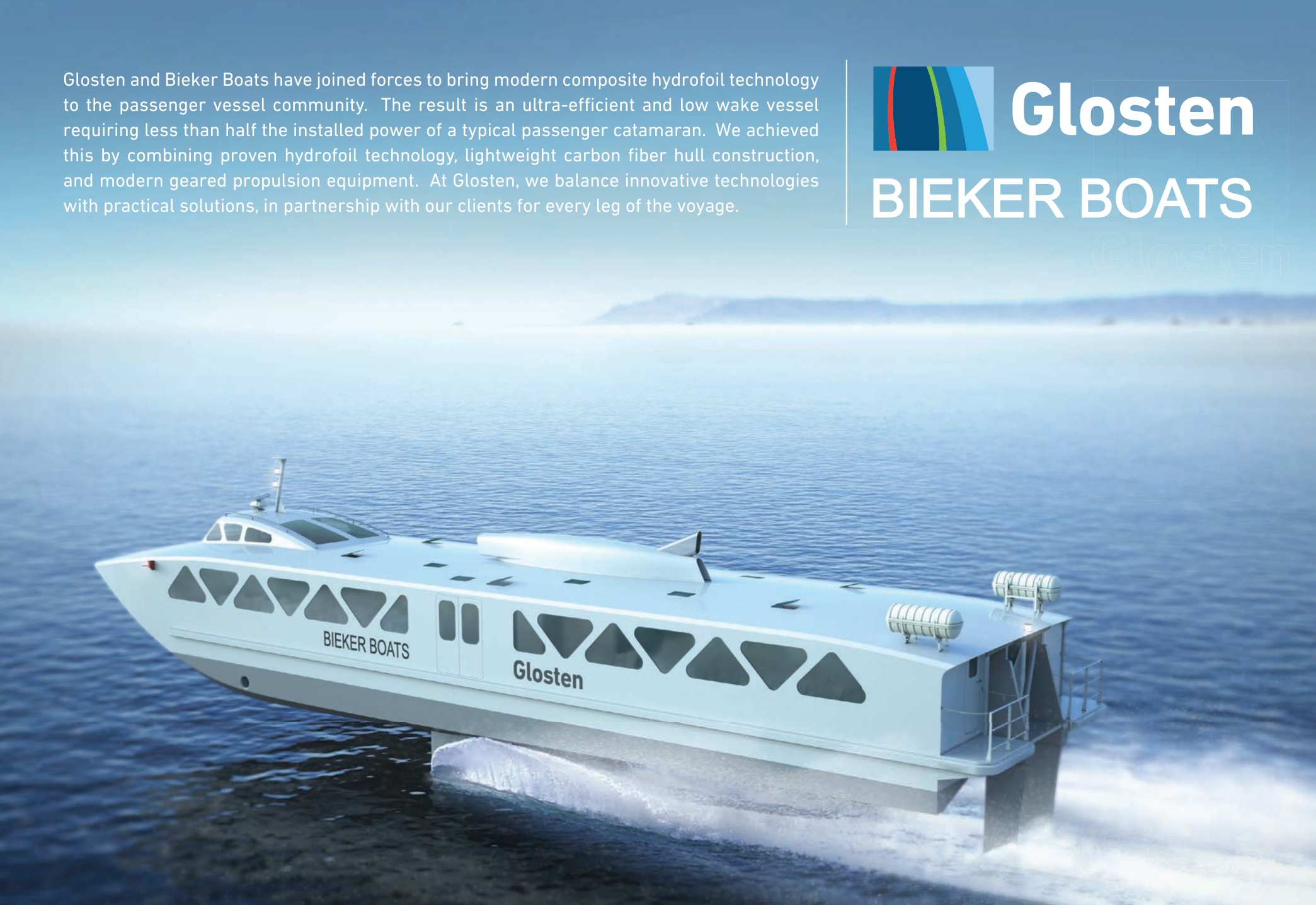

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Editorial

In the Yard

The Shipyard edition is a perennial personal favorite, as shipyards large and small, near and far, sit at the heart of everything we do at *Maritime Reporter & Engineering News*. Shipyards are the bellwether of the maritime industry, as activity levels on both the newbuild and repair & conversion sides provide not only a gauge on business today, but importantly a peak into the future.

As anyone with tenure in this industry can attest, the last few years have been challenging, to put it mildly, driven in large part by the prolonged slump in the offshore oil and gas sector. But the near-term future looks promising, for both the newbuild and repair sectors, driven by:

- **Environmental Regulation:** It is no secret that the maritime industry is being squeezed by regulators to reduce emissions and, in general, be a better environmental stewards. The big question is 'how fast and how far,' as vessel owners mull their strategy to effectively and economically meet the new rules. There is not a single or a simple answer, but as the pace of technology quickens, it appears that quality shipowners are increasingly pulling the trigger to dump older tonnage and build new.

- **Tech Refit:** In step with environmental regulations, repair and conversion business has picked up as the need to fit ballast water management systems and scrubbers, for example, have kept yards busy.

- **The Navy:** To put it simply, the world today is contentious and unsettled. A focus on military assets on and under the world's waterways is projected to increase, domestically and abroad.

- **New Markets:** It appears that the U.S. has woken up and discovered the promise of offshore renewable energy. While it's a full-generation behind Europe, it's 'better late than never.' With brightest pospects in the U.S. Northeast region, the need for new boats, ships, port and logistics solutions are growing rapidly.

This year's shipyard annual is headlined by our interview with **Ron Baczkowski**, President and CEO, VT Halter. VT Halter has had a busy year, but the pinnacle surely is a contract that has not yet begun: The deal that it recently won to build the first new U.S. Coast Guard Polar Security Cutter. Delivered from Pascagoula, MS to serve in the Arctic, Baczkowski is hoping that this will be only the first of many more icebreaker contracts to come. This story starts on page 36

In a continuation of my trip and interview with **Admiral Karl Schultz**, Commandant of the U.S. Coast Guard, this month in our 'Heavy Lift' focus we visit with **Todd Fuller**, President, Associated Terminals. I met Fuller on a recent trip to New Orleans for an on-water, underway visit to Associated Terminal's mid-stream cargo handling operations on the Lower Mississippi River. I was duly impressed with the operation, a logistical challenge on its best day, put to the test recently with the persistent high-water on the entire inland waterway system. Make no mistake though, the heart of this operation – and hence it's position at the center of our 'Heavy Lift' coverage – are Associated Terminal's 14 Gottwald cranes that range up to 120,000 lb. duty cycle lifting capacity. Our interview with Todd Fuller starts on page 52.

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Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators. In his former life he was a computer science faculty member at the University of BC researching online learning and assessment delivery models and their effectiveness. This led to him develop WebCT, a learning management system that was used by 14 million students in 80 countries.

Acknowledgement is **Never** *Enough*

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What is an Acknowledgement?

It is very common practice in maritime training to have trainees either sign a form or click a check-box online to acknowledge that they have taken and understood some particular training. We have all seen these. At the end of a training video, after reading a handbook, or after some classroom session we are presented with a little form or webpage that asks us to attest to something like the following:

I have read and been informed about the content, requirements, and expectations of the safety policy for <insert vessel operator here>. I have received a copy of the policy and agree to abide by the policy guidelines as a condition of my employment and my continuing employment at <insert vessel operator here>. It is very common for companies to use these as a part of their training program. Are they effective? Should they be used? Well – it depends on what you are hoping to achieve. Often the answer is "no".

When is it OK to use them? When is it NOT OK to use them?

Acknowledgements are good for one thing: ensuring that trainees understand that they are jointly responsible for the knowledge required to do their job. That's actually very important – so this is a valid use. Even so, most acknowledgements are written in an implicitly threatening way. Instead, a much more positive (and truthful) statement is that training and knowledge is a joint company/employee responsibility. Stating this, and asking the employee to promise that they will diligently do their part to live up to that responsibility creates a more positive team dynamic and culture.

Too often however, acknowledgements are used as a shortcut for assessment. We want to ensure that trainees read and understand the knowledge we are trying to impart. So logically if we simply tell them that they are responsible for doing so, and they say they have done so (and we have a record of that) – then we are done. Unfortunately, it does not work that way. First, and most obviously, acknowledgements provide no evidence at all that the trainee absorbed any of the materials.

They may threaten the employee with consequences if they are subsequently found not to know it, but as an organization you have no idea whatsoever whether they actually do know what you need them to know.

Second – even if the acknowledgement and implicit threat does incentivize employees to learn (which it likely does not), knowledge acquisition is not a binary process. By presenting an acknowledgement, we are not providing any information to the employee as to how deeply or how extensively they are required to remember and understand the knowledge. It is the responsibility of a training organization to provide this information.

What should you do instead?

Instead of only requiring trainees to acknowledge their training, require them to demonstrate their knowledge. That is – require them to take an exam that assesses their understanding of key components of what they need to learn. These exams do not necessarily need to be long or complicated – their complexity and length should be consistent with the length and complexity of the learning materials. In addition to the assessment, if you still have reason to add an acknowledgement – then do that as well. But *always* assess.

Assessing the trainee's knowledge accomplishes all of the goals above. First – it creates a record of training. That's important. Second, it provides some evidence of knowledge. That's even more important. And finally, because assessments themselves are learning opportunities, the assessment itself implicitly informs the trainee what the company expectations are in terms of depth of understanding.

Thus the assessment is one way that the company lives up to *its* side of the joint responsibility for training.

MarTID 2019 Report

The 2nd Annual report from the historic MarTID survey initiative to study global maritime training practices, investment and thought is now available. The surveys draw on insights from shipowners and operators, maritime education and training institutions and seafarers. The insightful report is available free for global distribution @

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Dennis L. Bryant
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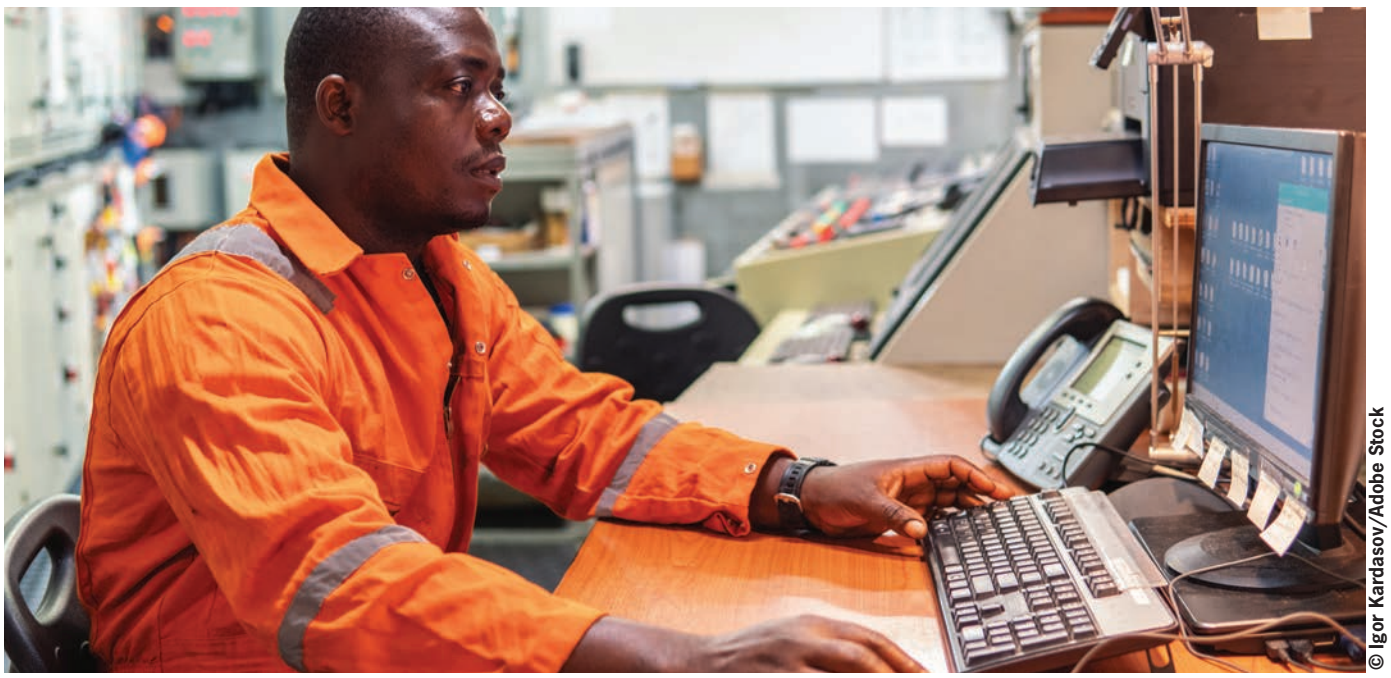
Recordkeeping is Serious Business

In addition to fuel, modern ships also run on paper or their electronic equivalent. Vessels are required to keep written or electronic records of many things – and the list is growing.

There is the traditional Ship's Log, which records the vessel's position, course, speed, weather, and unusual events to name a few. The Oil Record Book (ORB) has been around for a long time and tracks all movement of oil throughout the vessel, including its loading, consumption, and discharge (generally via the oily water separator and overboard discharge piping).

Shipboard recordkeeping requirements have expanded in recent years. The Sewage Record Book keeps track of sewage discharges by type, date, time, distance from shore, rate of discharge, and vessel speed. The Garbage Record Book records each discharge operation, incineration, escape, or accidental loss of garbage. The Ballast Water Record Book records each operation concerning ballast water, including the date, time, location, and volume of each uptake and discharge, as well as the date and time ballast water is circulated or treated. The Biofouling Record Book keeps track of vessel dry-dockings, hull cleanings, anti-fouling system maintenance and changes, diver surveys and cleanings, and vessel layups, among other things. On Board Training and Drills are tracked in another record. Ship Security Record Book keeps track of training, drills, exercises, audits, etc. The Cargo Securing Record Book, in addition to containing the procedures for accepting, maintaining, and repairing or rejecting of cargo securing devices, also includes a record of inspections of such equipment. The dangerous goods manifest and stowage plan must be kept up to date. The Ship Security Plan includes recordkeeping requirements for training, drills, exercises, and audits. Work and Rest Hours have their own recordkeeping system, including an obligation for each crew member to be provided with a signed copy of their individual records.



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Any and all of these records must be made available to the port state control officer upon demand. In the United States, it is a violation of federal law to present a fraudulent record to such officer. Specifically, 18 U.S. Code § 1519 provides:

Whoever knowingly alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in any record, document, or tangible object with the intent to impede, obstruct, or influence the investigation or proper administration of any matter within the jurisdiction of any department or agency of the United States . . ., or in relation to or contemplation of any such matter or case, shall be fined under this title, imprisoned not more than 20 years, or both.

Unlike in some port states where fraudulent ship's records are either not detected or ignored, the United States vigorously prosecutes any and all violations suspected to exist. In addition, if a crew member provides substantial evidence to support the prosecution, that crew member can be handsomely rewarded in many instances. Thus, multimillion criminal fines against ship owners and operators for violations including fraudulent recordkeeping have become commonplace.

In 1999, Royal Caribbean Cruises Ltd pled guilty in federal court to a variety of offenses including the intentional discharging at sea of waste oil that was not processed through the oily water separator and of lying to the US Coast Guard by presenting to a boarding officer in the Port of Miami the ship's oil record book which did not contain entries for the illegal discharges. The company paid an $18 million criminal fine and served five years under a court-supervised environmental compliance program. While this was the first high visibility such prosecution, it was certainly not the first instance of the federal government pursuing fraudulent recordkeeping offenses in the maritime sector.

Initially, the industry bemoaned these prosecutions, particularly the ones that involved whistleblowers. Eventually, the industry acknowledged that, for the most part, these prosecutions have been for intentional crimes.

Unfortunately, these multimillion dollar fines have not resulted in wholesale changes in the manner in which many ships engage in recordkeeping. Fudging entries, ignoring unpleasant facts (such as malfunctioning equipment), cutting corners, and outright fraud remain all too common. Some companies accept this as a fact of life. Others see it as an acceptable cost-cutting measure, saving money on repairs and downtime, in an era of low profits and cut-throat competition. In egregious cases, the federal government has banned the vessels of offending companies from operating in US for a period of years.

Million-dollar fines related to fraudulent oil record book entries have become frequent. Less frequent, though growing, have been fines for fraudulent entries in sewage record books, garbage record books, and ballast water record books. Any official and some unofficial records maintained by a vessel or its owner/operator could become the focus of a criminal investigation.

Companies that do not make concerted efforts to encourage accurate recordkeeping on their vessels while discouraging and rooting out fraudulent record entries are engaged in high stakes gambling. Penalties will continue to increase for violations detected in the United States. Other nations are starting to take action when maritime fraud is discovered. The days of laisser-faire are drawing to a close.

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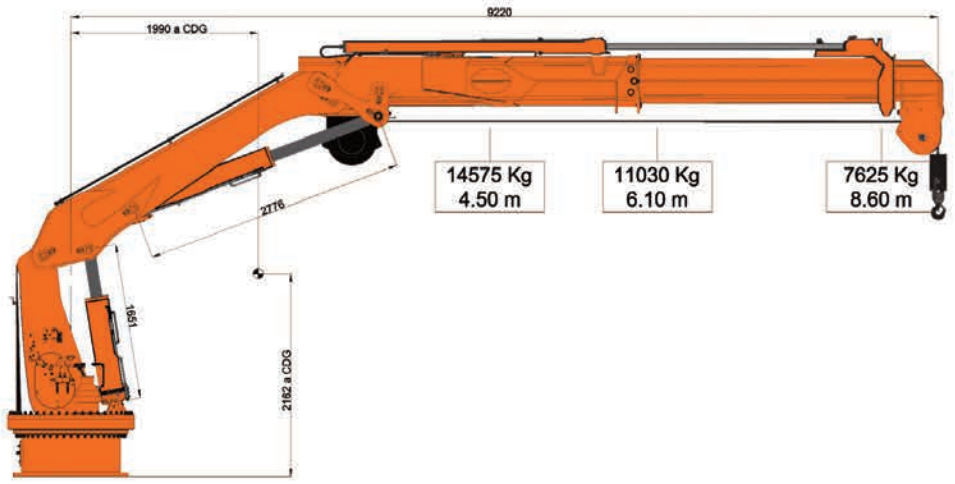

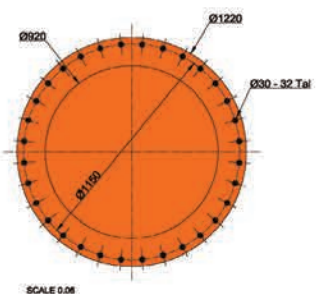

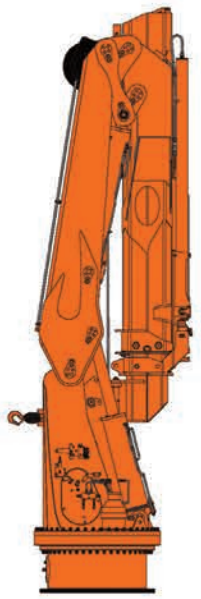

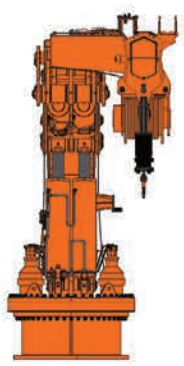

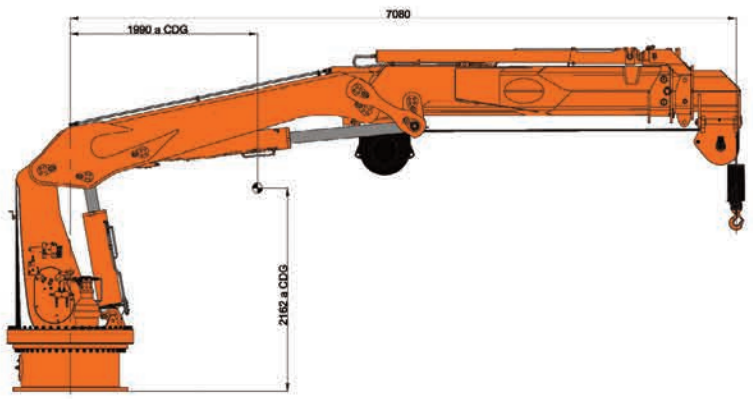

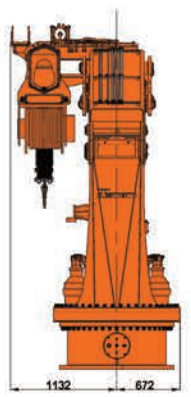

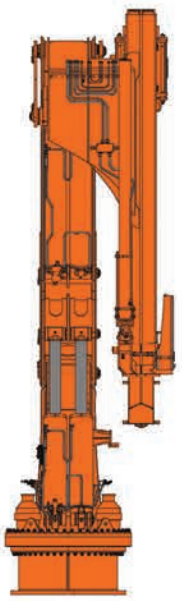

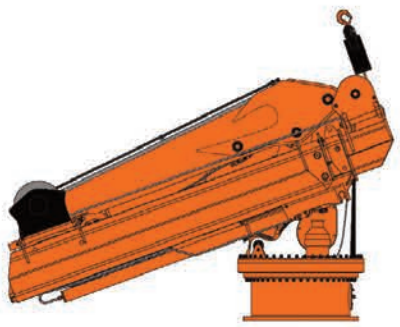

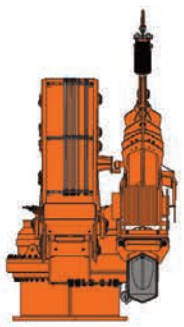

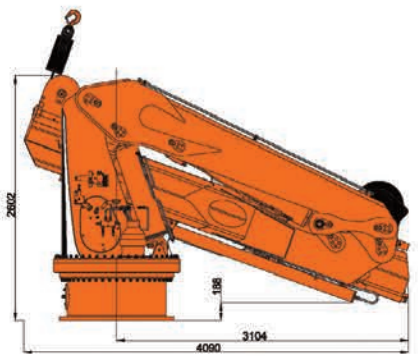

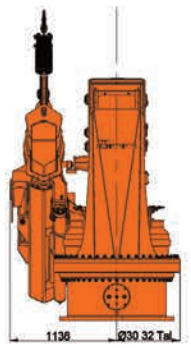

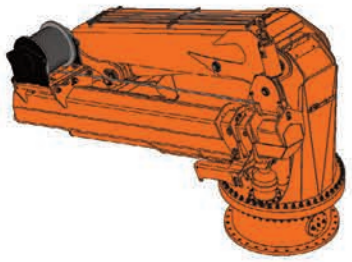

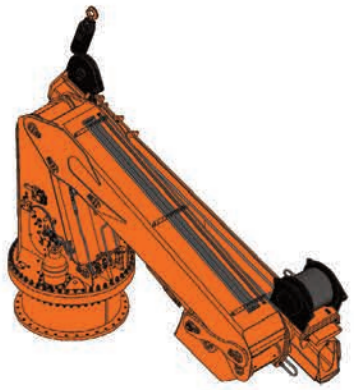

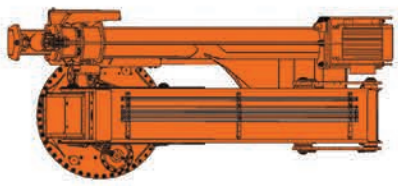

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Exercising Maritime Liens
Against Cargo and Sub-Freights

Vessel owners rarely carry cargo for their own account. More commonly by far, a vessel owner will charter its vessel to another party to carry their (or their sub-charterer's) cargo. The contracts can vary widely – from voyage charters or contracts of affreightment to time charters to negotiable bills of lading (not to mention the more complex arrangements that one often sees for container cargos). But in most instances, vessel owners are in the business of transporting cargo on behalf of others and, all going well, of being paid to do so. This article is about one mechanism the vessel owner may use to ensure that it gets paid: the maritime lien against cargo.

It has been settled for over a century under United States maritime law that a shipowner has a maritime lien against cargo for charges incurred during the course of its carriage. As the Supreme Court stated in its 1866 decision in *Bird of Paridise,*[1] "Ship-owners, unquestionably, as a general rule, have a lien upon the cargo for the freight, and consequently may retain the goods after the arrival of the ship at port of destination until the payment is made." Traditionally, a maritime lien against cargo for freight and demurrage was considered a "possessory" lien, meaning that the lien is lost upon the delivery of the cargo to the consignee. To exercise its maritime lien, in other words, the vessel owner was expected to retain possession and control of the cargo until payment; and if no payment was received, it needed to enforce its lien by maritime arrest while the cargo remained in its possession.

It is not difficult to imagine the impracticalities of this rule. For instance, it certainly would not do in most circumstances to simply retain the cargo on board the vessel pending payment, given that the vessel is presumably looking to complete discharge and commence her next voyage as quickly as possible. And while some kinds of cargo may lend

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themselves to segregated storage ashore, whether in a bonded warehouse or dedicated storage facility, this is often logistically complicated and also expensive. Add to those practical difficulties the additional contractual challenge that some portion of freight and demurrage often are not even due until sometime after the cargo is delivered, and it is not difficult to see why the "possessory" element of the lien can often prove problematic.

Recognizing these problems, the courts have determined that "it would frustrate commerce to require shipowners to retain their liens only by actual possession of the implicated cargo." They therefore have found that "a shipowner enjoys a strong presumption that, absent a clear indication to the contrary, he has not waived his cargo lien upon the delivery of cargo." [2] As the Fifth Circuit Court of Appeals explained in one case where the charter provided for a lien against cargo for freight and demurrage but also provided for payment of these items after the cargo's delivery: "No rational person would establish a lien on cargo for certain costs that are due after delivery of the cargo but have delivery of the cargo extinguish the lien. If that were the case, the lien would be a futile mechanism for protection." [3]

What does this "no waiver" presumption mean? It means that although the cargo may have been delivered to the receiver, it may yet be possible for the vessel owner to maintain and enforce its lien by arresting the cargo in an in rem court proceeding. In analyzing whether the lien persists after discharge, the Court will look at the available evidence to determine whether the parties intended that the lien would be waived upon delivery. Most relevant in this respect would be wording in the applicable charter or bill of lading making clear that the lien survives discharge, but it could also come from a notice from the vessel owner at or before discharge that the delivery is conditioned on the maintenance of the lien. It might even come from established local usage at the port.[4]

Of course, this rule presents its own practical difficulties. In particular, once a cargo is discharged it is not always easy to identify or segregate – particularly with liquid or dry bulk cargoes that may be discharged into storage facilities and commingled with other product. Some commentators have suggested that the lien may yet survive so long as the cargo is commingled with product of the same type and specification; however, once the cargo is admixed or processed, the lien may be extinguished.[5]

It is one thing when the cargo belongs to the charterer who actually owes freight or demurrage, but what if the cargo belongs to a third party? Here, the vessel owner's rights become far more constrained, and the courts have held that the vessel owner does not have a maritime lien against a third party's cargo.[6] Vessel charters do, however, also commonly provide that the vessel owner shall also have a lien against sub-freights – meaning the amounts that may be owed to the charterer by third parties for the carriage of their cargo. Such liens are routinely enforced.

A lien against sub-freights is materially different from a lien against cargo. First, the lien can only be exercised to the extent of sub-freights still outstanding, and once the freight is paid the lien right disappears. Moreover, the lien against sub-freights arises solely as a matter of contract, and not under the maritime law. Thus, to be enforceable against a third party – i.e., the party owing the sub-freight – the vessel owner must give actual notice of the lien to the cargo owner before it pays its freight to the charterer; otherwise, the lien is discharged. (If, however, the party owing sub-freights pays the original party after receiving valid actual notice, that party may be liable to pay the freight twice).

As can be seen, maritime liens against cargo and sub-freights are important tools in the shipowner's enforcement arsenal, both before cargo is discharged and, often, even afterwards. Fully understanding how these tools work – and how far they may (or may not) reach – is important for both the vessel owner and the charterer of a vessel carrying cargo.

1 72 U.S. 5 (1866).

2 See Dampskibsselskabet Norden A/S v. 25,001.078 MT of Fly Ash, 308 F. Supp. 3d 693 (N.D.N.Y. 2018) (quoting In re World Imports Ltd., 820 F.3d 576, 584 (3d Cir. 2016).

3 Arochem Corp. v. Wilomi, Inc., 962 F.2d 496, 500 (1992).

4 In re 4,885 Bags of Linseed, 66 U.S. 108 (1861); See also Dampskibsselskabet Norden A/S v. 25,001.078 MT of Fly Ash, 308 F. Supp. 3d 693, 697 (N.D.N.Y. 2018).

5 VOYAGE CHARTERS, 17A-19 (Informa 4th Ed. 2014).

6 See Lykes Lines Ltd. v. BBC Sealand, 398 F.3d 319, 323 (5th Cir. 2005).

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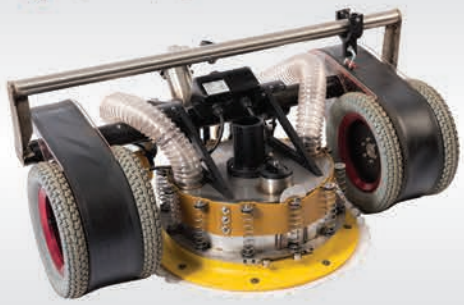

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STEM *is so "Yesterday"*

Recently I was attending the United Nations Science Technology and Innovation conference (STI Forum). While I attended to present on Wave Energy Conversion, the main subject at the conference was STEM education and STEM gender inequality. Almost every country in the world reports a lack of available STEM educated workers, and also reports that they have had problems engaging the non-male population in STEM professions.

The discussions were extremely far and wide ranging, but when all was said and done, the single sense I came away with is that nobody at the United Nations had a clear idea on solving either problem. As an engineer I am struck that there is such a tight focus on STEM. STEM alone is not going to solve the world's problems, whether in the form of coding (the currently fashionable term for computer programming) or in the form of technology design, manufacturing, maintenance, or operation, which is the outcome of STEM and is called problem solving (a common definition of engineering).

The whole world seems to think that engineering is something that requires math and science and little else. Nothing is further from the truth. When I hire young engineers, I certainly expect them to be able to deal with mathematical and scientific issues, but what good is science and math, when everything they produce lacks elegance and fails to connect with their main customer; humanity at large. While engineers only receive a limited amount of college training in non STEM subjects, it is almost a given that those engineers who rise rapidly in their profession, are the ones who will also focus on non STEM skill development in their early career.

More recently, people have suggested that the answer lies with STEAM. Thereby somehow suggesting that Art is needed to make STEM complete. This is both true and pointless at the same time. True because Art is an incredibly important part of science, engineering, math and technology. Not Art in the form of a search for prettier depictions of emotional concepts, but, instead, in the form of the search for, and expression of, deeper truths, in math, science, engineering and technology. Hence, we talk about the art of engineering, or elegant mathematical proofs, or rugged and efficient code. However, in all those discussion about STEAM, people sadly seem to talk about Art as something that also deserves attention besides STEM, which is not going to make STEM, or even Art, any more viable.

If there are artists and art teachers who will put their skills at the service of STEM education, we will achieve a greater level of success in STEM. But do such teachers exist? Where do I find Art teachers who understand both the complexities of Art and of STEM? I know of a few artist that understand STEM, and can even provide some examples of art projects that hit the nail on the head, but in the vast majority of cases, we are dealing with artists and art instructors who happily engage in art that has no connection to STEM and will staunchly defend their right to produce art that is just art and not befouled with the realities of science and engineering.

Meanwhile, there is ultimately little wrong with STEM education. We know, because STEM innovations are flooding our society (even though a large number of them may have no benefit to humanity at large). The problem lies with the Liberal Arts. Liberal Arts used to be a term that was related to the search of truth in

Photos: MAST/File Photos

all its natural forms (originally as a push back against religious education), but, over time, the Liberal Arts split. It split into hard science and engineering educational specialties and all the other non-STEM specialties. There was a day that a Liberal Arts degree required Math and Science and even a little engineering, but today a liberal arts degree can be wholly dedicated to History, or Language, or Philosophy or Art, without a serious immersion into Math and Science, and hence the schism between the two.

This has resulted in presorting of young people, regardless of gender, into subcategories along the path of least resistance into ineffective stovepipes. In this technological age this has resulted in groups of haves and have nots. Somehow, we seem to think of that as the STEMs, and the PHLAs (Philosophy, History, Language and Art). Undoubtedly, each individual human may have more talent or interest in one or another specialty. But specialties are useless if they cannot operate seamlessly in the whole. So what is the whole? The whole is not STEM it is not STEAM it is STEMPHLA.

STEMPHLA is the integration of humanity's knowledge for the greater good of each individual, and humanity at large. Only STEMPHLA can draw on sufficient tools to come up with better technical solutions and only STEMPHLA can draw on sufficient tools to come up with better social solutions too.

So how do we solve the lack of STEM trained people and gender inequalities in STEM? I suggest we do it by not treating STEM as something different from PHLA. And now I will engage in a bit of finger pointing. Who has been treating STEM as different from PHLA? The engineers, scientists, mathematicians or technologists? Maybe, but as I hear too often at college graduation ceremonies: STEMs have the jobs.

Moreover, STEM education has not ignored PHLA, there are strict humanities requirements in STEM education and beyond that, once STEMs realize that there are no successful STEMS without a solid grounding in PHLA, STEMs rush to increase their skills and knowledge in PHLA. But is this occurring with PHLA's? I have a strong sense that once a person has specialized in PHLA they treat STEM with fear or contempt, and therefore will not be able to engage in the workplace in the most productive way.

So what is the solution? It seems simple to me. Let's stop talking about STEM and instead focus on STEMPHLA. Only young people that see no difference between these categories will develop into fearless adults who can engage the world with a full toolbox to provide the solutions that we all need.

In writing this column, in the time to come, I hope to be able to discuss engineering from a STEMPHLA point of view.

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 the technology program at **MAST**, the Marine Academy of Science and Technology, a Monmouth County, NJ Vocational High School that is a national leader in breaking the STEMPHLA stovepipes.

www.mcvsd.org/mast.html

Mike Corrigan
Interferry CEO Mike Corrigan explains why the global trade association is poised to take its work to the next level.

Interferry *sets sights on Growth*

While I respect the mantra of cautious optimism, I can't help feeling genuinely excited that 2019 could prove to be a milestone year in the continuing growth of Interferry's influence as the global voice of the ferry industry.

We've come a long way since our US origins in 1976 as what was essentially a networking movement, but developments in recent months already suggest we are on course for yet more enhancement of our present-day worldwide networking and lobbying relationships.

Regulatory authority the International Maritime Organization (IMO), where Interferry has proactive consultative status, has specifically requested our assistance after agreeing to act on calls from us and others to increase its involvement with ferry safety in developing nations. The decision came soon after Interferry staged two fact-finding visits to the Philippines to produce 'lessons learned' guidance.

The IMO is also embracing our interventions on ro-pax fire safety and a raft of environmental challenges. Meanwhile a meeting with the European Maritime Safety Agency (EMSA) has boosted our sense of ever-closer bonds with industry playmakers.

Elsewhere we announced our support for the charity Mercy Ships, whose volunteer-manned hospital ships bring healthcare to the developing world. We will be promoting them to our industry-wide membership – currently more than 250 ferry operators and suppliers in close to 40 countries – including at our 44th annual conference in London this October.

The conference also dares me to think of a watershed 2019. London is the global leader in maritime chartering, legal, financial and insurance services, so a record delegate attendance is not beyond reason. Furthermore, with an Innovation theme, we called for speakers who could focus on step change rather than incremental improvements. A remarkable line-up of heavy-hitters will explain the potential to transform every aspect of our industry.

Photo courtesy Interferry

Last but not least, we have drafted our strategic plan for 2020-2022, which adds far-reaching weight to Interferry's vision of making a difference both within the ferry industry and society as a whole. More on this follows after some details on our 2019 headlines…

Safety breakthrough

Terrific news came in June at Session 101 of the IMO's Maritime Safety Committee (MSC) – they agreed to establish a new output on measures to improve domestic ferry safety in developing countries, where virtually all ferry fatalities occur. Explicitly supported by the IMO Secretary General, the agreement built on a proposal from China and, not least, Interferry advocacy and cooperation with the IMO over many years. Now a much better defined work plan will go beyond general support to include the development of model regulations. The initiative will be overseen by the IMO's head of special projects, who met us shortly before the MSC decision and distinctly asked for our continued contribution.

Findings from Interferry's Philippines study mission will undoubtedly help the cause. Under our specially-formed FERRYSAFE project, a four-man team made week-long visits to Manila in March and ferry hub Cebu in May to research dramatic improvements in the nation's ferry safety record – once the world's worst but now in line with the global average.

The visits involved informal interviews with 66 stakeholders – from operators to customers – together with seven ferry crossings, shipyard visits and meetings with the maritime, port and Coast Guard authorities. No 'silver bullet' safety solution was unearthed, but several paramount factors consistently emerged – notably government support, reasonably stringent regulations, a weather-dependent no-sail policy, local enforcement and the importance of in-

The revised G8 countdown has started

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> **Terrific news came in June at Session 101 of the IMO's Maritime Safety Committee (MSC);** they agreed to establish a new output on measures to improve domestic ferry safety in developing countries, where virtually all ferry fatalities occur.
>
> **Mike Corrigan,**
> CEO, Interferry

Photo courtesy Interferry

surance and insurance surveys. The team is now developing a best practice document that will be shared with the IMO and other developing nations.

Fire alarm

The MSC meeting in June also approved new draft interim guidelines on RoPax fire safety, another area of major Interferry engagement over the past few years. We argued that some aspects of the voluntary guidelines required greater discussion to avoid unjustified construction recommendations. One example, the draft stipulates safety distances for life saving appliances in relation to RoRo deck openings, yet the distances derive from a study urging further research! Many member states shared our concerns.

EMSA envoys

In June we met EMSA's new executive director Maja Kostelac. We toured its 24/7/365 operations and security monitoring center covering all vessels in European waters. The drone technology that detects ship-specific environmental spills was very impressive – as was the feedback that Interferry is a highly respected key player in regulatory debate.

Green for clean

Session 74 of the IMO's Marine Environmental Protection Committee (MEPC) in May confirmed that member states are refining potential short-term greenhouse gas (GHG) measures such as a stricter Energy Efficiency Design Index, shaft power limitations and speed requirements.

Interferry has formed a GHG working group to help the ferry sector's leadership on IMO emissions targets and will present our own sector-specific ideas at the GHG intersessional meeting in November. Ferries already lead the industry regarding the uptake and planned installation of battery, hybrid and hydrogen power.

Agreement to work on harmonized rules for discharge water from exhaust gas scrubbers came after MEPC74 noted a worrying tendency of States to introduce local or regional restrictions without scientific justification. The issue is due to be completed by 2021. Interferry will continue to maintain its position that existing installations, made in good faith and in compliance, must not be affected by any future changes, while any new requirements should be based on scientific facts.

Step change

Progress on developing zero-emissions ferries will be among the transformational topics at Interferry's upcoming annual conference in London, which promises to reveal 'the next big things on the horizon'. Keynote speakers include renowned futurist hi-tech writer David Rowan, with insights from his recent book *Non-Bullshit Innovation: Radical Ideas from the World's Smartest Minds,* and Guy Platten, head of the International Chamber of Shipping - where Interferry is an associate member – which represents more than 80% of the world merchant fleet.

Shipyards will present the latest thinking on all types of construction, while a status report on autonomous ferries will include a legal angle on the potential ramifications of operating with minimal human interaction. Other highlighted innovations range from terminal berthing and bridge navigation technologies to advances in IT and satellite networks. Customer service providers will examine developments in terminal interfaces, billing systems and the Internet, while a major insurance company is unveiling its 'paradigm shift' analytics-based risk model. Each day of the speakers program will end with an international panel of CEOs from various-sized ferry companies discussing the innovations required to anticipate evermore demanding regulatory and customer expectations.

The conference sessions on October 7-8 are at the core of a River Thamesside event running from October 5-9, when networking and social highlights include a reception on famed 1869-built tea clipper Cutty Sark and a closing dinner in the historic Painted Hall at the Old Royal Naval College.

Future vision

After 14 years working for a world-class ferry operator, Canada's BC Ferries, I took the helm at Interferry in April 2017 with a mandate to build on the association's firm foundations and take us to the 'next level'. At our June board meeting and strategic planning session in Copenhagen, the directors acknowledged the collective efforts made to date, particularly through our specially formed domestic safety, security and regulatory committees. Then it was time to set our sights on new targets to further grow our reach and influence as we drafted Interferry's 2020-2022 strategy.

The new plan will be presented at our annual conference following final approval at the October board meeting. It sets out the course for a visionary mission in which we will continue to drive for safety improvements and membership growth in developing nations; allocate the necessary resources to ensure regulatory success; and focus more of our communications on the overall ferry industry, with particular emphasis on analysis of the size and economic impact of our industry worldwide. Given our current rate of progress and Stronger Together mantra, I'm now encouraged more than ever of our continued success as an influencer and leader in the global shipping industry.

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Hydrogen propulsion

"Nothing competes with this"

After pushing drivers to biodiesel (banned in some European cities) then ship owners into natural-gas engines (before cutting incentives), Oslo is now sponsoring marine energy storage. Yet, sharing the subsidies is a parallel drive synced with the European Union and aimed at fostering the first marine-hydrogen projects. Norway hopes to marry electro-chemical energy-storage and liquid hydrogen or fuel cells for an early-mover market lead. Readily available in theory, hydrogen's place in propulsion will now determined by the first projects.

By William Stoichevski

The first hydrogen filling station in Norway fuelled-up its first public bus back in 2012. That followed on the heels of a hydrogen study done in 2000. "Things move fast," says DNV GL's principal hydrogen consultant, Gerd-Petra Haugom. She says marine battery awareness really took off in 2011, also on the results of studies. Since the International Maritime Organization revised its greenhouse-gas reduction strategy in April 2018 and pledged to cut greenhouse gas emissions 50 percent by 2050, the quest for true zero-emissions marine propulsion has also, now, really taken off.

To hurry what Haugom calls the frontrunner "projects", near-shore and oceangoing supply chains here are being joined by onshore hydrogen and auto-sector players keen to solve "hydrogen as (marine) fuel" and marine "hydrogen carriers."

Given the influence of DNV GL in Norway, it's possible Haugom's visible enthusiasm for hydrogen has helped

World First:
A first hydrogen-hybrid ferry operation is envisoned starting up in 2022 with hydrogen containment up top.

Image: NCE Maritime CleanTech

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Oslo decide to fund from two to five hydrogen-propulsion ferry projects. At least one of these is also an EU-financed "fast-ferry project", and it has a corresponding designated supply chain for hydrogen transit's anticipated infrastructure needs. The same cold realism that saw the EU and Norway first promote and then abandon biodiesel and LNG over a span of 15 years will now deliver hydrogen by compression or refrigeration down to -265 degrees Celsius.

"Batteries are preferred when they work, but you need to have electric power available," Haugom says, adding that hydrogen is the fuel that contains the most energy per kilogram. "Nothing can compete with hydrogen for energy density. But, you have to contain it. The challenge is to pressurize it. The containment gets heavy."

Hydrogen, today, is mostly used in fertilizer production. Capturing hydrogen from the burning of fossil-fuel or from "scrubbing" industrial emissions is one way to get it, but critics say that would undermine hydrogen's green credentials as a fuel. Trucking it to Norway just won't do either. For now, the supply of hydrogen looks "unsolved".

Urban Water Shuttle

Yet in an era of "design your way to market", Europe and Norway are hoping for commercial effects on a grand scale with a fast-ferry called Urban Water Shuttle, or UWS, which aims to "link" passengers in Stavanger, London and Belgium in a common endeavour called the TrAM project. The "all-elec-

Stavanger to London: A fast-ferry commuter vessel, the Urban Water Shuttle is a joint EU-Norway project.

Image: NCE Maritime CleanTech

tric" UWS, or at least TrAM, is a EUR 12 million EU research project intended to solve a range of issues related to hydrogen fuels for passenger vessels: from training to use in an urban setting. TrAM animator, NCE Maritime CleanTech — aka Norway's zero-emissions supplier cluster — is focused on making the UWS "modular" transport that builds easy and meshes seamlessly with commuter traffic on land.

The main result, however, is expected to be a fast UWS ferrying through sheltered waters from oil town Stavanger to a coastal village. The vision of invited designers is a propulsion system that'll use a hydrogen fuel cell or hydrogen engine to charge the ferry's batteries. Similarly, Maritime CleanTech and DNV GL are also shepherding suppliers into the development of a hydrogen-run platform supply vessel for offshore oil and gas: Equinor and Wärtsilä were listed as parties to the PSV. There's also a containership project and several ferry and fast-ferry variants.

Servogear

A business of Norwegian conglomerate, Hydro, is seen as a likely supplier of hydrogen fuel. Local yard Fjellstrand is understood to be building the UWS. Themes Clippers and Waterwegen & Zeekanal are understood to be interested in sharing experiences and perhaps gaining a ferry, and at least three North Sea rim universities are involved in transit studies.

System-power integrator, Wärtsilä — in on the PSV, the container-concept Short Sea Pioneer and the fast shuttle —

and propulsor outfit, Servogear, are key to the fast ferry, and a hydrogen vessel concept is the immediate goal. Servogear managing director, Torleif Stokke, is confident his propellers and shafts will give the UWS quieter propulsion. Like marine batteries, his high-screw propeller blades can mean fuel savings, less noise and smaller engines. "We can work with any engine supplier, whether it's battery, hydrogen or diesel," a giddy Stokke says. Supplier to many a Norwegian and a foreign ferry project; whale-watching boat and fishing vessel, Stokke's propulsor's have been known to provide the kind of kick that allows vessels once needing 5.7 MW of engine power to run on 3.7 MW.

While that's "green," Stokke says a hybrid hydrogen-battery vessel is "greener", although when it comes to hydrogen-battery hybrids, like the UWS concept, he seems prone to thinking batteries won't be used for high-speed operations. While that's a slight divergence from stated DNV GL hopes that all-electric might be all-you-need, Stokke's already a zero-emissions star: apart from his 70-percent export-driven propeller business, March 2019 also saw the first all-electric ferry service start up in Haugesund with his quiet-screw blades onboard. There's also a whale-watching vessel contract, where the motor gives 25 minutes of hybrid battery time and up to 8 kWh of power over 10 hours.

He admits that the UWS idea is the "greenest" yet. He sees many challenges. What type of propeller will the fast commuter have? "That's our core IP. What is the propeller tech? It'll be a pulling propeller, so it will always have optimal conditions," he says. The main engine will be hydrogen-powered with a controlled pitch to control the load: "We don't quite know how to do it, but we have to get it slimmed down." Interestingly, Haugom says she envisions a smaller hydrogen motor charging the batteries of a much larger electric engine.

Green, greener, greenest

Stokke has at times been concerned with the project's "greenness". "As long as the hydrogen is produced from a clean source, then operations are clean. I'm optimistic that they will be." He says he knows "liquid hydrogen sources (scheduled) are only from Europe (and) from three sources — fossil fuel, LNG gas and sent here by trucks". All are keen to solve the hydrogen-supply problem ASAP. The ferry operator's contract makes the demand that, "within three years, hydrogen must be green", as in from local gas-plant hydrogen capture, or ammonia production — not flue gas from the Continent.

Maritime CleanTech asserts the supply chain is "on the verge of a hydrogen revolution." By the end of 2019, Oslo, too, promises a new hydrogen strategy

to safeguard the revolution. Yet, already, Servogear can look forward to working with Norled on Norway's — and the world's — first hybrid hydrogen ferry (not "fast", as in the UWS); with its designer LMG Marin and with an unnamed local or international shipyard. One of two designated electric ferries will have hydrogen handling and storage placed topside. As DNV GL's Haugom says, "containment" is the issue. In case of a hydrogen leak, gas escapes into the air rather than posing a concentration (explosion) risk.

Norled's first hydrogen ferry will in 2022 will run a four-stop crossing from quayside at a place called, Hjelmeland, where a storage site and filling station will stand. Every third week, the H-ferry will take on four tonnes of hydrogen, NCE chroniclers say. To start, liquid hydrogen will deliver from "international sources." From 2023, they'll use local hydrogen. The H-ferry will get 50 percent of its power from a hydrogen fuel cell. While it's not the hydrogen-powered fast-ferry conceptualized for the UWS, it's a start. Class's DNV GL will follow along "in order to deal with a whole new set of hazards and challenges that hydrogen brings", not to mention help for "all the certificates and approvals" needed to operate an H-powered vessel. DNV GL already offer a Guideline to help get your vessel on hydrogen.

For Stokke, the UWS and the Norled hydrogen hybrid ferry are "the next electro pods". Though still a concept, he says he knows the NCE partners will build the vessels. "We as a company are lucky that the focus on energy concepts has increased so much."

If there's doubt, it derives from hydrogen permitting and Oslo's "abandonment" of LNG, a fuel it once supported to the hilt, as did the EU. Meanwhile, Oslo is scheduled to convert to battery power 21 LNG-driven ferries of 72 in operation.

For now, the goal with fast hydrogen hybrids is a modest 1.5 hours without charging. That's not quite Haugom's vision. She sees a smaller hydrogen engine topping up the vessel's battery power as passengers read their favourite news app.

"You don't need to bunker or charge every time". From 2030, she sees storage — pressurized, not refrigerated — liquid hydrogen onboard, as fast, next-generation hybrid vessels emerge with hydrogen fuel cells and/or a hydrogen engine.

"Do you need a supply of compressed hydrogen," is one of the questions DNV GL and others have yet to solve. And, then there are the different types of hydrogen fuel cells. When it comes to hydrogen, don't hold your breath.

Captain Todd Bonnar, M.S.C., CD from Canada heads the Warfare Analysis Team at Combined Joint Operations from the Sea Center of Excellence in Norfolk, VA. He holds a Bachelor of Social Sciences Degree from the University of Ottawa and a Masters of Defense Studies from the Royal Military College of Canada.

"The First Steps in Mitigating Contemporary Risks *to our Strategic Sea Lines of Communication"*

It is indisputable that the world's economy floats on seawater. It is equally indisputable that international maritime transportation is the tool that keeps the global economy moving. The world economy has surged over the last half century, and that growth has been largely driven by globalization and the consequent reduction in barriers to trade. Any operational disruptions in maritime transportation have wider consequences for society, making the management of the associated risks a priority that should transcend industry and national boundaries. The maritime transportation sector's symbiotic relationship with the global economy means that the risks faced by the industry are influenced by factors beyond its control. Increasingly complex trade markets, regulatory frameworks such as the EU in a state of flux, the inexorable march of technological risks caused by advanced cyber threats and geopolitical shifts as seen in Europe and the Middle East are all example of these extant risks to the global economy. Far from being isolated in silos, these factors are in constant interplay in complex relationships that are difficult to understand, let alone predict despite increasingly advanced data analytics tools and the introduction of Artificial Intelligence (AI) in business strategies and work flows. Clearly, an increasingly connected world requires a maritime community response to the many interconnected risks in the maritime commons. The numerous processes of coordination and cooperation in the field of international maritime security are based on acceptance of the importance of the world's seas and oceans to the wellbeing and prosperity of the people that depend on them. This close link between the security and safeguarding of the seas and the development and economic wellbeing of whole societies drives natural partnerships. The world's navies and the international maritime community share concern over safeguarding strategic sea lines of communication owing to the increase in illicit uses of these waterways. Their physical traits make it a particularly conducive environment for activities that seek to evade the authority of States, or from legitimate end-user stakeholders, and aim to undermine regulatory compliance and general stewardship.

Trans-national phenomena such as terrorism, organized crime, the proliferation of weapons of mass destruction or even hybrid warfare, sometimes interrelated, have an undeniable maritime dimension and impact the global economy. It only stands to reason then that human migration, climate change and challenges to a world order based on free markets, human rights and the rule of law must be addressed by the relevant organizations, especially in the field of maritime security and for this we need a common maritime strategy.

As Rear Admiral JC Wylie, USN explains in his original exposition of cumulative and sequential strategies of the early 1950s, maritime strategy is "one in which the world's maritime communications systems are exploited as the main avenues by way of which strength may be applied to establish control over one's enemies."[1] What the Admiral was referring to is the basic tenet of establishing sea control as the foundation of a maritime strategy. The establishment of sea control has two critical conceptual components – ensuring one's own use of the sea and denial to the enemy of their use of the sea. If we look at transnational criminals, smugglers, pirates and environmental polluters as common "enemies", we can see a path to developing the framework for this common maritime strategy starting to emerge.

In the maritime domain this immerging strategy requires an understanding of time, space, risk, oceanography, the global supply chain, critical infrastructure and the environment, as well as an understanding of the nature of the risk, and the capabilities, readiness and location of multi-agencies assets capable of responding to or assisting with risk mitigation efforts. The repeated outgoing message from annual maritime security roundtables and conferences such as the CJOS COE Maritime Security Regimes Roundtable, held annually in April in Norfolk, VA and the USCG's Maritime Risk Symposium, held annually in the fall is that the maritime community needs better cooperation and situational awareness between key stakeholders and regimes (merchant shipping community included) as the first critical step in widening the path to success.

Security in the global maritime commons is not a given. Without a comprehensive, shared understanding of what is occurring in the maritime domain, achieved through Maritime Situational Awareness (MSA), vital opportunities to detect and mitigate threats or critical vulnerabilities at the earliest opportunity may be lost. A comprehensive MSA network is required to facilitate information sharing and can only be established with the cooperation of law enforcement, military forces and the international maritime transportation industry.

The lack of modern and agile global and regional governance structures has generated friction between the globalized corporate sector, maritime authorities and policy-makers that undermines the maintenance of relationships necessary to enhance. In an increasingly interconnected, inter-dependent and rapidly changing globalized world, there continues to be an absence of persistent relationships between the ever-increasing number of key stakeholders in the global maritime community of interest. Operating according to disparate mandates, objectives, areas of responsibility and jurisdiction, there is an obvious need to develop a shared network and develop a collaborative contribution to achieve a comprehensive MSA capability in which all stakeholders' requirements are met and enhanced. Consequently, the Combined Joint Operations from the Sea Centre of Excellence is acting with key partners, such as the United States Coast Guard and State University of New York, to advance the interests of the maritime community and to promote information exchange and networking across all stakeholders through discussion at venues such as the Maritime Risk Symposium and the Maritime Security Regimes Round Table.

There is important work to be done by all. Operating within this shared network is invariably more challenging than acting independently; this is exacerbated by the complexity and sheer volume of information being processed. A lack of common tools and vernacular in which stakeholders operate makes the need for standardization critical; however, adapting policy, tools or operating procedures takes commitment, effort and investment. There are naturally certain national and commercial barriers to overcome, but generating confidence and trust among members through dialogue and persistent partnerships, over time, will facilitate the necessary cooperation.

In the words of former US President Barack Obama "if you are walking down the right path, and you are willing to keep walking, eventually you'll make progress."

THE 10TH ANNUAL MARITIME RISK SYMPOSIUM
is scheduled for November 13-15, 2019, at SUNY Maritime in New York.
www.sunymaritime.edu

1 Wylie, Joseph Caldwell , "Military Strategy – A General Theory of Power Control", Annapolis, MD: Naval Institute Press, 1989

Tom Ewing
Tom Ewing is a freelance writer specializing in energy and environmental topics. He has been a regular contributor to New Wave Media publications for the past two years. He has extensive experience working on legislative and public policy issues, both at the state and federal levels.

Regulatory "Takes" – Take a Close Look

On April 30 the National Oceanic and Atmospheric Administration (NOAA) published a notice, requesting public comments, on a proposed "incidental harassment authorization" (IHA). An IHA is a legal and enforceable document presenting the terms and conditions with which a company must adhere in order to protect wildlife. In this case, the draft IHA was for Vineyard Wind, the wind energy company ready to start construction on an 800 MW offshore wind farm in the Atlantic, covering about 675 square kilometers, starting 14 miles from the coastline of Martha's Vineyard. This would be the first large-scale, ocean-based US wind energy project, consisting of up to 100 wind turbine generators (WTG), an onshore substation, offshore and onshore cabling and onshore operations and maintenance facilities. Water depths are between 37-49.5 meters (121-162 feet).

An IHA is required by the Marine Mammal Protection Act (MMPA) because, obviously, a huge project like this has impacts and it's likely that "take" of marine mammals will occur during construction. "Take" is an interesting word within this regulatory specialty. It can mean anything from killing or wounding an animal to "harassment" – of which there are two Levels – A and B. Level A harassment has the potential to cause injuries; Level B has the potential to disturb, but not directly injure, a marine mammal or stock, e.g., migration, breathing, nursing, breeding, feeding, or sheltering. Vineyard Wind, and National Marine Fisheries, do not expect the project to cause mortalities or serious injuries; hence, the "harassment" filing is deemed appropriate.

For maritime companies experienced with ocean energy projects, such as oil and gas, these are not new concepts and regulatory demands. The MMPA was passed in 1972 and updated over the last 47 years.

Along the Atlantic, however, there is no ocean-based energy construction industry comparable to, say, the Gulf Coast. For many east coast maritime companies curious about bidding on offshore wind contracts this is new. Indeed, creating business and employment opportunities is a central goal among east coast governors who want people to get on this band wagon. New opportu-

nities are great, of course, but offshore wind is still set within well-established and complex regulatory and enforcement regimes. For companies looking to move into the energy field, there are lessons within Vineyard Wind's incidental harassment authorization; those lessons deserve a close look.

The Marine Mammal Protection Act requires exacting teamwork between a company in receipt of a "take" permit and the project's contractors and subcontractors. This is not a workspace that can tolerate a casual attitude.

An approved IHA will offer a "safe harbor," if you will, to Vineyard Wind for unavoidable takes of marine animals. But how far does that safe harbor provision extend for a contractor? How is liability affixed if Vineyard Wind does everything right, but a novice contractor does something wrong, not intentionally, but nevertheless, something that shuts down the project? Does Vineyard Wind's IHA serve as an umbrella, providing cover for everyone who's hired, or does it just cover Vineyard Wind's operations and personnel?

The answers are, well, complicated. Not straightforward. Labyrinthine. Each case is unique.

If you want to move your company into emerging offshore wind projects, invite your maritime attorney to lunch, now. Hopefully, based on his or her counsel, your next steps will be clear and decisive. In general, though, the bigger picture is harder to bring into focus.

The primary concern within Vineyard Wind's IHA is controlling and attenuating noise and related acoustical repercussions from pile-driving, installing the vertical infrastructure to support wind towers. These sounds impact numerous species – whales, dolphins, porpoises and seals. Some of these animals – the North Atlantic right whale, for example – are among the most protected classes of wildlife.

For North Atlantic right whales, again, as example, the IHA requires "enhanced clearance measures," including extended clearance zones, that must be monitored. If a right whale is detected, pile driving must be delayed, and not resume until the next day, or surveys "confirm all right whales have departed" the clearance zone. There's no room for error. The IHA proposes that zero North Atlantic Right Whales can be subject to Level A harassment, while 20 can be subject to Level B. That's during the entire IHA timeframe, around one year, presumably to start in 2020. The stakes are high. Wildlife experts write that in the last two years at least 20 right whales have been killed and the population is now estimated to be no more than 420 individuals.

In contrast, thirty-five Common Dolphins can be subject to Level A and 4,646 to Level B. Still, if dolphins are nearby, work must stop. It can restart when the mammal "has voluntarily left the respective clearance zone and been visually confirmed beyond that clearance zone, or, when 30 minutes have elapsed without redetection."

Note the reference to "visually confirmed." All vessels in the ocean work area will be required to employ PSOs – "protected species observers." Crews are required to have specific training in wildlife avoidance, which has to be documented and reported. If take occurs beyond what the IHA allows, that negligence may result in IHA "modification, suspension, or revocation." For work to restart, depending on circumstances, an evaluation is required for each pile, not the entire work zone. The point is, a company may originally commit vessel and crew for two days or two weeks or two months; actual demands may be far different.

Jolie Harrison is NOAA's Chief of the Permits and Conservation Division within the Office of Protected Resources. When asked about IHAs and liability issues, Harrison explained, in an email, that –

"An IHA limits liability of the IHA holder (and potential designees) for the take described in the authorization resulting from activities described in

For maritime companies experienced with ocean energy projects, such as oil and gas, these are not new concepts and regulatory demands. Along the Atlantic, however, there is no ocean-based energy construction industry comparable to, say, the Gulf Coast. **For many east coast maritime companies curious about bidding on offshore wind contracts this is new.**

© Luna Vandoorne/Adobe Stock

the authorization, provided required mitigation and monitoring measures are implemented."

She said that work that is delegated – say, in this case, by Vineyard Wind to a contractor – becomes a shared responsibility between the two companies to ensure compliance which then limits liability. Importantly, the IHA holder and the contractor could be held liable for "any take not in compliance with the specific authorization."

A basic "take" concept is that an event can be considered an accident only if a company can document that it has done everything possible to avoid an accident.

NOAA was asked what happens if a contractor's vessel strikes, say, a whale, injuring it or, worse, killing it. In a way, that's a naïve question. Maritime managers likely know, NOAA explains, that "only the US Navy is authorized for the mortal take of whales from vessel strike off the East Coast" (but that does not include right whales).

Again, NOAA considers it generally "unlikely that 'normal' vessel operation will result in marine mammal take, and NOAA Fisheries does not advise operators conducting 'normal' vessel operations to request incidental take authorization." NOAA does recommend –

"that vessels operating a fairly high-energy underwater sound source (such as seismic airguns, tactical sonar, sub-bottom profilers, or multi-beam echo-sounders) or towing gear that could cause entanglement or injury request incidental take authorization."

Finally, Harrison advises that "each project is different, so NOAA's Permits and Conservation Division is available to answer questions about specific activities and provide case-specific input."

Questions about vessel strikes, though, are hard to tamp down. True, under "normal" conditions a strike may seem unlikely. For an animal, though, pile driving may prompt careless, reckless, panicked behavior. Flight could be directly towards an incoming supply vessel properly transiting, at a speed set within the IHA, an approved shipping lane. In comments to NOAA, a group of conservation and environmental groups reference the concern that federal agencies have not considered -

"the potential for acute synergistic effects from multiple activities taking place at one time, or from offshore wind activities in combination with other actions. For example, the agency does not consider the greater susceptibility to vessel strike of animals that have been temporarily harassed or disoriented."

Despite the presumed low risk of a vessel strike, the IHA sets demanding requirements for PSOs, required on every project vessel. Sometimes, there needs to be a PSO just to watch for right whales. If this work is similar to positions in the fishing industry, these observers are not amateurs, handed a pair of binoculars and placed on watch.

From the IHA it's not clear who has to hire the PSOs and provide their training, nor even what constitutes "training;" maybe that's a video watched during lunch, maybe it's much more substantive. Again, the concern here is that in this new business, with a public policy goal of attracting businesses, new companies will face issues that may never have been part of their maritime work experience. Are there liabilities if the training expected by Vineyard Wind – but delivered by a contractor – is deemed inadequate? (Training and PSO questions were not answered, by this report's deadline, by NOAA or Vineyard Wind.)

In comments to NOAA The Atlantic Offshore Lobstermen's Association suggests a -

"Third-party certification program, like the (federal) system used for fishery observers, which sets universal standards for all wind projects and requires reporting after each construction activity/trip."

In a new industry even old and familiar concepts can present as new. For wind developers and for people looking to work in this new energy sector, these operational questions will eventually get worked out. The first project teaches the most important lessons. Pay close attention if you cast off into these waters.

Ulstein Verft AS

Expedition Cruisers Power Ahead

While nothing lasts forever, the cruise industry – and particularly the 'expedition' cruise sector – remain on a historic run with no indication of a near-term slowdown.

By Barry Parker

The leisure travel sector, of which expedition cruising is a part, offers numerous possibilities for delivering new "experiences" unlike industrial shipping businesses (or even conventional ferry and passenger transport), which can only grow as fast as the demand in a particular sector.

Though there is no precise definition of "expedition", the ships are smaller than mainstream cruise ships, usually carrying less than 300 passengers, and the destinations are well off the beaten path, more exclusive and generally devoid of the traveling masses.

The influential Virtuoso Luxe Report identifies ongoing industry trends and for 2019 it notes that luxury travel, generally, will be "…highly personalized and inspired by a desire to experience new destinations in unusual ways."

Expedition cruising is at the leading edge of this trend.

Much of the attention goes towards the high-end marketplace (where well-heeled travelers may endure harsh conditions, or not, but always with creature comforts), though, technically, "Expedition" is not synonymous with "Luxury". The fleets may be found within larger corporate structures, or may be operated through brands focused specifically on the sector. From a vessel design perspective, maneuverability and the ability to navigate in special conditions are paramount. The design of the ship is always linked to the passenger experience and the destination's parameters. Because the destinations, are often environmentally sensitive, building sustainability into vessels is crucial. Attention to sustainability also plays well with branding and brings marketing appeal to higher end audiences.

Celebrity Cruises, part of the Royal Caribbean family, made a commitment to the sector early on with its 2,842 gt Celebrity Xpedition (built 2001 at Cassens in Emden, Germany, acquired by Celebrity in 2004, and refurbished in 2018). Described variously as a luxury yacht, the 2001 built vessel has operated on itineraries serving the Galapagos Islands.

Celebrity has recently put its Celebrity Flora, 5,739 gt, newly delivered from Rotterdam's De Hoop yard, into a year-round Galapagos Island service. Patrick Janssens, CEO of De Hoop, told Maritime Reporter: "We are active in the expedition marketplace for several years now. For us it was a logical step after the experience with the more complex offshore vessels and other vessels for more specialized and extreme environments and building many smaller cruise vessels (up to 200 passengers) for years, in an expedition ship those two disciplines are combined. Also the size of our yard and its facilities and organization is very suitable for this type of vessel. We are fortunate to have various requests now coming in and happy we have the possibility to build such special vessels."

Illustrative of the "built for purpose" nature of the expedition ships, Celebrity says: "…This is the first ship of its kind to ever be designed and built specifically with the destination in mind."

Most noteworthy is the vessel's deployment of Dynamic Positioning System instead of anchoring, with aim of protecting sensitive corals and rock formations. Janssens pointed to the yards

experience with other vessel types: "De Hoop has many years of experience with DP vessels, we have been building them since the early eighties. The DP system is similar as the ones used in the offshore sector, where there are high demands (close to oilrigs, etc.). We have a DP system with Navis this time."

To propel the vessel, the builders selected Steerprop, based in Rauma, to provide two contra-rotating propulsors (CRPs), each 1450kW. Jussi Tarvairen, Steerprop's Sales Manager, said: "Expedition cruise vessels like Celebrity Flora are a growing segment, and our propulsion technology and special expertise are perfect for sensitive environments and ice classes."

He stressed the importance of the propulsors' hydrodynamic qualities with a specially engineered underwater body, and added that: "Noise levels and vibrations are extremely low, which was vital for this particular vessel. In addition, CRP provides outstanding maneuverability with its advanced azimuth propulsor design and excellent efficiency." All of these features are critical for "operating in strictly regulated marine environments."

Celebrity Cruise, in a release, notes: "Combined with a zero-speed stabilizer system, the DP system will choose a heading to minimize the roll and heave motions on the vessel, significantly improving passenger comfort. To achieve a high level of redundancy and to meet the Class requirements (PSMR* and DP1 / DP-AM notation), the power and propulsion plant of Celebrity Flora is duplicated and housed in two separate engine rooms."

The vessel has Steerprop azimuth thrusters and SKF zero-speed stabilizers. Two 400kW bow thrusters are provided by Veth from the Netherlands.

De Hoop explains that: "The power supply for two (CRPs), two bow thrusters and other consumers, is supplied by four Caterpillar C32 diesel generator sets," with Janssens telling Maritime Reporter that overall efficiency is enhanced because: "…we have optimized various items, hull shape, propeller design, new bow and efficiency of the whole propulsion train…". The diesel engines are fitted with SCR for nitrogen reduction, achieving IMO Tier III.

The De Hoop yard, which has built vessels for river cruising, as well as OSVs, is building another small vessel for the Galapagos to be delivered next year to boutique operator Silversea (also part of Royal Caribbean) already operating its Silver Galapagos - built 2012. The newbuild, Silver Origin, is also designed for 100 passengers (a statutory limitation for operation in the in the region). Janssens, from De Hoop said the importance of lessons learned, as it continues its foray into building for the expedition sector. "The cooperation and collaboration remains key in such projects. Communication is facilitated better also supported with IT. Also, we have made further steps in production efficiency and also we are now more able to integrate the various disciplines into the build of the vessel's sections and hull. The challenging part remains the outfitting and interior and exterior finishing, as there many wishes and demands have to be integrated with the technical vessel. We have increased our organization in this part, we have a dedicated general manager interior and exterior and a dedicated design office in which the teams work together to translate the wishes of the client and their de-

Above
Le Commandant Charcot.

Photo: Ponant/ Stirling Design International

Below
Silver Origin under construction @ De Hoop Shipyard.

Photo courtesy De Hoop Shipyard

signers (on-site) into the vessel."

Out in the Cold

Cold weather destinations are a major province of expedition vessels. Stalwarts such as Lindblad National Geographic have journeyed into frigid waters with vessels described as ice strengthened. For example National Geographic's Explorer (DNV Ice IA on the vessel's forward hull, approximately equivalent to PC7) originally built for Hurtigruten in 1982, as Midnatsol. Hurtigruten is now deploying its hybrid powered 530 passenger Roald Amundsen, with initial itineraries along the Norwegian coast.

But now, there have been recent strides as ship operators are building vessels for transits in actual ice. The first PC6 vessel, allowed to operate during summer/autumn in first year ice, will be Crystal Cruises Crystal Endeavor (20,000 gt), to be delivered in summer 2020 from the Stralsund yard, a sister company to Crystal (under the Genting umbrella), for itineraries that will include the Arctic (via the Northeast Passage) and the Antarctic (Ross Sea). The design concept for the vessel came from Foreship, a naval architect well known to cruise operators.

Ponant is privately owned, with its largest shareholder being the Pinault family (an important name in French luxury brands); previously the family behind container shipping behemoth CMA – CGM held a large stake. With a dozen vessels (including the newbuild Le Commandant-Charcot, named for a French explorer) with up to 132 staterooms, its destinations include the Mediterranean and Europe, but also the Antarctic, Greenland, Iceland and Alaska (via the Northwest passage). The newbuild vessel to be built to stringent PC2 standard (year-round operation in moderate multi-year ice), set for delivery in 2021 from Vard's Tulcea yard, will initially explore the Antarctic, with an intention to explore the North Pole, in the future. Ponant stresses the "hybrid" vessel's sustainability, with reduced emissions because of LNG propulsion and zero emissions when using battery power.

Ulstein Verft, in western Norway, is now building Endurance, classed as PC 5, for National Geographic. Delivery of the vessel, with the "X Bow" (familiar from the OSV trades in harsh environments), is set for 2020.

Tonje Øyehaug Ruud, from the Ulsteinvik-based yard, said to Maritime Reporter that "our initial idea entering into the market with expedition cruise vessels was that the ULSTEIN X-BOW, designed, built and tested on many offshore vessel operation in areas with extreme weather, was very suitable for passenger vessels intended to cross areas like the Drake Passage and the Norwegian Sea due to the reduced motions an accelerations given by this hull shape leading to increased comfort and safety. The Ulstein X-BOW has also an advantage in cold areas due to the fact that spray from the bow is reduced and by that the risk of icing is reduced."

The yard explained the power arrangements to Maritime Reporter, saying: "The vessel is equipped with four main engines from General Electric, each connected to a generator from ABB. Each engine room has an installation of one engine of 3,150 kW and one of 2,250 kW. The main propulsion is provided by 2 azipods from ABB each with a capacity of 3,500 kW and strengthened according to DNV-GL class notation PC(5) requirements. The vessel boasts two tunnel thrusters (on the bow) from Brunvoll for redundancy purposes during berthing. Each of the thrusters has a diameter of 2000 mm and a rating of 1000 kW."

Ruud noted that the ABB azipods provide a great deal of maneuverability, eliminating the need for stern thruster, adding that: "The vessel is equipped with two stabilizers, one on each side, from SKF. The stabilizers can be used both during transit and at zero speed."

She said "The vessel is equipped with a "DP light" system compared to the most advanced offshore vessel. A joystick system, providing virtual anchoring functionality allowing automatic course station keeping, is installed."

Silversea, the RCCL brand, also brings travelers to the Antarctic and other regions requiring ability to navigate in ice, on its Silver Cloud. The 2017 refurbishment, undertaken at Palumbo yard (in Malta), brought the vessel up to the elevated Polar Code standards where vessels must be configured for their intended service. The hull of the 1994 built vessel (the original vessel in the Silver-

Above
Celebrity Flora.

Celebrity Cruises

Below
PONANT vessel
Le Champlain.

Photo: Ponant / Mike Louagie

sea fleet) needed to be ice strengthened with additional plating, and a bulbous bow was installed.

Seabourn, a luxury offering in the Carnival family, is building two Expedition style vessels, with PC6 designation, for voyaging in ice-bound waters. Seabourn Venture, under construction at the T. Mariotti yard, in Genoa, is scheduled to launch in June 2021, with the sister ship, so far un-named. set to launch a year later.

In design of Expedition vessel, redundancy is key. Ruud, from Ulstein, comments that: Two GE engines are installed in each of two engine rooms for redundancy purposes, and according to Safe Return to Port requirements. Other design tweaks are also needed. Capacity for fuel, water and storage of provisions must consider the logistics of voyages far from readily available replenishment. HVAC design must consider the extreme cold (or heat, for tropical itineraries). Access to varied watercraft that passengers (usually accompanied by specialized naturalist guides) can board for close-up exploration is an important design consideration. Celebrity Flora, borrowing a page from megayacht design, employs "Novurania" yacht tenders that are deployed from a platform accessible by a staircase at the vessel stern. The Seabourn vessels, still under construction, will utilize shell doors at the waterline to provide access to Zodiac rafts. Silver Cloud's refit also included special loading platforms, cranes and floats for Zodiac rafts used by passengers, a feature throughout the sector. But, as the expedition bar is raised- with travels to new depths- there is a new consideration; the two Seabourn newbuilds and Crystal Endeavor will be providing special access for mini submarines, as the operators provide yet more in the way of new experiences.

Celebrity Flora Technical Specs

(Source: De Hoop Shipyard)

Principal particulars

Length, o.a.	101.5 m
Length, bpp	97.43 m
Beam, molded	17 m
Depth, molded (maindeck)	6.5 m
Draught, molded	4.5m
Propulsion power	2x 1450 kW
Bow thruster power	2x 400 kW
Speed, max	14.5 knots
Deadweight (T = 4.5 m)	1200t
Gross tonnage	5922t
Passengers	100
Passenger suites	50
Crew & Personal suite attendants	80
Crew & Personal suites	52

Tank capacities

Fuel oil	255 cu. m.
Fresh water	175 cu. m.
Sewage grey	150 cu. m.
Sewage black	45 cu. m.
Treated water holding	140 cu. m.
Urea	16 cu. m.
Water ballast	530 cu. m.

Classification

Lloyd Register of Shipping

100A1, Passenger Ship, *IWS, ECO (BWT, IHM, OW, P, SEEMP), LMC, PSMR* UMS, DP(AM), NAV1, PCAC 1, 3

Left:
Ron Baczkowski,
President & CEO,
VT Halter Marine.

Above:
Q-LNG's 4,000 cbm
ATB Bunkering barge in
production

Photos: VT Halter

BACZKOWSKI

VT Halter in Pascagoula, MS has been on a strong run, capped by its winning the high-profile contract to build the U.S. Coast Guard's next generation of icebreakers. Maritime Reporter recently spoke with Ron Baczkowski, President and CEO, VT Halter Marine, for insights on the shipyard's recent success and future prospects.

By Greg Trauthwein

Photo: VT Halter

Multiple projects:
Left to right – Q-LNG bunkering barge cargo discharge platforms; Q-LNG ATB Tug superstructure; Auxiliary Personnel Lighter – Small (APL(S)) Barracks barge.

Below:
Q-LNG's tug & barge.

Photo: VT Halter

Globally, the shipbuilding industry has gone through some 'interesting' times of late. How has it looked from your perspective?

The shipbuilding market and activity at VT Halter during the past 12 months has been dynamic. Commercial and government program opportunities alike, with the continued development and proposal submittals, followed by the award of the Polar Security Cutter being a highlight.

How does it look for the coming 12 months?

We are encouraged by the outlook for our government and commerce opportunities in the coming year.

How has your company invested in its yard(s) over the past year?

Over the past 24 months, we have invested heavily in our capital improvements, employee training, environmental improvements and engineering. We are committed to continuous process improvements. We are currently upgrading our structural fabrication work stations to replace old outdated equipment with new equipment for steel panel line fabrication, this includes one-sided steel plate welder, structural profile fitter with automatic weld tacking station and automated eight head profile weld station. This will allow us to improve quality of our products and production efficiency by up to 35 percent at these work stations.

New in 2018, VT Halter Marine debuted the blast and paint facility, a cutting edge, enclosed building that allows our crews to work in any weather conditions while in an environmentally safe atmosphere. The facility is also designed for 24/7 operation in all weather conditions, and uses 100 percent LED lighting to reduce energy consumption and carbon footprint.

VT Halter recently won one of the most coveted shipbuilding contracts, the deal to build the U.S. Coast Guard's Polar Security Cutters. Please give a statement on the importance of this contract to your shipyard.

The USCG Polar Security Cutter project is a great opportunity for our shipyard the local community, the state of Mississippi and the U.S. We are already in the design phase, and gearing up for the program, with all of our employees doing their part and getting ready. We are hiring 900 new jobs, which will more than double our workforce, and every job we add supports our local economy. We are proud to have been selected for this program, which is necessary to meet national defense and homeland security mission demands.

Who do you count as key teammates to bring this

project from inception to finish?

VT Halter Marine is teamed with Technology Associates, Inc. as the ship designer and, for over two years, we have participated in the U.S. Coast Guard's Heavy Polar Icebreaker Industry Study. The ship design is an evolution from the mature "Polar Stern II" currently in design and construction; the team has worked rigorously to demonstrate its maturity and reliability. During the study, TAI incrementally adjusted the design and conducted a series of five ship model tank tests to optimize the design. In addition to TAI, VT Halter Marine has teamed with ABB for its Azipod propulsion system, Trident Marine for the Machinery Control and Monitoring System, Raytheon for command and control systems integration, Caterpillar for the generator sets, Jamestown Metal Marine for joiner package, and Bronswerk for the HVAC system. The program is scheduled to bring an additional 900 skilled craftsman and staff to our Mississippi-based shipyard.

How does this project differ from others you have run through your yard?

Size- and capacity-wise, the Polar Security Cutter program is similar to the previous programs such as the Crowley Con-Ro and the PASHA car carrier.

What is the timeline to design, build and deliver this ship?

We are currently in the design phase, and construction is set to begin in early 2021. Final delivery is planned for mid-2024.

How is the shipyard investing to accommodate this specific project?

We are expanding our Pascagoula shipyard. We are upgrading our side launch facility for the Polar Security Cutter and upgrading a second NC plasma cutter for beveling of thick plates. We are adding a robotic plasma shape cutter, robotic welder micro-panel fabrication line, robotic welders to the assembly lines and adding four 60-ton overhead cranes in the assembly bays.

Discuss if you will your business management philosophy, and discuss the key to running a successful, profitable U.S. shipbuilding business today.

Our most valuable asset is our people. We are committed to hiring the brightest and most capable engineering and office staff as well as skilled and dedicated craftsmen and women. VT Halter has a continued commitment to protecting the environment, which is why we created the Blast and Paint Facility. It has attracted the attention of many companies in the shipping industry because we all are committed to working safely and with a finely attuned dedication to being environmentally sound.

Recent Activity at VT Halter

Contract awards:

(1) U.S. Navy Polar Security Cutter
U.S. Navy CHAMP program
(3) U.S. Navy Auxiliary Personnel Lighter
(1) ATB Tug
NAVSEA T-AGS 67 Oceanographic Survey Vessel study
(2) Logistic Support Vessels - Undisclosed
(1) Q-LNG – Offshore U.S. flagged, Jones Act compliant
4,000cbm LNG bunkering ATB barge
(1) Q-LNG – Offshore ATB tug
NOAA NAV AGOR study

Vessel deliveries:

Crowley Maritime Corp's M/V Taino
Crowley Maritime Corp's M/V El Coqui
Bouchard Transportation's M/V Evening Breeze
Virginia Department of Transportation, the Jamestown Ferry
(scheduled delivery Sept. 2019)

Photos: Nakilat – Keppel Offshore & Marine Ltd. (N-KOM)

Nakilat – Keppel Offshore & Marine Ltd.

"Green Refits" drive business

Since it was founded, N-KOM has completed almost 1,000 marine and offshore projects, with a significant number of drydocking and repairs undertaken for various types of vessels including LNGc, LPGc, VLCCs, oil/chemical tankers, cargo ships, dredgers, offshore support vessels, to name a few.

The shipyard's facilities include three VLCC sized docks (two graving docks and one floating dock), berthing capacity of 3,150 meters, specialized workshops and cryogenic cleanrooms, enabling it to handle repairs and maintenance for all types of marine vessels and offshore structures.

The year 2019 has been a busy year for N-KOM, as the shipyard observed a 50% increase in volume for ship repairs in comparison to the same period last year.

Over the recent months, there have been strong demand from the market for the installation of scrubbers, fuel systems modification and ballast water treatment systems, to be in compliance with the new IMO regulations that will be enforced soon. The yard expects strong interest for scrubber retrofits throughout the year of 2019.

Following the winning of a competitive bid last year, N-KOM has completed the installation of several in-line type scrubbers and ballast water treatment system retrofits for the first four in a series of seven VLCCs.

The remainder of the vessels in this contract are scheduled for a similar program of green system retrofits and drydocking repairs throughout the rest of this year at N-KOM. Major repairs

are also in progress for a cutter suction dredger from DEME (Belgium), comprising of spud, anchor boom lifting and repairs, steelworks as well as repairs of spud doors, suction mouth, cutter ladder, spud clams and piping systems, and other general drydocking repairs.

Drydocking and general repairs for vessels such as LNG and LPG carriers as well as tankers and VLCCs are most commonly carried out at N-KOM throughout the year. More recently, the shipyard completed major side shell steel repairs for a Japanese-owned LPG carrier and deck steel repairs for a Greek cargo vessel.

The yard will also be retrofitting three ballast water treatment systems onboard two LNG carriers and a VLCC during the month of August, in addition to other drydocking and general repairs during the repair period.

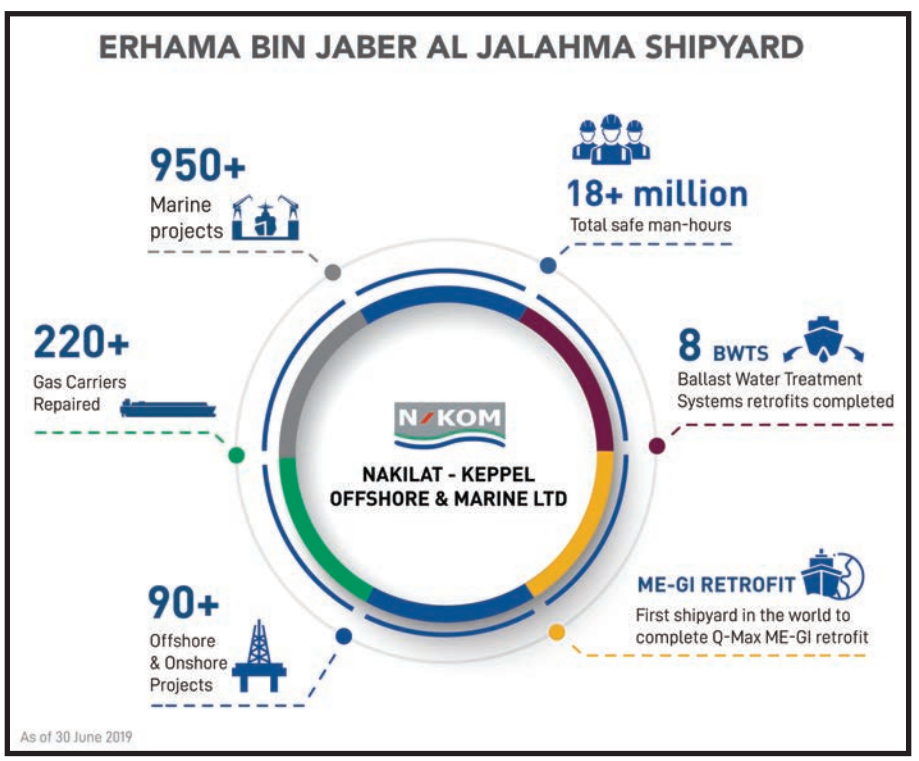
While there have been a number of interesting jobs coming into the yard, receiving its first floating storage regasification unit (FSRU) repair project earlier this year was a significant milestone for N-KOM.

Owned by Excelerate Energy (USA), the 138,000 cu. m. FSRU Excelerate underwent several modifications and retrofitting of new systems, including the installation of a ballast water treatment system (BWTS).

To date, the shipyard has completed eight such BWTS installations for various types of vessels such as LNG and LPG vessels as well as very large crude carriers (VLCCs).

N-KOM recently signed an agreement with STX Korea which is now stationed in the shipyard to provide special attendance for engine and auxiliary maintenance work on vessels during anchorage and in voyage.

Given N-KOM's strategic location in Qatar, the world's largest exporter of LNG, the shipyard has a long track record for gas carrier repairs. Since operations began in 2011, N-KOM has completed in excess of 200 LNG carrier routine drydocking and repairs at its facility, including retrofits of specialized systems such as the Ballast Water Treatment System (BWTS) and the world's first ME-GI conversion onto a Q-Max LNG carrier, the largest type of LNG tanker.



RMK Marine Targeting the *"Next Wave of Tanker Demand"* in 2021-22

RMK Marine Shipyard is located in the Tuzla/Istanbul, Turkey, since 1997 as part of the Koc Group of Companies (https://www.koc.com.tr/en-us) which is Turkey's biggest conglomerate. It specializes in shipbuilding as well as super/mega yacht refit, conversion and new building projects.

On the shipbuilding side, specialty, high-temperature product tankers, such as asphalt and bitumen, as well as chemical and oil products tankers have been a staple of RMK Marine. Since 1997, RMK Marine has involved in many turnkey tanker building projects starting from the design and procurement phases through the delivery with a reference list of 23 tankers. Most of them have been configured with different types of equipment and cargo area based on the specific requirements of each project. In addition to tankers, the shipyard has had good success in the workboat sector, including tug boats, pilot boats, service boats and mooring boats.

"In the last 12 months, we delivered two tankers. In addition to that, it is planned to deliver two tankers and one tugboat by the end of 2019," said Gürkan Türkeş, Director, Business Development and Project Management Affairs. This is significant as the delivery of five vessels in this time period is a record for RMK Marine. While the yard has enjoyed this record run, it eyes the future with caution. "Generally speaking, the global market conditions for the short and midterm are still cloudy," said Türkeş. "When we analyze the market data about the global fleet and their ages, we see that the big wave of demand will most probably occur again in 2021-2022 in the scale of average 7K dwt tankers as it happened between 2004 -2006 according to the cyclic characteristic of the market."

"When we analyze the market data about the global fleet and their ages, **we see that the big wave of demand will most probably occur again in 2021-2022** *in the scale of average 7K dwt tankers."*

Gürkan Türkeş, Director,
Business Development and Project Management Affairs

Recent Success

During the last five years, RMK Marine has achieved "remarkable success" by signing contracts for seven tanker building projects. "Five of them have already been delivered while we have been continuing the building activities of two other vessels in accordance with the contractual building schedules," said Türkeş. "Three of them are asphalt/ bitumen tankers while other four are chemical/oil products tankers. "It is also worth mentioning that RMK MARINE had built two asphalt/bitumen tankers, each with 19,900 dwt deadweight and which are considered as one of the biggest and most advanced tankers in their segment globally."

"In the chemical/oil products tanker segment, RMK Marine is one of the most capable and skilled yards regarding to the design and building of the high spec cargo tanks of marine line coated and stainless steel," said Türkeş. "One of the last examples of RMK Marine portfolio is the high spec NB 114 Chemical and Oil Products Tanker which will be delivered just before the end of 2019. She has 16 Marine Line coated cargo tanks, a two-stroke ME equipped with SCR and hybrid Scrubber equipment to comply with the IMO Tier III NOX criteria and IMO 2020 SOX cap respectively. Other relevant equipment, such as diesel generator sets and thermal oil boiler are also considered to be integrated to the emission control systems."

The company signed a contract in mid-2018 with a local client for building of two 70-ton BP Harbor tugs which are going to be delivered in the first and second quarter of 2020.

A particular point of pride for the shipyard was the delivery in May 2019 of T. Adalyn, a 15,000 dwt Asphalt/Bitumen and Oil Products tanker. "The special

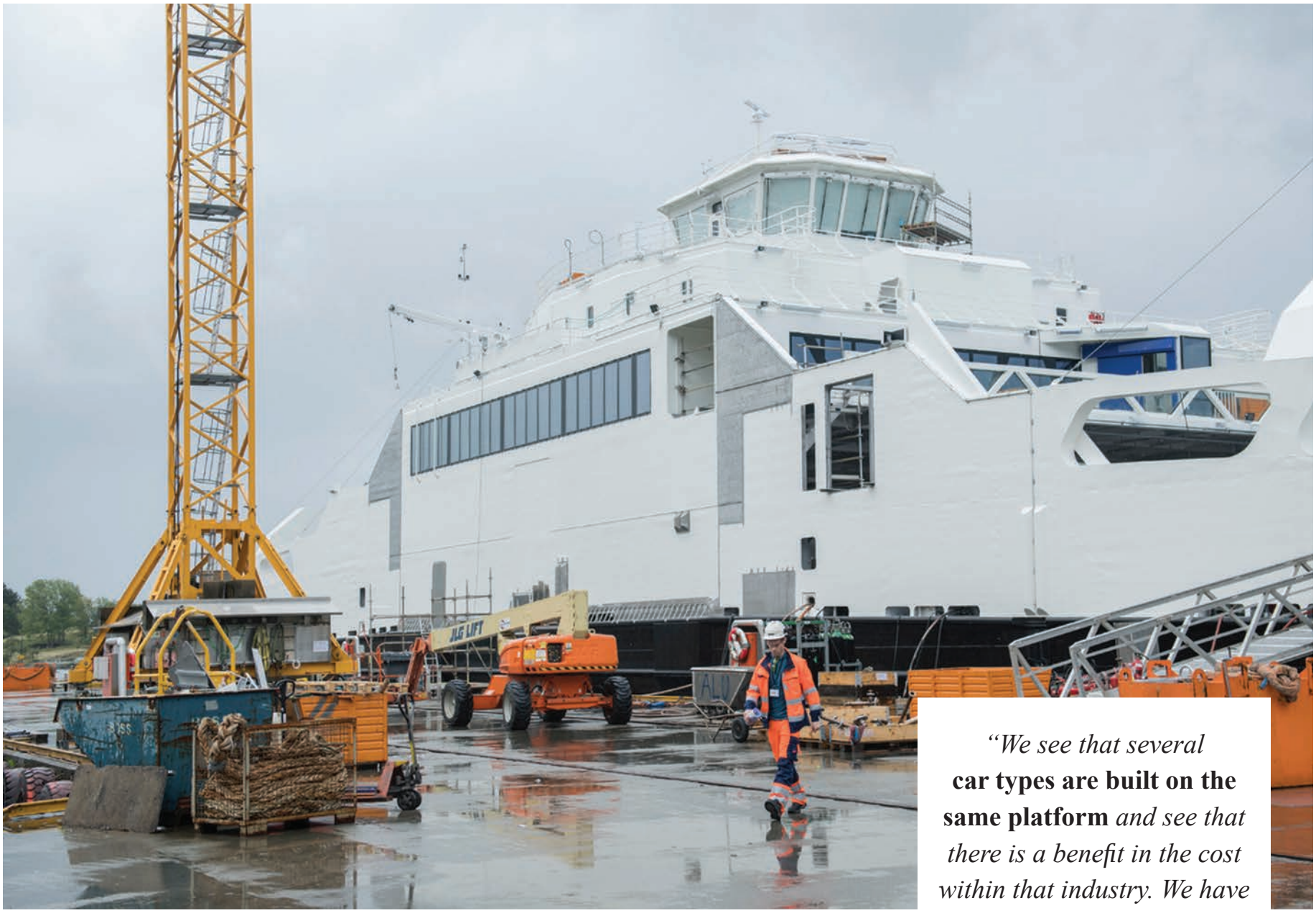
Left:
The RMK Marine shipyard.

Right:
Launched on June 12, 2019, Cosima PG is being built for a European client, to be delivered in November 2019.

Photos: RMK Marine

point about her is that the floating cargo tanks were built, installed and completed in house at RMK Marine despite the first planning which envisaged these steps to be realized outside RMK Marine, by taking into account the previous asphalt/ bitumen tanker projects due to the reason of workload planning," said Türkeş.

As with any shipyard, RMK must invest to stay abreast of evolving shipowner needs. "RMK Marine has recently made two important investments after two years of planning," said Türkeş. "One of them has been performed on the ERP system in order to upgrade the existing version and make it fully integrated into the processes of all departments. The other one has been done on the steel production processes starting from the steel plates and profiles depot areas to the end point of block building just before lifting them onto the slipway for erection works. The goal of this investment is to increase the competition power of RMK Marine by increasing the efficiency of the steel production processes."



"We see that several **car types are built on the same platform** *and see that there is a benefit in the cost within that industry. We have no reason to believe that this should not be the case also within the maritime industry."*

Edmund Tolo,
Fjellstrand's head of R&D

Photos: Courtesy Fjellstrand

Norway's Fjellstrand Shipyard

Rewriting the Shipbuilding Book

As maritime digests a number of historical changes, Norway's Fjellstrand shipyard wants to put aside the rule book and look at the whole process in a new way, reducing engineering costs up to 70% and production costs up to 20%.

The process of designing and building a ship, even in today's highly standardized mass manufacturing environment, remains largely a one-off, one-of-a-kind design and build. Ships are most often built to a shipowner's or operator's specific requirements, which are often based on fixed parameters such as speed, fuel consumption, route and cargo or passenger capacity.

Blueprints are created, detailed plans are approved by a classification society, financing is secured and building is started, block by unique block.

Fjellstrand is part of the EU-funded Transport: Advanced and Modular (TrAM) Project, which is coordinated by Rogaland County Council through its transport company Kolumbus. The $13.2m project initiated by industry cluster NCE Maritime CleanTech aims to build what would become the fastest battery-powered, zero emission, high-speed aluminum ferry, building on a growing level of zero-emission competence in Europe while at the same time reevaluating the actual design and build process.

The Modular Approach

Taking "the airline approach" is a mantra heard in maritime circles often, globally, as the airline industry is seen as the de facto "standard in standardization" in many regards. So, what if shipbuilding could emulate some of the advances seen in airline construction or even car manufacturing? What if the modular approach, where core components or central frames that are constant across a range of models while other variable components or systems can be selected depending on changing demands?

As much as the TrAM project is about building a high-speed clean ferry, it is also about building a process template that can then be copied for other vessels. The project will develop three distinct uses for a zero-emission aluminum ferry: one for European inland waterways another for a London city Thames commuter ferry and the first vessel, to be built to serve a community near Stavanger from 2022.

All three have different speed, depth, passenger capacity and range and noise requirements, but all three have identical design features. A shipyard might elect to go through the same traditional design process for all three ferries, but what if the only things that were changed in the design systems arrangements of the vessels, were those that needed to be changed?

Nearly all modern vessels are designed with their operation in mind said Dr. Christoph Jürgenhake, group manager at German Fraunhofer Institute for Mechatronic System Design IEM, one of the TRaM consortium members. Fraunhofer IEM is an application-oriented research organization. Its focus is on how objects and systems, including manufacturing processes, work … and work better. Its staff, with experience in aviation and car production, can look at the top-level requirements of a vessel, or car, and then how different building process parameters can be impacted. In TrAM Fraunhofer IEM is taking the lead in assessing how engineering planning and construction methodologies can be improved to reduce costs and time. This is the crux of this part of the project: To determine how to create a modular approach to shipbuilding that create significant savings by enabling engineering and production to be replicable and modular. Dr. Jürgenhake said that project's objective is to find the key part of the design that is common to all these three possible designs and then build modules up for there. By borrowing this approach from car and airline makers, the aim is to have set of designs that can still be tailored for operational needs. For example, he notes that VW uses a central module in the chassis around which many different models can be built. "It is a new way of thinking for shipowners and operators. They need to look at the total lifecycle cost when looking at the system design options," said Dr. Jürgenhake.

While the TrAM Project has yet to find an ideal design, initial sketches suggest a twin hull catamaran.

For Fjellstrand shipyard, this modular approach could help them in a challenging shipbuilding market where reducing costs remains a priority. "Of course, there is the reduction of labor cost if any of the processes might be automated but this modular approach to design might also lead to more efficient use of materials," said Fjellstrand's head of research and development, Edmund Tolo. "We see that several car types are built on the same platform and see that there is a benefit in the cost within that industry. We have no reason to believe that this should not be the case also within the maritime industry."

If so, then other partners in the project, such as aluminum firm Hydro Extrusions, or Leirvik, a company focusing on superstructures, could create a standard module that could be used on different vessel designs, such as a deep-water high-speed ferry, or a shallow draft, slow speed, rapid turnaround vessel with larger passenger capacity. The project partners recognize that by revaluating the process of designing and building a vessel engineering costs can be cut by up to 70%, and production costs by 20%.

Diversity Drives Derecktor

Derecktor is a diverse boatbuilding organization, with a multitude of yards and long experience building hundreds of yachts, workboats and military craft. Its shipyards today include:

- Robert E. Derecktor: The company headquarters located 25 miles north of Manhattan in Mamaroneck, NY, and the original Derecktor yard. Today, the site remains as the company's new construction base, and it also provides repair services for a variety of yachts and commercial craft.
- Derecktor Robinhood: Located in Riggs Cove, Maine, Derecktor Robinhood is a full-service yacht yard and marina, offering summer slips and moorings, winter storage, yacht sales, Spartan Marine Hardware, Riggs Cove Houseboat Rentals along with the popular Osprey Restaurant.
- Derecktor Dania: A South Florida large-yacht repair facility, Derecktor Florida celebrated its 50th year in 2017. The yard caters to many of the world's most impressive power and sailing yachts in need of repairs, storage or major refits.
- Derecktor Ft. Pierce: Our newest and most unique shipyard. It will be the first U.S. shipyard designed specifically for megayachts – power and sail vessels over 200 feet and 900 tons. It will boast the world's largest mobile lift.

> *"***There is ever growing enthusiasm for green solutions in commercial vessels** *and we anticipate signing a contract for a fourth hybrid shortly."*
>
> ***Paul Derecktor,***
> *President and Chairman of the Board.*

A recent, significant project culminated in the launch of the Captain Ben Moore, a Hybrid Cargo Catamaran. "We have launched the third of our hybrid catamarans and had a tremendous response" both inside and outside of the industry, said Paul Derecktor, President and Chairman of the Board. "There is ever growing enthusiasm for green solutions in commercial vessels and we anticipate signing a contract for a fourth hybrid shortly. We are also currently repowering multiple ferries operating in NY Harbor, and the demand from this market remains strong and ongoing."

The third in a series of 65-ft. aluminum catamarans built by Derecktor and powered by BAE Systems hybrid technology, the vessel was built for Harbor Harvest, a Norwalk, Conn., based company set on changing the way fresh produce and foods are transported around metro areas. Once in service, the boat will carry goods from family farms and small producers in the region across Long Island Sound, relieving traffic congestion and reducing emissions. The vessel has a top speed of 15 knots and boasts 300-sq.-ft. of open cargo space, 100-sq.-ft. of covered space and 140-sq.-ft. of walk-in refrigerated space. Total capacity is an impressive 12,000 pounds of cargo or the equivalent of three to five full truckloads, according to Harbor Harvest founder Bob Kunkel.

In looking for opportunities for future growth, Derecktor doesn't have to look far. "The NY harbor fleet, and ferries in particular, will continue to provide work as the fleet grows and diversifies," he said. "We are also now established as a leader in the commercial hybrid market and anticipate building on that with orders for new and more varied vessels."

Capturing this business means continual investment, and in this regard Derecktor has a solid plan to continually improve its facilities.

"Along with development of a new megayacht facility in Ft. Pierce Florida, we are undertaking an improvement/expansion program in NY to meet the growing demands of the market, both in repair and overhaul for the NY harbor fleet, and in the hybrid platform we have pioneered," said Derecktor.

Left:
Derecktor's New York shipyard, the origins of the company

Right:
Derector is building the third in a series of 65-ft. aluminum catamarans powered by BAE Systems hybrid technology, a vessel built for Harbor Harvest of Norwalk, Conn.

Photos: Derecktor

Meet Paul Derecktor

Paul is the oldest son of Robert E. Derecktor, founder of Derecktor Shipyards. He studied engineering at New York Maritime College and the University of Rhode Island.

Paul has been apprenticed in every trade involved in the construction and repair of wood, aluminum, steel and fiberglass vessels. He has extensive experience in boat design and boat building, as well as fabrication methods and curing techniques. Paul was instrumental in the design and development of lighter, stiffer hull construction – development that went into the design of racing sailboats such as Boomerang, a maxi-racer with unprecedented winnings, and Stars and Stripes, the 12-meter winner of the 1987 America's Cup race.

He was a founding partner of New York Fast Ferries, enabling Derecktor Shipyards to build its first two high-speed catamaran ferries, laying the groundwork for developing Derecktor's presence in the fast ferry market. Paul has managed Derecktor's Mamaroneck facility since 1978.

Photos: Courtesy Blount Boats

@ Blount Boats, Ferries, Offshore Wind Vessels Power the Future

Founded in 1949, Blount Boats is a full-service shipyard in Warren, Rhode Island, with a customer base comprised of a variety of commercial and government entities including the U.S. Coast Guard, U.S. Army, and private and public vessel operators. Hundreds of Blount built boats have been put into service since its founding in 1949, and one of the more recent, significant newbuilds was the Atlantic Pioneer, the first U.S. Flagged crew transfer vessel for the Block Island Wind Farm.

According to Marcia Blount, President of Blount Boats since 2007, the business climate has been "excellent" over the past 12 months.

"Blount has contracts for four builds which will be delivered in 2019," said Marcia Blount, President of Blount Boats.. Recent deliveries include the Governors 1 built for The Trust for Governors Island, a ferry that began service on June 15, 2019, and will serve 400 passengers per trip between lower Manhattan and Governor's Island. Blount Boats also completed an 85-ft., triple-screw aluminum ferry boat, Isle of Fire for Fire Island Ferries – the 10th vessel built for Fire Island Ferries by Blount Boats – that was delivered on June 19, 2019 and will service 386 passengers between Bay Shore and Fire Island on Great South Bay.

When eying future opportunities, they are best described as 'blowing in the wind' as **the offshore wind farm business continues to build in the Northeast U.S. Atlantic Ocean region.** *"This market has been off to a slow start but leases have been purchased and should develop into a robust market for a variety of vessels"*

***Marcia Blount**, President, Blount Boats*

Blount is currently working on building a steel passenger/vehicle ferry for Shelter Island, NY. The 101 x 40-ft. double-ended ferry to be named Southern Cross marks the third vessel built for South Ferry. The shipyard is also building a 56-foot ice-breaking, all-welded-steel, diesel powered, double crew tugboat to be named Breaker II for the New York Power Authority. When eying future opportunities, they can best be described as 'blowing in the wind' as the offshore wind farm business continues to build in the Northeast U.S. Atlantic Ocean region. "This market has been off to a slow start but leases have been purchased and should develop into a robust market for a variety of vessels," said Blount.

GMR: Regulatory Mandates Drive Business

Gulf Marine Repair (GMR) in Tampa, FL, is a ship repair yard specializing in the repair, modification and conversion of ocean-going commercial vessels, USCG cutters and large yachts. The largest part of its business relates to Jones Act tug-barge units (ATBs) transporting refined petroleum products. GMR has four floating drydocks with lift capability from 1,500 – 10,000 tons.

According to John Gallagher, President of GMR, the market was quiet for about six months stretching the last quarter of 2018 into the first quarter of 2019, but "business has picked up in Q2 2019 and GMR is very busy now. The biggest challenge in the past few months has been where to berth the vessels coming into the yard." As any ship repair yard will attest, finding berths of future work is a good problem to have, and looking forward Gallagher is "cautiously optimistic that coming 12 months will continue to be busier due to new regulatory requirements."

Photos: Courtesy Gulf Marine Repair

"The requirement for addition of **BWTS ... has added significantly to the amount of work in the five year special survey work** *package for most ATB units. The new* **Subchapter M** *regulations are also generating more work on tugs."*
John Gallagher, *President of GMR*

While recent environmental regulation has been a big driver for yards globally, Gallagher said "the requirement for addition of BWTS ... has added significantly to the amount of work in the five-year special survey work package for most ATB units. The new Subchapter M regulations are also generating more work on smaller tugs." As in any shipyard, continual investment is needed, and GMR is no exception. GMR recently acquired its 4,500-ton floating drydock, the AW Hendry, to allow docking of the larger tug units for the bigger ATBs (over 250,000 bbl). GMR is also adding a new 10,000 sq. ft. building to expand its pipe shop and machine shop capabilities for the growing work on BWTS. Recent significant jobs include work on the MV Charleston , a 250 x 49-ft. Norfolk Dredge, as well as a number of tug/barge units, including: Moran New Hampshire (425- x 78-ft, barge) and the tug Scott Turecamo; Moran Montville (418- x 75-ft. barge); Ismas Bahia de Tampa (472- x 80-ft. barge) and the tug Betty S. Most significant was the docking of the 600-ft. container ship MV Capt David I Lyon in May-Jun, one of the largest vessels to go on GMR's Scotia Drydock. (pictured below)

SMOOTH MOVES

By Randy Manus, AeroGo Inc.

Cakewalk
A 2,998 ton megayacht is launched using air bearings.

Photo: AeroGo Inc.

Photo courtesy Aero Go, Inc.

Like the magic carpet of ancient myth, air caster technology has revolutionized the way in which heavy payloads can be moved in the most cost effective and efficient way imaginable— floating on air. Developed post-World War II by engineers at General Motors, air casters were later modified and improved for the construction of the iconic Boeing 707 in the early 1960s. Today, used in a host of industries, companies in the maritime industry are employing air casters to handle lifts from mega-yachts to massive hull sections and Z-drives.

A Primer

A form of hydraulics that utilizes air instead of fluid, air casters rely on torus bags that expand as they are filled with compressed air. As they reach their inflation limit, air begins a controlled escape and is released in a steady even flow that creates a seal with the floor and carpet of air on which the load floats similar to an air hockey puck.

The floating nature of air casters provides friction-free, omni-directional movement, which means heavy loads can be transported freely in any direction almost literally, with the push of a finger—a virtually impossible task for conventional cranes, rollers, rails, or skid beams. These capabilities meld to provide a unique system capable of moving vessels and major components during construction and repairs or for loads from 1,000 lbs. to as much as 6,000 tons.

Practical examples

For example, Z-drives, installed vertically into a ship's hull, can be challenging to install. Air caster technology allows the drive to be slid onto the vessel and then winched up into position with a precision fit. The same holds true of propeller installation, where the fit of the hub to the shaft must be exact. This is where the omni-directionality, as well as the precision lift capability of air caster systems, comes into play. The freedom of movement of the air casters provides for the precise positioning of an otherwise awkward vessel component.

Air caster technology is used extensively in Korea, moving massive hull sections where hull components are moved from where they're fabricated for positioning on the vessel's framework. Once in position, small, lightweight guides on the hull are used to pilot the precise marriage of the new section with the hull.

In the Shipyard

In July 1989, the technology was used by the National Shipbuilding & Drydock Company in San Diego, Calif., to repair the Exxon Valdez. The VLCC had sustained serious damage and required extensive work on its buckled bow. With the ship resting in a drydock, the yard turned to AeroGo technology to precisely lift a quarter-inch thick, 200-plus ton, 30 x 80-ft. hull plate under the hull and exactly align it with the ship's repaired frames.

In 2010, the largest and heaviest transformer in the world—a 700-ton, one million KVA/2000KV test reference transformer—was moved in Chanzhou, China utilizing AeroGo's air caster technology. The unit was moved via a sophisticated computer control system to synchronize the movement of two smaller transporters which together reach the total capacity of 800 tons.

More recently, a Boston shipyard needed to move a 3,200 ton mega-yacht from the structure in which it was built, down a slipway and a 30-degree left turn to line up with the drydock. Implementation of an air caster system reduced not only the time needed to build the vessel, but provided the yard with the flexibility of handling larger craft and moving them from weather shelter, down the slipway and out onto the drydock and launch it.

The cost to the yard for the air caster system was $500,000 and required virtually no time to install. That, compared to the $4 to $6 million that would have been needed to build a conventional rail system and taken at least a year to install. Should the yard ever decide to relocate or expand its operations, unlike a conventional rail system, the air caster system can relocate with them.

On-board, air caster technology is currently used to move generators, pumps and other heavy equipment, while air caster pallets are used on Trident submarines to float 1,500 lb. pallets of stores for storage between the missile bays. Limited space handled with zero friction so the pallets can be fit into the tightest space with a single crew member can move a 1,500 pallet with ease.

About the Author

*Randy Manus is a Senior Application Specialist with AeroGo, Inc., (*www.aerogo.com) *in Seattle, Wash. AeroGo manufactures heavy load equipment utilizing hovercraft technology for moving heavy, awkward or delicate loads.*

REMOTE CONTROL

Seeking a way to move industrial plant equipment (IPE) without a forklift or crane, the Industrial Engineering Department (Code 983) began researching a heavy lifting device that could be operated with a small team to increase efficiency for the workforce.

"When we're moving IPEs on the waterfront, we have to follow standard operating procedures when utilizing crane services," said Code 983 Mon Kwong. For each lift, a team would be assembled featuring seven Lifting and Handling (Code 700) personnel, two Code 900F.12 maintenance mechanics and a Code 983 engineer. A lengthy process would then begin including drafting lifting sketches, approvals being routed and coordinating the team to build a lift plan and oversee the project. In addition, lifting IPEs are considered overhead functions and take a backseat to production work, so that extends the length of time to get the job done. "We would see constant delays which cause labor-hour increases, excessive down-time, missed transportation deadlines and disruption of the entire planning process. We accomplish less work this way in the longest amount of time which is a lose-lose for everyone involved."

"We researched a device that would fit our specifications for our waterfront and we found the Hilman TK-EVO," said Kwong. The TK-EVO is a battery-operated, remote-controlled powered crawler used for heavy load transportation. With a more compact size and only weighing less than 500 pounds, the machine is able to traverse the corridors and narrow pathways with ease with an operator using a wireless hand-held controller. It can lift up to 20-ton loads by itself and up to 40-ton loads with the rear roller units that were included. In addition, the unit comes with four powered hydraulic toe jacks used to lift the IPEs and place them on the main crawler and roller units.

"We wanted to see this unit in action and see if it fit our needs," added Kwong. Hilman came into the shipyard to provide a demonstration of the equipment, the team fitting a HAAS VF-2 CNC Milling Machine onto the TK-EVO and using it to transfer the machine from the first floor to the third floor of the toolmakers building. The machine in question weighed approximately 9,500 pounds. The device handled the load and was able to maneuver onto the freight elevator and through the narrow passageways.

The entire operation was completed within four hours and only required two mechanics for fitting the machine and one operator at the controls.

Production Machinery Mechanic Ethan Holland operates the TK-EVO Heavy Lifting Device using a remote-controlled device.

Photo Courtesty Norfold Naval Shipyard Public Affairs/Hilman TK-EVO

MID-STREAM HEAVY LIFTING

All photos courtesy Associated Terminals

Associated Terminals runs an impressive mid-stream cargo handling operation on the Lower Mississippi River, unloading bulk carriers with high-efficiency cranes loading a carousel of barges. *Maritime Reporter & Engineering News* spent some time with Todd Fuller, President, Associated Terminals to discuss the operation.

By Greg Trauthwein

For those not in the know, provide an overview of the Associated Terminals assets in your New Orleans midstream cargo ops.

Associated Terminals operates 13 deep draft midstream berths and 11 deep draft fixed dock facilities on the lower Mississippi River. In conjunction with these deep draft berths ranging from Mile 56 to Mile 158, the company operates 14 high capacity, Gottwald floating cranes.

What is the value proposition to the ship owner of the midstream cargo ops?

A major benefit of midstream cargo handling is that multiple cranes can load/unload from both sides of the vessel. Basically, this type of operation allows for non-stop operations, other than some minor service and crew changes.

Unlike typical dock operations with fixed assets, a major mechanical failure does not have a significant impact to the vessel owner or shipper as the asset can easily be replaced with another asset. If storage of bulk cargoes is not necessary in the lower Mississippi River, another benefit is the cost of direct discharge to barges that are ultimately transiting inland. A typical bulk transfer to/from storage is 2.5 to 3 times the cost of handling via floating crane directly to or from barge. Floating cranes also offer the flexibility to shippers and vessel owners to capture advantages related to barge freight savings at cer-

"A major benefit of midstream cargo handling is that **multiple cranes can load/unload from both sides of the vessel.** *Basically, this allows for non-stop operations."*

Todd Fuller, *President, Associated Terminals*

tain locations and ocean vessel savings in pilotage and sailing time.

As a point of reference, can you give details/a case study of how the operation specifically works?

A typical midstream cargo handling starts when a vessel arrives at a berthing system consisting typically of 3 bow buoys and 2 stern buoys. The vessel will drop its anchors and utilize its mooring lines "hooked" to the buoys for extra stability. Once the vessel is all fast, Associated Terminals can deploy the floating cranes to each side of the vessel to start discharge. As the cargo is being handled, a production manager is coordinating the barge switches and cargo hold discharge/loading. With vessels having homogenous cargo, the production manager can ensure maximum discharge/load efficiency by having the cranes winch up and down the sides of the vessel to discharge full cargo holds while other holds are being hand trimmed or machine cleaned with loaders and excavators.

I noted some fairly sophisticated cranes working when we took our took. Can you provide specifics on those units?

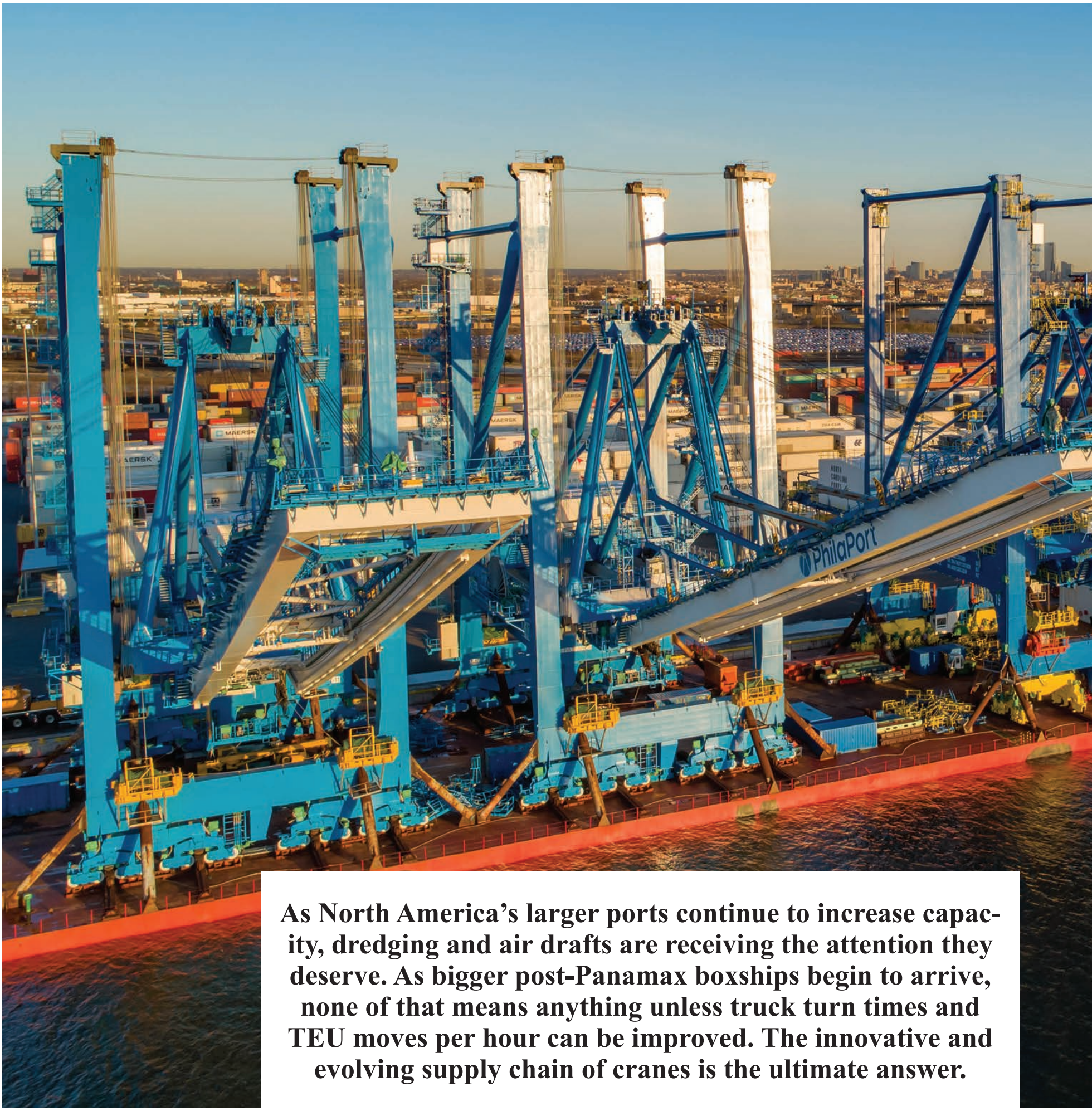
Associated Terminals has 14 Gottwald cranes ranging from 110,000 lb. duty cycle lifting capacity to 120,000 lb. duty cycle lifting capacity. Five of the 14 cranes have boom length of approximately 169 feet with a capability of utilizing an 18 to 26 cubic yard bucket on dense cargoes up to an 85 cubic yard bucket on lighter material. The balance of the cranes can handle an 18 to 22 cubic yard bucket for dense cargoes to a 68 cubic yard bucket for light material. Each crane is capable of handling 1,250 tons of cargo per hour in duty cycle operation. Associated has also developed a custom written telematics system that monitors around 3,000 parameters for operational performance and overall system health. Details such as bucket performance, digging efficiency, and delay periods are accessible to our operations team. Crane alarms ranging in severity from the low windshield wiper fluid up to engine fire alarms are recorded and immediately transmitted to a central server. The system automatically notifies the responsible maintenance personnel based on priority and emergency rules. The result is higher operational efficiency with lower downtime.

The Mississippi River system has been at a historic water level for more than six months. How, specifically, has this impacted Associated's business in the region? (Editor's Note: This interview was conducted before the New Orleans area was hit by hurricane Barry).

Associated Terminals' business has been impacted in many ways relative to high river. Due to daylight vessel berthing restrictions placed during such high river events, Associated Terminals finds itself in a position of having cranes available to work, but no vessel in berth to handle. Many times, Associated will lose 12 to 20 hours in such events waiting for the vessel that just completed to sail at daylight and another several hours for the next vessel to arrive depending on where the vessel is anchored. Having the amount of berths Associated has can minimize the effects of to the shipper and vessel owner, but loss of time making these vessel swaps does occur. Another benefit of midstream operations and floating cranes is the ability to move cranes throughout the harbor to increase discharge and load rates at various locations along the river system. However, when the river is at such a level as it has been, the floating cranes have an air draft that prevents them from transiting under some of the bridges in the harbor. This eliminates the company's ability to maximize it's efficiency and flexibility to handle vessels in a more timely manner. Barge switching will also take a huge effect on the cranes efficiencies as well during periods of high water. During normal river conditions and even a little high water event, barges switches take minimal or little effect on the company's ability to ensure the cranes are always swinging cargo. Just in 2019 alone, Associated has experienced approximately 9800 crane hours of standby waiting for barge switches. All of these high river factors have basically equated to a very conservative estimate of 2.5 million tons in lost capacity and in excess of $14 million dollars in vessel demurrage and lost production expenses.

What do you consider the biggest challenge to your business today (outside of the high waters)?

Our greatest challenge to our business today is finding ample personnel to fulfill positions available on the Mississippi River. With an ageing workforce across this country, many companies and facilities are having a difficult time finding sufficient and qualified personnel. Although our industry is vital to this region, it still remains very unknown and a mystery to the average person in South Louisiana. Associated is challenged with making the future workforce aware of our industry and the well compensated career opportunities that are available.



CREDIT: Philaport

As North America's larger ports continue to increase capacity, dredging and air drafts are receiving the attention they deserve. As bigger post-Panamax boxships begin to arrive, none of that means anything unless truck turn times and TEU moves per hour can be improved. The innovative and evolving supply chain of cranes is the ultimate answer.

By Joseph Keefe

Recent crane deliveries to Greenwich Terminals in Philadelphia, PA.

Photo: Philaport

RAMPING (UP) TO LIFT PORT PRODUCTION

As 2019 passes its midpoint, the backlog 2019, one firm, Shanghai Zhenhua Heavy Industry Co., Ltd. (ZPMC), a global heavy-duty equipment manufacturer listed on the Shanghai Stock Exchange, finds itself as the undisputed leader of the container crane supply chain. That's right: the supply chain itself. That's because ZPMC's turnkey model is unlike any other in this market sector, and its innovation arguably second-to-none. Moreover, the firm's North American backlog is robust and it is growing. At a time of unprecedented port growth in this hemisphere, there are very few variables which can slow this juggernaut. A trade war is one of them.

Politics

As the trade spat between the U.S. and China heats up, there is much at stake. ZPMC has as much skin in the game as anyone. In late June testimony before the U.S. International Trade Commission in Washington, port advocates weighed in on the issue. Glenn Wiltshire, Acting Chief Executive and Port Director at Port Everglades, testified, "It is of critical importance to the Port for the Committee to remove gantry cranes, classified in subheading 8426.19.00, Harmonized Tariff Schedule of the United States (HTSUS), from the list of items that would be subject to ad valorem duty up to 25 percent. A 25 percent duty would immediately increase Port costs by $10,350,000 for a current gantry crane order." ZPMC is currently the only company in the world that manufactures low profile super post-Panamax rail mounted container gantry cranes. There has not been a rail mounted container gantry crane manufactured in the United States in many decades. In separate testimony, Kurt Nagle, the outgoing President and CEO of the American Association of Port Authorities (AAPA), was more direct, saying, in part, "… we are deeply disappointed ship-to-shore cranes and other tariff codes that include port equipment are back on the proposed List 4 ... At a time when infrastructure investment is a national priority, we urge you to avoid increasing the cost of infrastructure through the imposition of new tariffs."

As this issue of MLPro went to production, AAPA and its member ports were making best efforts to ake sure the ship-to-shore gantry cranes would not be added to the tariff list. That's because the increased cost of these cranes might cause ports to rethink their expansion plans to handle the new mega-container vessels. It might also prompt them to look at yet another rapidly emerging ZPMC turnkey service.

Raising Cranes

The profusion of projects has become routine for ZPMC USA in its third full year as official service provider for ZPMC North America in the U.S. and Caribbean. ZPMC handles all of it in house. Beyond this, the firm has opened six U.S. service centers. Each service center serves as a central location for customers to get local service. Recently, the raising of existing cranes has become much more common. Price and timing are the two reasons why.

"It is a bit of both," explains Jeff Rosenberg, ZPMC Crane Service's VP of Sales & Marketing, who adds, "New crane deliveries are now 12-18 months away. We typically we can raise a crane in three to four months (after engineering), and at about one-third the price of a new crane." That latter metric – with the escalating trade tensions – might become even more important. That's because, says Rosenberg, new cranes are going for $10 to $12 million, and raising a crane costs about $4 million. Given the uncertainty in today's trade climate, it isn't hard to see why ZPMC's unique ability to raise and/or alter an existing structure is so attractive.

In May, Rosenberg told MLPro that ten cranes at APM in Los Angeles had been raised; four more in Charleston and three of nine in New Jersey had been completed. Scores more, internationally, had also been accomplished. In fact, as much as 30% of ZPMC's existing business involves crane alterations.

The same proprietary care and expertise that ZPMC applies to its new build efforts also goes into any alteration of existing units. That's because, insists Rosenberg, it isn't just about raising a crane, it involves doing it as efficiently as possible. "We also relocate cranes using our own SPMT's (self-propelled modular trailers)," explained Rosenberg, who continued, "This is a big plus for the terminals as we can easily move cranes around to place them out of the way while they are being worked on, to avoid conflicts with terminal operations."

Rosenberg makes it sound easy, but there is far more to raising a crane than meets the eye. Myriad design issues precede every operation. These include, but are not limited to:

- How high do we go?
- Can dock handle the weight of newly raised crane?
- Can it be jacked up off the dock?
- Which jacking frame to use?
- How will increased height affect Crane stability?
- Do you to Jack up off the crane?
- Weld or bolt leg inserts?
- What other upgrades make sense at same time?
- Will it impact hoisting machinery?

As port customers are looking to upgrade local equipment, two big issues need to be considered when contemplating what to do next. Specifically, as they look for height, the weight of these new cranes is becoming a factor as existing docks were not built for the new wheel loads.

The purpose of 'crane raising' is to accommodate the large post-Panamax tonnage, but this involves (to date) an increase in height only, as opposed to also having an increased outboard reach. The higher crane really does provide that much more of an advantage, especially given the ever-increasing beam of these newer vessels. Rosenberg agrees, saying, "We haven't been asked to extend any booms yet. I also believe there was some forethought on the part of the terminals, ordering cranes with booms for 22 TEU's width."

Now, as the enlarged Panama Canal brings exactly what was promised, that sort of forethought is also proving to be prescient. "Yes, it's all about larger ships. We are in the 'raising cycle' right now. Most terminals have at least a few new cranes large enough to attract the larger ships. Now they are raising their older cranes to increase capacity." And, it goes without saying, quickly increase capacity.

Photo: ZPMC

Indeed, raising STS cranes is fast becoming the signature project for ZPMC USA. For his part, Rosenberg isn't aware of any other firm that also plays in this sandbox. ZPMC has four proprietary jacking systems available for crane raise work in the U.S. that accommodates varying pier loading situations and height increases. Two of the jacking frames load off the dock, and two are designed to jack the crane from its own structure to avoid putting any extra weight on the pier. Rosenberg explains, "These are patented systems; devised and designed by ZPMC."

The scope of these projects is enormous. In fact, the tallest port crane in North America was recently raised to that height by ZPMC, which raised the crane 33 feet (10.08 meters) to prepare for Ultra-Large Container Vessels calling at APM Terminal's Pier 400. In a landmark project that kicked off July 1, 2016, ZPMC upgraded 10 cranes for APM's Pier 400 Terminal. The cranes can now service ships carrying up to 20,000 twenty-foot equivalent containers (TEUs). Prior to this crane raise, the largest vessels that could be serviced at the Port of Los Angeles were 13,000 TEUs.

ZPMC

ZPMC impressively owns and operates 25 heavylift ships ranging in capacity from 60,000 to 100,000 DWT, delivering products all over the world. ZPMC North America is the operating company for North America, and ZPMC Crane Services is its North American service subsidiary. The firm boasts annual revenues of $5 billion and employs more than 30,000 personnel. With eight factories in the Shanghai area, the firm claims a 70% global market share of the STS Crane market. What is particularly noteworthy is that when ZPMC sells a crane, the sale often involves the manufacture of that crane, its transport from point A to point B, the dismantling and/or removal of the old crane and the in situ delivery of the new one. That menu is about to expand.

The firm delivered more than 200 STS cranes in 2016 alone. 2019, especially on this side of the big pond, promises more of the same. Nevertheless, and beyond the crane raising trend, ZPMC isn't sitting on its hands. For example, automation is the hot topic now. Rosenberg said, "ZPMC has had numerous successful automation projects around the world. LBCT is the flagship in the USA." Beyond this, a smaller, second hand crane market is emerging. Rosenberg says that ZPMC will get involved, when and if the project makes "regional" sense.

Clear Goals in an Uncertain Climate

The process of acquiring or shedding a container crane is a carefully planned event – in and of itself a supply chain; all its own. The success or failure of that kind of operation can be the 'make or break' for any port in the fast moving world of ever bigger boxships. No one wants to get left behind in the competitive quest to keep and grow TEU market share. Now, with the rapidly expanding crane raising option, ports not only get it done faster, it'll be far cheaper.

International trade disagreements may drive the decision process, but if the newest post-Panamax crane is out of reach, it is likely that the raising of an existing one will not. If so, it is ZPMC that can be thanked, for that.

"We also relocate cranes using our own SPMT's (self-propelled modular trailers). *This is a big plus for the terminals as we can easily move cranes around to place them out of the way while they are being worked on, to avoid conflicts with terminal operations."* -

Jeff Rosenberg,
VP, ZPMC Crane Services

Photo: ZPMC

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MONEY IN THE TANK

FUELTRAX melds decades of maritime experience with NASA engineering experience to deliver real-time, accurate fuel monitoring and savings. **Anthony George, CEO and Founder of FUELTRAX, explains.**

"Customers who utilize the real-time throttle recommendations save on average 5 - 8% in fuel consumption across their fleet."

Photos: FUELTRAX

By Greg Trauthwein

In a sentence or two, concisely describe FUELTRAX.

FUELTRAX is changing perceptions of what to expect from your standard marine fuel management system. By combining highly accurate fuel monitoring hardware with intelligent and secure data processing software, FUELTRAX helps vessel owners make smarter decisions in real-time. We've helped save more than $30 million worldwide and counting.

From the time it debuted, how is the FUELTRAX most different?

Early on with FUELTRAX, I learned the importance of standardizing on reliable technology to enable system expansion and growth in the marketplace. By standardizing on Coriolis meters and Iridium satellite communications, we have the most dependable and robust monitoring system available in the maritime market, with an unprecedented 99% uptime globally.

How is it most the same?

Each FUELTRAX system relies on the FUELTRAX patented design for Marine Fuel Monitoring. The patent is based on principles I learned while studying physics in college as well as engineering robust control systems while at CDI.

What has been the key technological enablers that have been central to evolving the system?

It was the NASA engineers that I brought onto the team that pushed for standardization on Coriolis and Iridium to ensure they could support the system remotely. If you think about the space shuttle ... it can't come home for a fix if there is a technical issue. They saw our client's vessel operations in the same way.

Is there a "typical" FUELTRAX customer?

Anyone looking for more insight into their vessels operations and to enhance their fuel monitoring through accurate, live reporting and tracking can benefit from FUELTRAX. Today's typical customers come from international oil companies, charterers and vessel owners, or ship owners who pay for their fuel. As the responsibility of fuel costs is evolving in the industry, this is changing.

Realizing that vessel and fleet operation are diverse based on the route, cargo, machinery/equipment; is it possible to generalize fuel savings for a new FUELTRAX customer?

Like any tool, the more our clients use FUELTRAX, the more they gain. For example, customers who utilize the real-time throttle recommendations save on average 5 - 8% in fuel consumption across their fleet. Also, users who take advantage of the reporting and visualization tools see significant savings in resources for their logistics and operations teams.

This is a transcendent time in maritime history with the focus on environmental matters. How has this impacted your business?

Environmental awareness is driving the fundamental need for vessel operators to reduce fuel consumption and thus reduce the vessels contribution to greenhouse gases. FUELTRAX is uniquely suited to assist in this endeavor.

FUELTRAX sits not only on the cusp of the environmental transformation, but also the digitalization revolution. Where are we today in terms of vessel owners actively pursuing and adopting new technologies such as FUELTRAX and FUELNET?

There is a broad spectrum of adaptation among the different marine verticals. Early adopters see the value of this technology in an attempt to reduce fuel pilferage which is endemic in many parts of the world. Our system provides significant gains in fuel savings, which has been the catalyst for the adoption of digital technologies within our customers fleets. Other marine verticals will come along in time.

What exactly is FUELNET?

FUELNET works hand-in-hand with FUELTRAX as a dashboard where you can see all of your vessels critical data points in one place. It features tracking of weather data metrics, time-stamped and linked to a vessel's location.

FUELNET is unique in that it offers a single-source view for all of your fuel reporting and activity needs.

Where do you see opportunity today, geographically?

Today, FUELTRAX operates across 500 plus vessels and can be used anywhere in the world. Our largest area of operations is currently Nigeria, where we have nearly 150 vessels and counting. We see growing fleets in Malaysia, South America, and the Middle East.

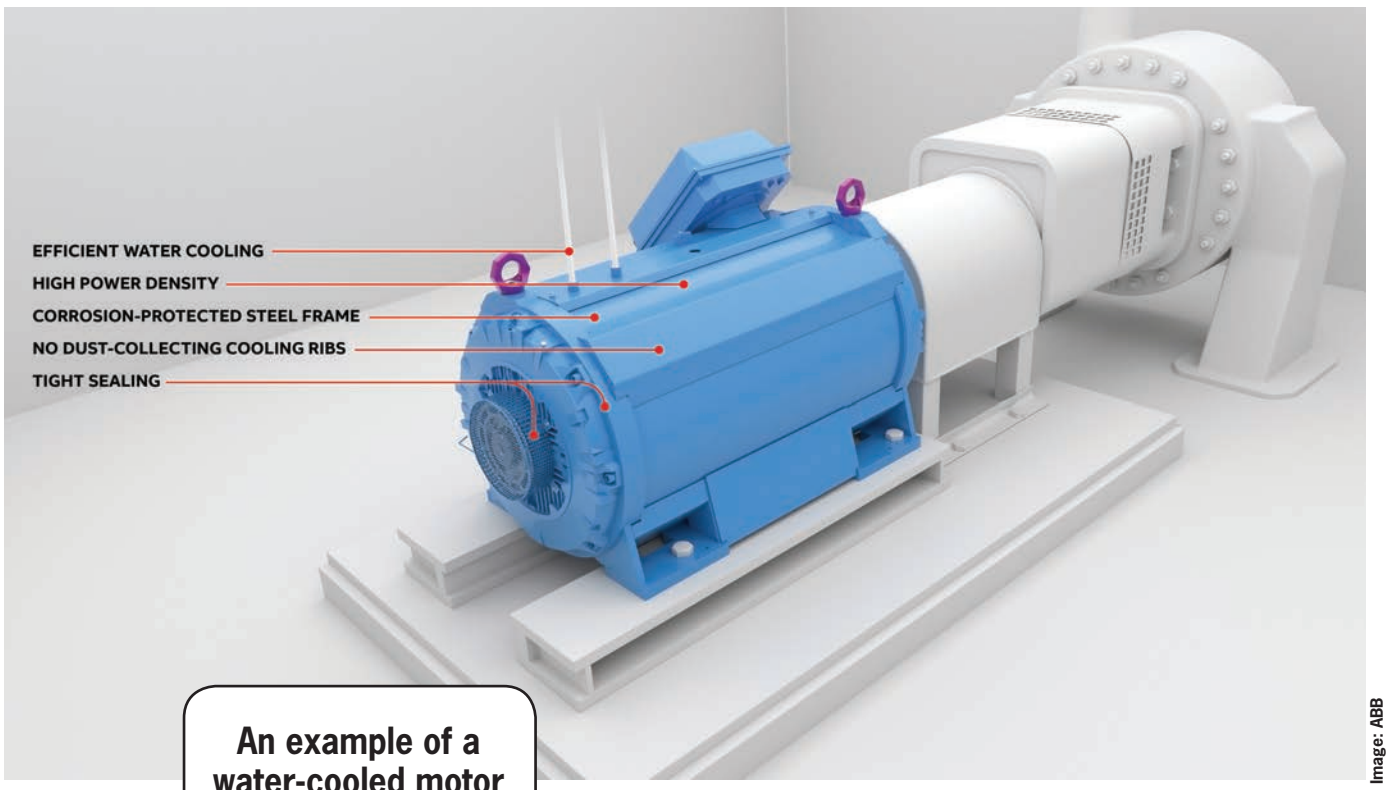
By vessel type?

The early adopters have been in upstream oil and gas OSVs but we are seeing this transition to larger hull forms in light of the coming IMO 2020.

The Drive Behind Water-Cooled Motors

Peter Svartsjö at ABB discusses the benefits of water-cooled motors for marine applications that require megawatt levels of power, including space saving, increased energy efficiency and reduced maintenance needs.

Electric motors run several main functions on marine vessels – from propulsion and thrusters to deck handling equipment such as winches, anchors and pumps. This makes them mission-critical for ship owners and operators, as their reliability and performance can have a direct impact on the smooth-running of the whole vessel.



An example of a water-cooled motor supplied by ABB.

Image: ABB

Water-cooling & the way forward

Air-cooled motors are the traditional choice, which means they require cooling air to be circulated around the motor frame's cooling ribs. However, because marine motors are often installed in dirty and dusty environments, the spaces between the ribs can become clogged with debris, reducing their cooling efficiency.

Without regular cleaning operations, the motor starts to run at increasingly higher temperatures. That causes a higher rate of wear on vital components such as the bearings and windings. This calls for additional maintenance and in the worst case will reduce the motor life, resulting in premature, unplanned failure.

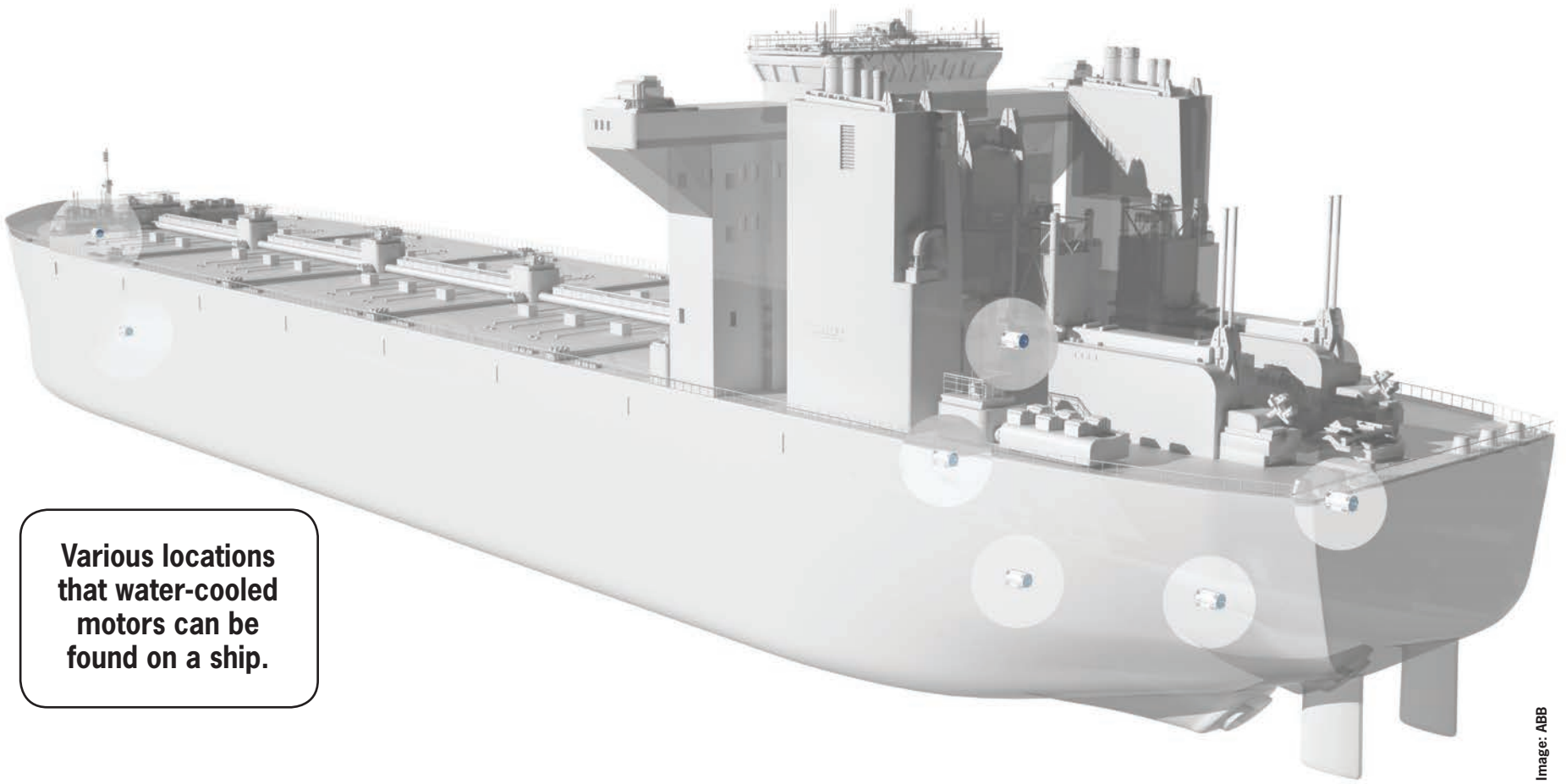
In contrast, switching to water-cooled motors that do not require external ventilation systems not only reduces capital costs, it also enables a smaller installation footprint – on a ship that could free up useful space for other equipment or more cargo. There is also a further benefit as a water-cooled motor can be sealed tightly against the ingress of dust or other pollutants, which makes it ideal for installation in demanding, dirt-laden conditions. Some additional considerations for a water-cooled motor:

- **Clean Water Required:** The cooling method for water-cooled motors requires just a steady supply of clean 'tap' water, along with a chiller, pump and a pipe system to operate the closed water cooling circuit to cool down the motor frame and active parts. Because the motor is independent of the ambient air quality it is able to deliver constant, predictable and problem-free operation over a long period of time. The absence of frame cooling ribs results in a relatively smooth external structure, which enables higher quality of motor painting, and significantly reduce build-up of dust compared with an air-cooled design. And should dust accumulate, it cannot harm the motor's cooling performance or be ingested into its internal parts.
- **Optimized life-cycle costs:** In the same marine applications, a water-cooled motor will generally have an improved life cycle cost against an air-cooled motor. This results mainly from longer intervals between service and a longer service life, mainly because the bearings and windings are protected from the overheating that can occur should the performance of the air cooling system be compromised - such as when dust accumulates.
- **Quieter operation:** In some marine applications, and especially when a vessel is docked, noise levels can be an issue, particularly when several motors are operating in the same location. In an air-cooled motor most of the noise is produced by the fan. That means that a water-cooled motor with no fan will be significantly quieter.
- **Space Saver:** There are installations where space can be at a real premium, especially in engine rooms or other below-decks applications. Water-cooled motors have high power density (in terms of kilowatts output per unit weight or volume). Therefore, a water-cooled motor can offer the potential to deliver the same output as an equivalent air-cooled motor within a significantly smaller footprint. In some cases, there can be further efficiencies and space saving possibilities as the water cooling system can also be utilized with other water-cooled equipment, such as variable speed drives (VSDs), which would otherwise require their own supply of cooling water.

New applications are driving higher power designs

The use of water-cooled electric motors is not new in itself. They have been deployed in the marine industry for more than 50 years in special applications where space is scarce and the environment hostile in terms of dust, dirt and damp.

However, with the advent of new larger ships there has been a consequent demand for higher motor powers. Yet the same constraints on space and the requirements for safe, reliable operation



Various locations that water-cooled motors can be found on a ship.

Image: ABB

remain. That is why the marine industry has been instrumental in driving the development of megawatt-class motors with high energy density.

ABB's new megawatt motor

Leading the way in this development is the new water-cooled M3LP 500, ABB's largest low voltage (LV) water-cooled jacket motor to date. In a 500 frame size, it is available with up to 2 megawatt (MW) output, which meets the growing global demand for ever-higher power while minimizing its installation footprint due to its optimized power density.

As well as delivering more power per kilogram than a comparable air-cooled motor, the M3LP 500 is also about 20 percent smaller.

The M3LP 500 has a media temperature of 38°C/100°F and a cooling-media flow of 15 gpm. Its internal cooling system is compatible with most marine cooling circuits. Therefore, there is no need for special adaptation or other time-consuming configuration work before deploying the motor.

The new motor offers extended maintenance intervals as it has been designed specifically to reduce the maintenance needs of the key active parts. In particular, the wear-sensitive bearings are kept cool at all times.

This improves reliability, extends service intervals, and increases bearing lifetime. The use of standardized components, including the bearings, makes replacement fast and easy.

The motor's end shields are easy to dismantle and re-assemble, which simplifies maintenance while reducing downtime. Labyrinth seals prevent intrusion of humidity, dust, or particles and reduce wear on the motor's active components.

The M3LP motor is just at the beginning of its product journey.

However, the indications are that it is opening up a number of interesting new applications. These include hybrid vessels and also for specialized functions such as driving water jet pumps on dredgers.

Jon Holloway & Jim Lerner
Jon Holloway (left) is the Head of Strategy for Danfoss Power Solutions, based in Hamburg, Germany.
Jim Lerner (right) is Vice President of Sales, Eastern US, for Danfoss Drives in Houston, Texas.

Preparing for IMO 2020

Alternative Propulsion Systems

In the **May 2019** issue of *Maritime Reporter & Engineering News*, Part I of this article discussed the implications of the International Maritime Organization's "IMO 2020 Rule," which will cut fuel sulfur content 86 percent by the year 2020. In that article, we outlined two routes commercial vessel operators and owners have to compliance — and explored the first:

1) Enhance engines and fuels: Commercial vessel operators can purchase higher cost low sulphur fuel oil (LSFO) or marine gasoil (MGO) — or for a high initial capital cost, they can retrofit their engine systems with scrubbers to remove SOx from emissions in conventional fuels.

2) Use alternative propulsion systems: Operators can convert to alternative propulsion systems, such as liquefied natural gas (LNG) or modern electric systems that adopt hybrid technologies which integrate energy storage.

This article serves as a continuation and will discuss alternative propulsion systems, including hybrid/electrics.

Value of Hybrid/Electric

For vessel owners interested in reducing fossil fuel consumption, hybridization and electrification technologies complement or offer an effective alternative with many benefits.

A basic definition of hybridization is any system with two or more sources of energy acting together to accomplish a task. In the automotive world, a common example of hybridization technology is the hybrid car where a conventional internal combustion engine is combined with an electric propulsion system to create a 'hybrid' powertrain. The benefits of hybridization, in this instance, are fuel savings, performance improvements and reduced emissions. Similar solutions and benefits are available and becoming more widely implemented in marine applications. Many long-haul vessels are still operating with direct diesel propulsion and no electric propulsion system. These vessels can improve efficiency and optimize main engine load power and emissions by adding a shaft generator/motor between the propeller and the main engine. This solution, called Power Take Out (implementing this system also enables Power Take In, which can be employed, for example, in "take me home mode") is an electrical add-on that makes vessels more efficient and ready for hybridization. In hybrid vessels, a shaft generator/motor with inverter technology allows the optimum control of propulsion machinery at various speeds to save energy. For short-haul vessels where electricity is available via a shore supply, ships can use drive technology and energy storage to source clean energy from local grids. The ship's main generators can be switched off completely to prevent unnecessary NOx and carbon emissions and noise pollution while the vessel is docked.

Image: Danfoss

Benefits of Hybrid/Electric

Given that compliance with IMO 2020 can be achieved solely with engine design and technology enhancements, why should vessel owners consider a hybrid or an electric propulsion solution? A hybrid propulsion system uses diesel-engine generators to charge batteries that can be delivered by drives to electric motors. Compared to a 100 percent fossil fuel power plant subject to pricing

Many long-haul vessels are still operating with direct diesel propulsion and no electric propulsion system. **These vessels can improve efficiency and optimize main engine load power and emissions** by adding a shaft generator/motor between the propeller and the main engine.

variations, or a 100 percent battery-powered electric drive that requires extensive dock time to charge batteries from a shore power connection, a hybrid system has several advantages:

1. Reduced engine size and complexity: Because diesel engines are used to drive generators instead of propellers, the size of engines and SCR components can all be reduced. This reduces complexity and maintenance costs as well as engine noise and emissions. It also improves the ship design, because the diesel generators can be placed freely as the engine no longer has to be physically connected to the propulsion system. The drive technology creates a smooth drive train with less current spikes, and if peak loads are present, the energy will be handled from the energy storage.

2. Improved engine efficiency: The engines can operate at their most efficient point. The gensets charge the batteries when the vessels are at a standstill or running at low speed. When the vessel accelerates, the peak power is drawn from the batteries. In other words, the electric motors are used to do what they do best—provide high torque—and the batteries are used to shave peak power and offload the horsepower demands to improve engine efficiency and downsizing.

3. Retrofit to augment or replace engines: When a higher tier engine is retrofitted into a ship (e.g., a Tier 4 engine retrofitted into a tug), horsepower may suffer. In this case, batteries can be used to provide supplemental horsepower to the original rating to secure the vessel's earning power and profitability. In other retrofit situations, it may be possible to replace one engine with a battery and electric drive. This option is feasible when vessels are replacing their backup generator and auxiliary engine.

4. Meet port operation requirements: Using batteries and electric-motor drives enable emission-free idling in port or at an offshore rig. This option meets demanding port standards, already a primary consideration for European ports.

Concerns of Hybrid/Electric

As with the application of any advanced technology, there are several potential drawbacks or risks to be considered.

First costs of hybrid/electric solutions are higher than traditional systems due to the addition of energy storage systems. However, battery costs are coming down as electric vehicles gain market adoption, helping to improve ROI. In many cases, the benefits of hybridization result in a payback of less than four years.

Fire safety is a consideration anywhere a lithium-ion battery is deployed. To address fire-safety concerns, solution providers can employ water mist, CO2, foam, or dry chemical powder systems—such as those offered by Danfoss Semco marine fire protection systems—that can be customized to fit particular needs.

Case Histories

Evidence of the benefits of hybrid/electric systems is seen in marine applications around the world employing a range of advanced technologies available now.

• Ferries:

In Amsterdam, IJveer Ferry 61 uses two 250-kW electric motors for propulsion, each fed by two 133-kW diesel engines and a 26 li-ion polymer battery pack producing 136 kWh. AC power is converted to DC using VACON NXP AFE drives. The 50 Hz electrical ship grid is generated by a VACON NXP Liquid Cooled drive with MicroGrid functionality. VACON NXP Liquid Cooled Drives are also used to power the electric azimuth thrusters. This hybrid solution delivers 30 percent energy cost savings and 40 percent CO2 and particle emissions reduction.

In Taiwan, a ferry's diesel engines were replaced with two Danfoss EMPMI electric motors with permanent magnet technology—a smaller and more manageable solution than a diesel engine. A propulsion motor was delivered that employs Danfoss EC-C1200 converters. One converter was used as the active front end (AFE) to charge the battery directly from the city's utility grid. This custom electrification solution applied by Danfoss EDITRON (formerly Visedo) delivered 33-50 percent fuel savings.

• Tugboats:

For a tug operating out of IJmuiden, Netherlands, a powertrain consisting of electric, diesel or direct diesel-electric drive was chosen because its low power profile was well-suited to the tugboat's operating requirements. The permanent magnet electric motor/generators are fully integrated with the azimuth thrusters, each of which is controlled by a Danfoss VACON® NXP drive. The hybrid powertrain delivers 20 percent operational cost savings on fuel and maintenance, plus 10 percent direct savings on diesel fuel. In Seattle, Washington, a shipyard retrofitted a tug with a hybrid diesel-electric powertrain to help reduce pollution at California's Port of Long Beach. Danfoss VACON NXP technologies enable two 900-kW electric motors/generators to either assist the main diesel engines or act as a generator to recharge the 126 gel-cell lead acid batteries. At idle, no fossil-fueled motors are running. Stopped and tied at the dock, shore power provides for the tug's "hotel" needs and recharges the batteries. This solution produces 73 percent less PM, 51 percent less NOx and 27 percent less CO2 than an earlier hybrid solution using a competitor's drive technology.

• Cruise ships:

A major river cruise line based its first river cruisers on an electrical energy and drive system using the VACON NXP Liquid Cooled Drive that enables an efficient DC bus. Each ship is fitted with four asynchronous generators controlled by VACON NXP drives that power the electric propulsion system and the onboard grid. Asynchronous generators are significantly more cost-effective than conventional gensets (standardized sets comprising a diesel engine and generator). The solution allows variable speed operation that optimizes fuel efficiency to yield 20 percent fuel savings. The drive also minimizes noise levels for the passengers. Given these and other benefits, the cruise line has made this electrical propulsion system standard on 50 vessels since 2009.

Conclusion

To meet IMO 2020 international marine emission standards, commercial vessel operators can take one of three different options: 1) purchase higher cost low sulphur fuel oil (LSFO) or marine gas oil (MGO); 2) retrofit their engine systems with a selective catalytic reduction (SCR) scrubbers that entail a high initial capital cost; or, 3) convert to alternative propulsion systems like liquefied natural gas (LNG) or electric solutions. For each of these options, hybrid/electric drive technologies make it possible to optimize power generation and propulsion on board. To make the most advantageous decision, vessel owners and operators can compare these solutions in their specific applications, and plan ahead to avoid fuel cost and supply uncertainties looming on the horizon.

1 "Second Hybrid IJveer Ferry Powers Its Way across the Amsterdam 'IJ'." EST-Floattech. June 26, 2017. Accessed October 31, 2018. https://www.est-floattech.com/hybrid-ijveer-60-and-61/.

See also: "Hybrid ferries connect the city of Amsterdam nonstop." Danfoss. Accessed October 31, 2018. http://did.danfoss.com/en/equip-differently/hybrid-ferries/.

2 "Danfoss Powers Asia's First E-ferry in Taiwan." Danfoss. Accessed October 31, 2018. https://www.danfoss.com/en/service-and-support/case-studies/dps/danfoss-powers-asia-s-first-e-ferry-in-taiwan/.

3 "Hybrid powertrain improves tugboat economy and maneuverability." Danfoss. Accessed October 31, 2018. http://files.danfoss.com/download/Drives/DKDDPC940A102_Telstar.pdf

4 Flannery, Jim. "Harbor Tugs Move to Diesel/electric Power." Soundings Online. February 01, 2011. Accessed October 31, 2018. https://www.soundingsonline.com/news/harbor-tugs-move-to-dieselelectric-power.

5 "VACON® NXP Liquid Cooled Drive Provides Quiet and Clean River Cruising." Danfoss. March 31, 2017. Accessed October 31, 2018. https://www.danfoss.com/en/service-and-support/case-studies/dds/vacon-nxp-liquid-cooled-drive-provides-quiet-and-clean-river-cruising

UAE

A Maritime Center Continues to Grow

Over recent years the United Arab Emirates has emerged as an important maritime hub with grand ambitions. ***Mark Venables*** visited the region to discover what is driving that growth.

When the UAE was elected to the IMO Council as a Category B member, it immediately raised its profile within the maritime community. The Emirates have taken a significant step forward in the maritime world.

Despite this success, the region remains a challenging market for shipping and logistics. One of the drawbacks about attracting suppliers to set up base in the respective maritime clusters created around the area is that competition is fierce, a problem sharpened by the oil price collapse five years ago.

According to His Excellency Dr. Abdullah Belhaif Al Nuaimi, Minister of Infrastructure Development & Chairman at UAE Federal Transport Authority - Land and Maritime, the UAE continues its efforts to occupy the leading rankings in all fields and indicators of the international maritime transport industry. He believes that the first year of the UAE's membership in the IMO Council has been a success with the UAE ranked 14th globally in the prestigious 'Leading Maritime Nations in The World' report released late last year.

"The presence of many small, high-income economies among the top ten countries in the field of maritime transport indicates the critical importance of the success of measures and policies of the maritime institutions," Al Nuaimi says.

"This includes regulating, controlling and managing the maritime assets efficiently, including investment optimization, which indicates a high value based on increasing research, development, innovation and higher education in maritime transport.

"The FTA, through the maritime transport sector, is working on providing a comprehensive perspective of the future trends and features of the maritime transport industry in the country. We are doing this in co-ordination with our strategic partners to maximize interests and investments in the maritime transport industry and enable them to have a better picture of the latest developments and trends in the global transport industry."

Nurturing the Dubai vision

Despite the aspirations of Abu Dhabi, the jewel in the crown of crown for the UAE remains Dubai. According to the 2019 edition of The Leading Maritime Capitals of The World 2019 report from Menon Economics and DNV GL Publication in the Middle East, India and Africa region, Dubai is the leading maritime center and at a global level, now ranked ninth. The experts predict that Dubai will continue to grow in importance and could be in the top five of the world's most important maritime centers by 2024, albeit with intense competition by the European cities as well as Hong Kong.

According to the Dubai Maritime City Association (DMCA), Dubai currently hosts more than 5,500 maritime companies and 13,000 maritime activities, which in turn support more than 76,000 jobs. The sector contributes almost seven per cent of the Emirates' gross domestic product, equivalent to $7.3bn, which the government hopes to significantly increase this proportion by 2030.

The tail end of 2018 was a significant time for Dubai with the Dubai Maritime Cluster Office (DMCO), part of the DMCA, signing strategic partnerships with the world's leading maritime clusters. These included Germany's Maritimes Cluster Norddeutschland, Canada's Vancouver International Maritime Cluster and the Maritime Cluster of the Panama Maritime Authority.

"The co-operation with a leading international authority in the maritime sector such as Panama reflects the trust and confidence placed by the global maritime industry in Dubai. We are one of the five most competitive and attractive maritime hubs in the world, supported by advanced capabilities in the infrastructure and maritime culture that stimulate innovative research and development," Nawfal Al Journai, director of DMCO, says.

However, according to Al Journai, one of the most significant signs that the UAE plays a growing role in the world

Dubai Maritime City Association

maritime community is the establishment of UAE Maritime Week as a significant annual event. "UAE Maritime Week is an important milestone for the sector," he adds. "Other major maritime centers such as Oslo, Greece, and Hamburg hold global Maritime events. In the Middle East, there was nothing until we came up with the UAE Maritime Week."

Leading port in the Emirates

DP World currently has five terminals in Dubai, three at the flagship Jebel Ali Port and one each at Mina Rashid and Mina Al Hamriya, but that will change when the fourth terminal at Jebel Ali comes online later this year.

The high-tech terminal was initially slated to open at the turn of the year but has been delayed because of weaker than expected market conditions.

Jebel Ali is already the tenth largest container port globally, handling more than 15 million TEU annually. The original plan was that the opening of Terminal 1 would lead to increased capacity, but now DP World will take the opportunity to refurbish Terminal 1.

When it does open, it will feature an innovative High Bay Storage (HBS) system. The design and rack structure of the system allows containers to be stored up to eleven stories high, delivering the capacity of a conventional terminal in a third of the surface area. It is also fully automated eliminating the need for reshuffling.

Abu Dhabi continues to shine

Mina Khalifa, Abu Dhabi's largest port, is set for exponential growth, following the signing of a 30-year concession with the world's second largest container line, Mediterranean Shipping Co (MSC).

It has been a busy six months for Abu Dhabi ports with a significant partnership along with several sectors increasing their presence. The main highlight came late last year when Cosco Shipping Ports (CSP) inaugurated the CSP Abu Dhabi Terminal at Khalifa Port; positioning Abu Dhabi as the regional hub for Cosco's global network of 36 ports and further connecting the Emirate to the major trade hubs along China's Belt and Road Initiative (BRI).

The deepwater, semi-automated container terminal includes the largest Container Freight Station (CFS) in the Middle East, covering 275,000 square meters. The state-of-the-art facility offers options for full and partial bonded container shipments, the full range of container packing services, short-term warehousing for de-con-

Dubai DP World

solidated cargo as well as easy connectivity with container terminals in Khalifa Port.

KIZAD, the industrial zone subsidiary of Abu Dhabi Ports, launched a Polymers Park which will form an integral part of the polymer conversion ecosystem in the Emirate. This is part of a strategic collaboration framework with Abu Dhabi National Oil Company (ADNOC), which aims to accelerate investment and innovation in the region's plastics industry.

The collaboration aims to offer companies fast and cost-effective access to polymers as well as the option to invest in the Ruwais Conversion Park – an initiative that will take shape over the next few years.

When it comes to transportation links, the rail infrastructure has always been a limiting factor, but that could be changing with the news that Etihad Rail and Abu Dhabi Ports have signed an agreement to connect Khalifa Port with the National Railway Network. The deal reflects the mutual efforts of Etihad Rail and Abu Dhabi Ports to support the growth and diversification of the UAE economy by strengthening the transport infrastructure and connecting vital facilities such as ports to the rail network to facilitate the transport of containers and various types of goods in a safe, efficient environment-friendly way.

Offering a Third Choice

Although Dubai and Abu Dhabi lead the way in the maritime sector in the UAE, they are not alone. Fujairah Port is the only multi-purpose port on the Eastern seaboard of the United Arab Emirates, approximately 70 nautical miles from the Straits of Hormuz and is home to two oil terminals. However, it is the Ras Al Khaimah Port (RAK Ports) and its free zone that has bold ambitions to grow as an alternative to Jebel Ali and Khalifa Ports.

RAK Ports consists of five ports within a 65km coastline. Al Jeer Port to the North, just on the Oman border, RAK Maritime City, which is a free zone, Ras Al Khaimah Port in the city center port, Saqr and Al Jazeera Port. "Each one of the ports contributes in its own way and we have just undergone a strategic exercise to identify more specifically what these ports do and should do," Captain Cliff Brand, RAK Ports CEO says. "As a result, at least two of these ports will be repurposed in the future to accommodate the strategy."

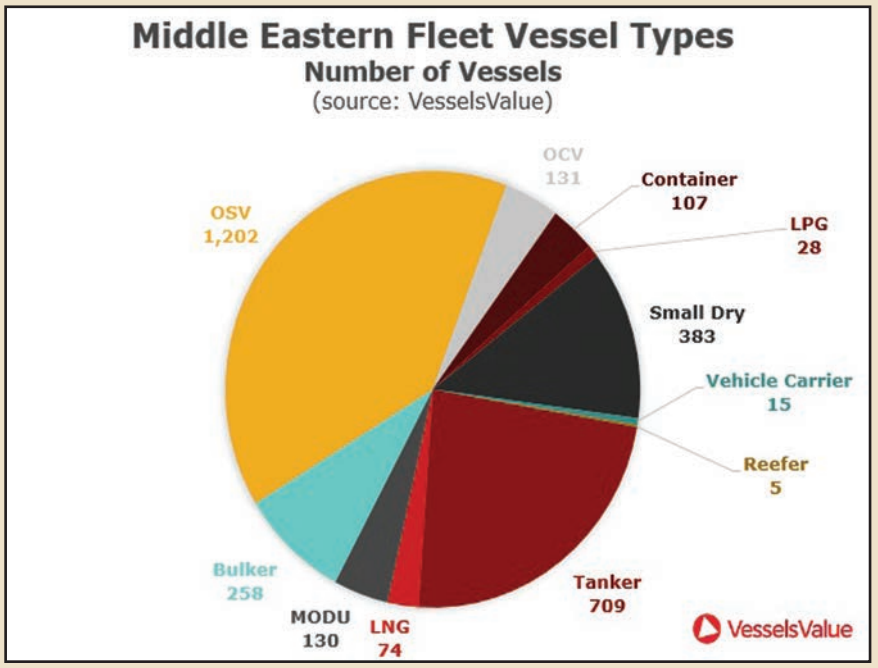
The first significant challenge that RAK Ports face is replacing the trade lost from the Qatar embargo that was imposed two years ago. "It took us almost a year to regain volumes we lost," Brand explains.

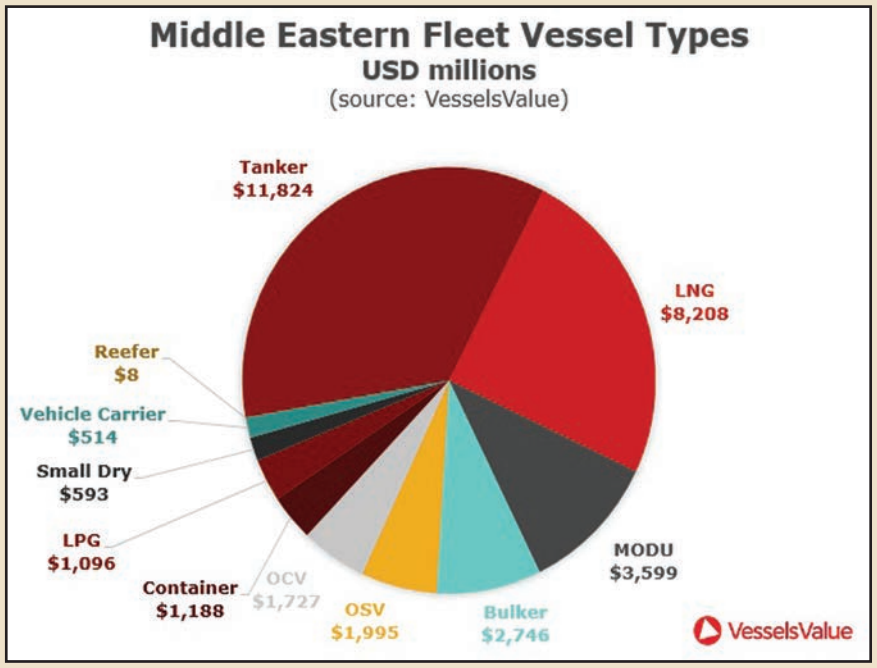
Part of this strategy was signing a 25-year agreement with Hutchinson Ports to develop and manage the container terminal facility at Saqr Port. The port comprises a four-berth, 350,000 TEU facility featuring an 800m quay with a depth of 12m. As for the development, the first of two new deepwater berths capable of handling capsize vessels have been completed along with investment in the latest bulk-handling equipment including high capacity mobile harbor cranes. The project will make Saqr Port one of the largest bulk handing ports in the world.

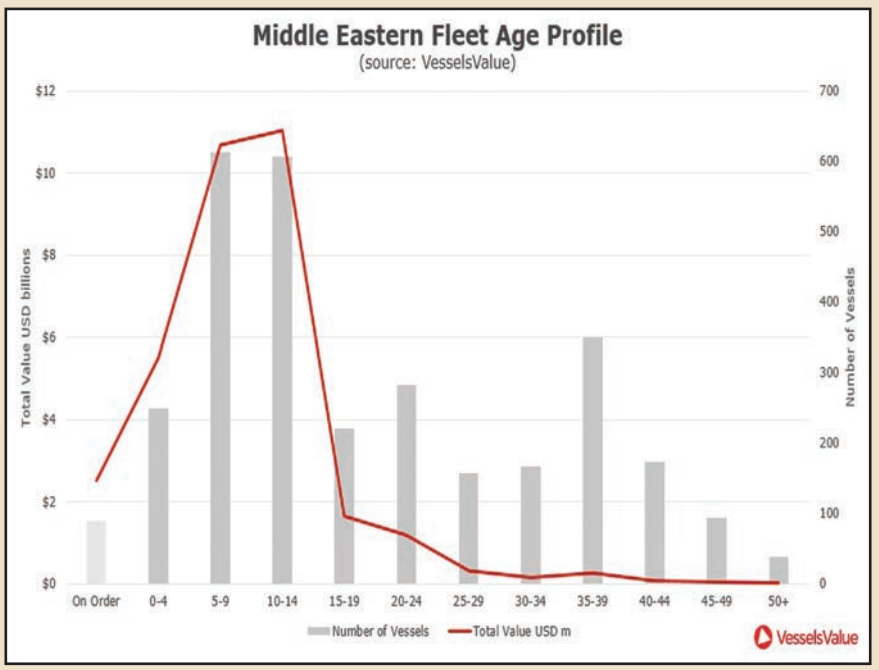
"This time last year we were doing about 220 TEUs a month, which was, of course, was a big jump for us considering we were starting from zero, but there's been a strong upward trend," Aryavansh Shukla, logistics solutions manager at Hutchinson Ports explains.

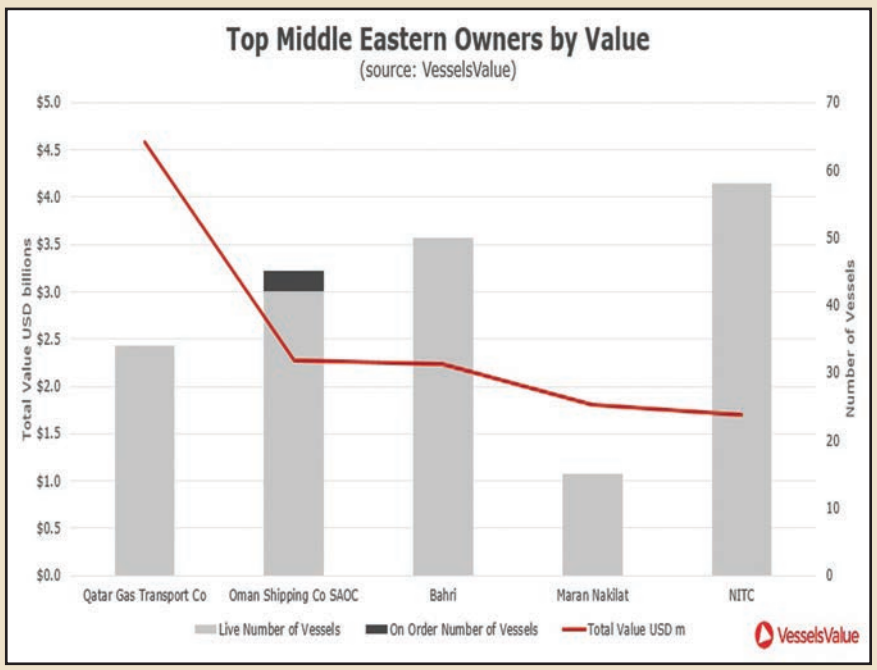
The figures have been impressive – growing to 4000 TEUs in December, and by the end of the first quarter this year the monthly statistics were almost 6000 TEUs.

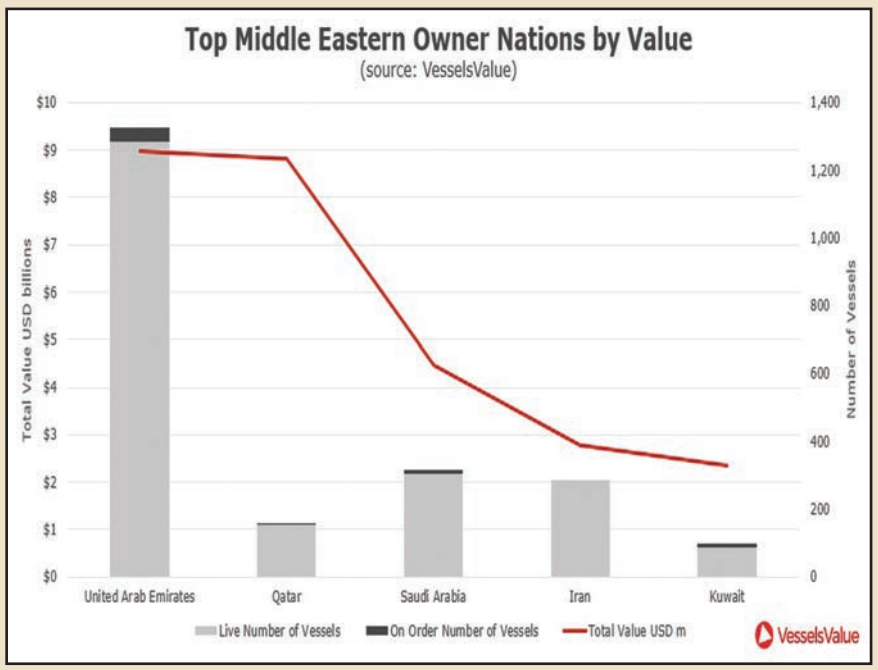
"What this leads us to believe is that now the market is more switched on to the advantages that we're offering; they're more aware of the cost savings. It is not only diverting volumes from other ports but also organic business growth. Many times we've had companies reach out to us to understand the model because they're investing in Ras al Khaimah, so they want to start off using the port from day one of operations. We see the trend continuing in the future as well."

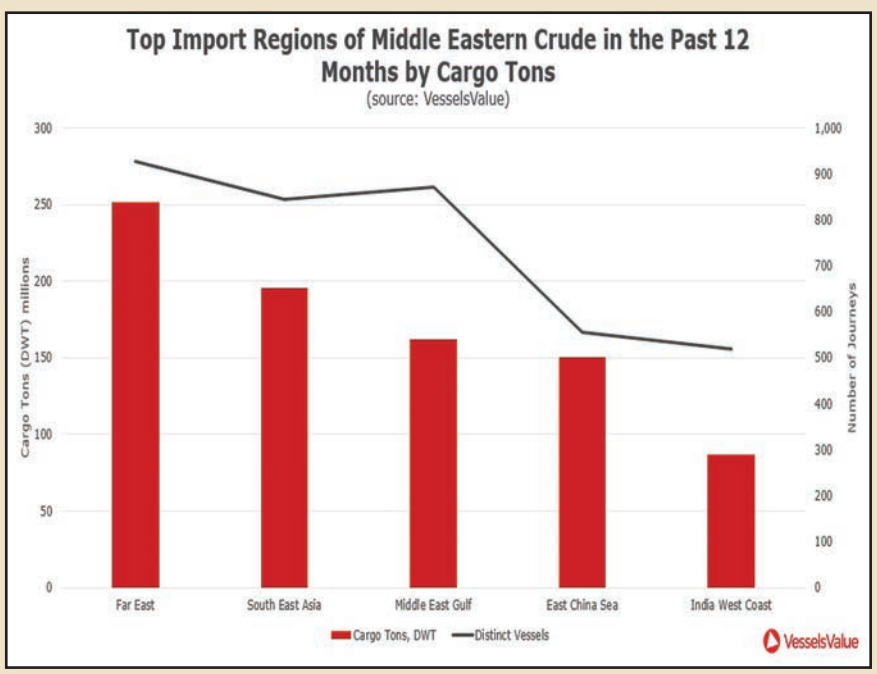

Middle Eastern Fleet Vessel Types
Number of Vessels
(source: VesselsValue)
OCV 131
Container 107
LPG 28
Small Dry 383
Vehicle Carrier 15
Reefer 5
Tanker 709
LNG 74
MODU 130
Bulker 258
OSV 1,202
VesselsValue


Middle Eastern Fleet Vessel Types
USD millions
(source: VesselsValue)
Tanker $11,824
LNG $8,208
Reefer $8
Vehicle Carrier $514
Small Dry $593
LPG $1,096
Container $1,188
OCV $1,727
OSV $1,995
Bulker $2,746
MODU $3,599
VesselsValue


Middle Eastern Fleet Age Profile
(source: VesselsValue)
Total Value USD billions
Number of Vessels
On Order
0-4
5-9
10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50+
Number of Vessels
Total Value USD m
VesselsValue


Top Middle Eastern Owners by Value
(source: VesselsValue)
Total Value USD billions
Number of Vessels
Qatar Gas Transport Co
Oman Shipping Co SAOC
Bahri
Maran Nakilat
NITC
Live Number of Vessels
On Order Number of Vessels
Total Value USD m
VesselsValue


Top Middle Eastern Owner Nations by Value
(source: VesselsValue)
Total Value USD billions
Number of Vessels
United Arab Emirates
Qatar
Saudi Arabia
Iran
Kuwait
Live Number of Vessels
On Order Number of Vessels
Total Value USD m
VesselsValue


Top Import Regions of Middle Eastern Crude in the Past 12 Months by Cargo Tons
(source: VesselsValue)
Cargo Tons (DWT) millions
Number of Journeys
Far East
South East Asia
Middle East Gulf
East China Sea
India West Coast
Cargo Tons, DWT
Distinct Vessels
VesselsValue

Jetstream

Cruise Ship Waterblasting

When it came time to tackle a 60,000-sq. ft. coating removal project for the 17-deck Grand Princess cruise ship at the Swan Island ship repair yard in Portland, Oregon, Vigor Industrial LLC, brought in Jetstream of Houston, LLP, to provide waterblasting equipment and on-site technical support. Jetstream provided two Verti-Drive robots and four pumps with eight Jetstream Tornado guns outfitted with tetraCORE nozzles. Jetstream and FS Solutions also provided uninterrupted access to service and expertise to ensure the job – performed at one of the largest shipyards on the West Coast – kept running on time and on budget.

www.waterblast.com

HGG Ship Profiler

HGG'S new UPC 450 Ship Profiler increases cutting and pre-fabrication productivity by eliminating the need to cut ship stiffeners and spools by hand. HGG production automation combines ship stiffener cutting, 3D profile cutting with optional tube cutting in the first affordably priced machine of its kind. The UPC 450 Ship Profiler also has a small machine footprint, saving valuable floor space. The HGG UPC 450 Ship Profiler offers full process cutting integration through the HGG ProCAM Software Suite, integrating thermal cutting HGG ProCAD design, HGG ProGRAM work preparation coordination, and HGG's internationally recognized 3D plasma cutting intelligence.

www.hgg-group.com

HGG

Saint-Gobain Abrasives

Norton BlazeX Fiber Discs

Saint-Gobain Abrasives introduced its Norton BlazeX F970 Fiber Discs, the next generation of Blaze. The Norton BlazeX F970 Fiber Discs enable faster rust removal, and enhanced cleaning and detailing processes for better finishes. Users performing right angle grinding on a routine basis will see immediate results using Norton BlazeX F970 Fiber Discs due to improved micro-fracturing grain. By consistently exposing sharper grain edges, this improvement delivers a better cut rate, and longer disc life when compared to blended ceramic alumina discs.

http://nortonsga.us/blazex

Plasma Cutting Consumables

Thermal Dynamics, an ESAB brand, launched its new Cutmaster Black Series of enhanced performance plasma cutting consumables, which extend operating life by 60 percent compared to standard life electrodes, the company claims. They are featured on the SL60QD 1Torch, which comes with the Cutmaster 60i handheld air plasma cutting system. Coupled with internal enhancements on the Cutmaster 60i, the new electrode design increases the unit's rated cut and piercing capacity to 0.75 in., a 16.6 percent improvement. The Cutmaster 60i can sever metal up to 1.5 in. The SL60QD 1Torch with Cutmaster Black Series consumables is also available as an option for the Cutmaster 58 handheld air plasma cutting system.

www.esab.com

Garlock Flood-Gard

Garlock launched FLOOD-GARD Bearing Isolators, which offer the proven performance of Garlock bearing isolators for flooded applications. The patent-pending seal design provides bearing protection even in the most challenging flooded environments, extending the life of rotating equipment such as gearboxes, pumps and motors. The latest addition to Garlock's family of KLOZURE Bearing Isolators, FLOOD-GARD is a seal that combines improved safety and overall process efficiency with cost savings through extended equipment and bearing life. FLOOD-GARD's Cam-Lock design provides excellent bore retention while allowing easy installation by hand.

www.garlock.com

Garlock

SI Tech

New Dry Glove Systems for SLÄGGÖ Flex Ring

SI TECH launched three Dry Glove Systems that connects with SLÄGGÖ Flex ring; NEVA, OBERON and LIANA. SLÄGGÖ Flex Ring provides the opportunity to change wrist seals instantly, without gluing. SI TECH has now developed three versions of Dry Glove Systems for SLÄGGÖ Flex Ring – to give the diver the opportunity to choose the system that is best for his/her diving needs. All three systems are easy to mount, easy to use Dry Glove Systems designed to perform – no matter the diving environment. NEVA is an easy to use "pull over" Dry Glove System.

www.sitech.se

HGG Is Making Shipbuilding & Repair Easy, Affordable & Accurate

With a small footprint and a big range of capabilities, HGG'S new UPC 450 Ship Profiler increases cutting and pre-fabrication productivity at small to mid-size shipyards by eliminating the need to cut stiffeners and handle secondary grinding by hand. Like its bigger brother, the PCL, the Ship Profiler is packed with automation, including ship stiffener cutting and 3-D profile cutting with optional tube cutting. And, it all comes in a package that is affordably priced.

"The Ship Profiler allows an operator to place a stiffener on the cutting table where it reads a program, scans the material and moves down the length of the material to cut all of the slots and profiles that are needed," John Tutino, HGG Sales Manager for the America, explains. "It can handle flat bars, bulbs and angles as well as tubular pipes."

The cutting trolley within the Ship Profiler's cutting cell controls moves over the material to locate the cutting start point while HGG's patented cutting head and biaxial cutting torch enable high-precision cutting accuracy. Knowing the space constraints many smaller shipbuilders face, the Ship Profiler can be configured to accommodate a variety of footprint requirements.

According to Tutino, "Before the Ship Profiler was available, smaller shipbuilders tended to do things manually, which is also more time-consuming. They simply never considered investment in a million-dollar machine." The UPC 450 changed that, and at one-fourth the cost. Plus, it accomplishes this while offering productivity and accuracy, and without that big prohibitive footprint and the high cost.

In addition to easing the operator's job, the Ship Profiler also aids in employee hiring and retention efforts. For starters, it eliminates the need for an experienced layout person and welder. And in the long run, employees are more likely to stay on the job when their responsibilities are less physically rigorous.

Another employee-centric feature included in the Ship Profiler is its integrated fume extraction. To maximize worker health and safety, the machine includes two fume extraction modules, safely capturing and disposing the dust, smoke and fumes created by plasma cutting.

HGG ProCAM Software

To simplify the cutting process, the Ship Profiler includes HGG's exclusive ProCAM software suite, integrating thermal cutting ProCAD design, ProGram work preparation coordination and HGG's internationally recognized 3-D plasma cutting intelligence.

"Our controller is graphic-driven so it's just a matter of initializing the starting point and selecting the correct program to execute, and the operator is ready to go," Tutino explains. "Once the parts are cut, he parks the machine in the home position, lifts the cut parts off of the table onto a cassette and moves them to the welding station."

The UPC 450 Ship Profiler also features a scanning device, which is important because no two raw materials are the same. It scans the area that needs to be cut, alerting the robot arm about the profile it's dealing with and how to execute that particular cutting routine.

An additional, optional feature is also available for shipbuilders that need to cut pipe, which can be added to the system at any point in time. Thanks to the ability to customize the overall machine based on the customer's needs, the pipe-cutting feature can also be integrated in a space-saving way. According to Tutino, the system is like a Lego set that can pieced together in a variety of ways.

John Tutino
HGG Sales Mgr, Americas

"Smaller shipbuilders build smaller ships, so the quantity of stiffeners they need to process is less than their larger counterparts," Tutino says. "But their needs for productivity are just as great. No matter the size of the ships being produced, the concept behind building them is the same. We're proud to be able to offer this segment of the market proven, existing technology that they can count on."

All American Marine


AAM

All American Marine began operations over 30 years ago by specializing in building aluminum fishing vessels used from California to Alaska. AAM has exclusive North American building rights with Teknicraft Design, Ltd. in Auckland, New Zealand. Unique design characteristics ensure high-speed travel, ultra-low wake, and leading fuel efficiency. AAM is at the forefront of aluminum vessel design and manufacturing. AAM guides clients through each step of the process, delivering value on a vessel that is truly unique to its specific application. Increased production capacity and a highly skilled and growing work-force allows AAM to produce high-quality vessels at a fair price. From lithium-ion powered vessels to the leading edge in catamaran and monohull design and production, the future is bright for aluminum vessel manufacturing.

AAM recently delivered the Reliance, an ultra-low wake passenger ferry for Kitsap Transit. AAM also recently launched its sister ship (the 3rd Rich Passage class vessel, including the Rich Passage I), the Lady Swift as well. Both are 118 passenger, hydrofoil-assisted catamarans that will serve as high speed passenger ferries for Kitsap Transit. Construction is underway on a 72-ft. research vessel for Duke University, as well as a 73-ft. research and patrol vessel for the Texas Parks and Wildlife Department.

www.allamericanmarine.com

Conrad Shipyard


Conrad Shipyard

Conrad Shipyard, established in 1948 and headquartered in Morgan City, La., designs, builds and overhauls tugboats, ferries, lift boats, barges, offshore supply vessels and other steel and aluminum products for both commercial and government markets. The company provides both repair and new construction services at its five shipyards located in southern Louisiana and Texas.

Diversity of offerings has been Conrad Shipyard's niche. Built at its Orange, Texas shipyard, Conrad delivered the Clean Jacksonville, the first LNG Bunker Barge built in North America, in August of 2018. Clean Jacksonville is currently serving LNG-powered vessels in the Port of Jacksonville. With five modern and expansive shipyards; an experienced workforce and computerized manufacturing equipment; multi-disciplined engineers; and a management team focused on customer satisfaction, Conrad Shipyard is well positioned to provide cost-effective solutions to complex shipbuilding challenges. Recent deliveries include the LNG bunker barge Clean Jacksonville (August 2018), the last of four Kapena Class Tugs for Young Brothers (May 2019) and delivery of a Vane ATB (March 2019).

www.conradindustries.com

Fincantieri Bay Shipbuilding


Fincantieri Bay Shipbuilding

Fincantieri Bay Shipbuilding traces its history of building quality ships back to 1918, and is an industry leader in the construction of articulated tug-barge units and OPA 90-compliant vessels. A feature that sets the shipyard apart is the diversity of its portfolio. Equipped with a large 1,154 x 140-ft. graving dock, a floating drydock with 7,000-ton weight capacity built to U.S. Navy certification requirements, and a 170-ton lifting capacity to meet the most demanding requirement, the yard's workforce averages more than 20 years of construction experience.

Over time, the yard has built ATBs, containerships, dredges, ferries and tour boats, OSVs, polar icebreakers, self-unloading carriers and more. FBS has also completed 14 engine repowerings which are more energy and emission efficient, ranging from 1,000 ft. vessels to passenger ferries and tugs. Last December, Fincantieri delivered an ATB to Kirby; the third the yard had built and delivered to Kirby. It also delivered a converted barge to Port City Marine Services. A 495-ft. freight barge with new cargo holds, trunk deck and bow, and a new cargo unloading system, the conversion project took 21 months to complete.

https://fincantieribayshipbuilding.com

Gladding-Hearn Shipbuilding, Duclos Corp.

Gladding-Hearn

Since 1955, Gladding-Hearn has been synonymous with pilot boats, having built more launches (90) operating in this hemisphere than any other shipyard. In 1978, the yard joined forces with designer C. Raymond Hunt to build the first launch with a deep-V hull, soon to become the industry standard. In 1977, the shipyard delivered America's first Z-drive tractor tug. An Incat Crowther licensee since 1987, Gladding-Hearn became the second shipyard in the country to build high-speed passenger catamarans and has built the majority of fast ferries on the East Coast and Great Lakes (43).

Recent high-profile projects include the delivery of a 113/320-ft. passenger high-speed catamaran ferry to Rhode Island Fast Ferry. This is the second passenger catamaran built for the operator. 2018 also saw delivery of a 75-ft. pilot boat to the Southwest Alaska Pilots Association, retrofit of Brandywine, one of the first Chesapeake class launches built in 2003, and delivery of the eight Gladding-Hearn launches to the Virginia Pilots Association. The shipyard is part of the Vigor Shipyard's team selected by the US Army in 2018 to build a fleet of 38 high-speed landing craft (MSVL).

www.gladding-hearn.com

Detyens Shipyard


Detyens

Celebrating more than 50 years of service to the maritime community, Detyens Shipyards, Inc., located in the historic city of Charleston, South Carolina is busy building a tradition of quality workmanship at a reasonable price. Family owned and operated since its inception, the company has continually emphasized customer service, family values and safety in the work-place. Hard work, dedication and the goal to provide economical ship repair services is the benchmark behind the Detyens Shipyards Creed, "Customer before Company, Employee before Owner, Family before Self, and Safety Above All." Specifically, Detyens Shipyards facility offers three (3) graving docks and with a capacity of up to Panamax. In addition to the docks, the facility also offers modern, enclosed shops for all crafts; eight 56-ton gantry cranes (on a continuous rail system); four tower cranes; rail access and over 8,000 feet of deepwater pier space and a floating dry dock for smaller vessels. Detyens Shipyards continues to increase its capacity with modern equipment and facility upgrades. Recently completed repair/conversion work includes no less than USNS hulls and projects as well as work for McAlister, Vane Brothers, Bouchard and myriad dredge assignments.

www.detyens.com

Eastern Shipbuilding

ESG

Eastern's proven shipbuilding expertise allows the firm to build and deliver any type of vessel that client's require; on time and on budget. As Eastern moves into the future, it looks forward to continued diversification and growth of its portfolio of vessels. Eastern is currently one of the largest employers in Bay County, Florida, with a workforce number that varies based on the number of vessels under construction. Many key superintendents and foremen running the shipyard have been employed at Eastern over 15 years. Eastern Shipbuilding's portfolio of more than 350 vessels includes OSVs, MPSV's, offshore construction vessels, diesel electric vessels, dredges, ATB's, offshore tugs, Z-drive harbor tugs, inland towboats, ro-ro/passenger ferries, barges, fireboats, research vessels, fishing vessels, military craft and more. It operates two new construction and repair shipbuilding facilities, both located in Panama City, Florida, spanning 326 acres and a workforce of over 800 employees. Recent deliveries and work include cutting steel on NYCDOT Staten Island Ferries, the USCG Off-shore Patrol Cutter, a contract with FMT for four Inland Pushboats, another with Bisso Off-shore for Z-Drive Tugs, and myriad other contracts and deliveries to a wide range of diverse customers.

www.easternshipbuilding.com

Metal Shark


Metal Shark

Metal Shark is a diversified shipbuilder with three fully self-contained shipbuilding facilities in Alabama and Louisiana, specializing in the design and efficient high quality construction of welded aluminum and steel vessels from 16 to 300-ft.+ for defense, law enforcement, and commercial operators. Key customers include the United States Coast Guard, Navy, Air Force, Army, foreign militaries, law enforcement agencies, fire departments, passenger vessel operators, pilot associations and towboat operators. By the numbers, Metal Shark employs 500+ employees and produces more than 200 vessels per year. The shipbuilder has been one of the more progressive and aggressively growing yards in the U.S.

Recently Miami-Dade selected the Metal Shark "50 Defiant X" fire boat, a welded aluminum monohull vessel featuring a proven hull form and a specialized arrangement optimized for firefighting. The new fire boats will be built at Metal Shark's Jeanerette, La., production facility and are intended to replace older fire boats currently operated by the Department. The 50 x 15-ft. vessels will be powered by twin inboard diesel engines mated to water jet propulsion units

www.metalsharkboats.com

Ribcraft


Ribcraft

Ribcraft designs and builds safe, durable, performance oriented professional grade rigid inflatable boats (RIBs) ranging in size from 15-41 ft. that fulfill a variety of missions from patrol and rescue to passenger-for-hire and military operations. Ribcraft specializes in building mission specific patrol and rescue boats, support and workboat vessels, dive boats, and USCG Certified passen-ger for hire vessels. Ribcraft designs and builds RIBs to meet the emergent requirements of military and government agencies with current contracts with the United States Navy, United States Department of Fish & Wildlife Service, and United States Air Force. The Sub Chapter T Certified tour boat market has also kept production busy with numerous recent deliveries and more under contract. Beyond military agencies and tour boat operations, Ribcraft remains dedicated to building rescue and patrol boats for First Responders. RIB-CRAFT recently delivered a specialized RIB-CRAFT 7.8 patrol boat to the U.S. Department of Fish & Wildlife Service with a Hypalon hybrid foam collar and featuring twin Mercury diesel outboards.

www.ribcraftusa.com

United States Marine


United States Marine

United States Marine, Inc. originally built racing sailboats with much success. Since 1987, United States Marine, Inc. has designed and built military, patrol and special warfare boats ranging in length from 21 to 90 ft., constructed of high performance composites and aluminum. A fully integrated manufacturer capable of designing, building and testing boats in-house, USMI has supplied DOD craft uninterrupted for 35 years and counting. Headquartered in Gulfport, MS, with a maintenance/repair facility in Chesapeake, VA, the Gulfport facility has extensive dockage and capability for launching and retrieving boats. The facility connects to the Mississippi Sound providing riverine and littoral type environments, as well as varying water conditions for trials and training.

USMI's dominate focus is the production of sophisticated craft for the Department of Defense. Craft include the SOCR, 11MNSWRIB, MKV and 9M MERC, all of which are in-house USMI designs. The 9M MERC is the latest USMI boat in the small craft naval inventory and includes an outboard powered open and cabin boat that is lower cost for initial investment and maintenance. The 9M MERC is used primarily by Navy EOD forces, including Mobile Diving and Salvage Units to conduct underwater operations, harbor clearance and passenger transport.

www.usmi.com

Vigor


Vigor

Vigor is a values-driven, diversified industrial business operating in seven locations with 2,300 people in Oregon, Washington and Alaska. Vigor excels at specialized shipbuilding and ship repair. Vigor's marine fabrication teams build high performance, mission-critical vessels for combatant, unmanned and port security applications as well as ferries, fireboats, survey vessels, tugs, and a variety of aluminum workboats. Vigor ship repair and conversion teams operate out of three primary locations with eight dry docks including the largest floating dry dock in North American. Key customers include MARAD, the U.S. Coast Guard, the U.S. Army and the U.S. Navy. Vigor took possession of its new state-of-the-art aluminum fabrication facility in Vancouver, WA in July. Production will be anchored by the nearly billion dollar contract the company was awarded to build the U.S. Army's new landing craft. Other government programs will be built at the site along with aluminum fast ferries and commercial workboats. The inaugural project at the facility will be two 56' pilot boats for the Port of Los Angeles. Vigor is steadily increasing its export portfolio. Two Response Boat – Mediums (RB-M) are on their way to Jordan and six RB-Ms will be delivered to Bahrain this year.

www.vigor.net

VT Halter Marine


VTHM

VTHM designs, builds and repairs a wide variety of vessel, including tugs, ferries, ocean-going vessels such as security patrol, oil and gas support, logistic support and survey vessels. VT Halter Marine has more than 60 years of experience. VTHM shipyards have delivered more than 2,600 vessels to commercial and government clients in 29 countries on five continents. VTHM builds to the requirements of the U.S. Coast Guard, U.S. Navy, ABS and other regulatory bodies and classification societies, up to and including vessels up to 50,000 DWT. New in 2018, VT Halter Marine debuted the blast and paint facility (pictured), a cutting edge, enclosed building that allows crews to work in any weather conditions while in an environmentally safe atmosphere. This facility allows ship sections to be prepared, blasted and painted in a controlled environment. The facility is also designed for 24/7 operation in all weather conditions, and uses 100 percent LED lighting to reduce energy consumption and carbon footprint. The firm's ongoing work and backlog is significant, mixing commercial with government projects.

https://vthm.com

Baltic Workboats US


Baltic Workboats US

Baltic Workboats has been building advanced vessels for two decades, producing vessels that operate in some of the most challenging environments worldwide. The firm focuses on next-generation vessels that are versatile and fuel efficient with integrated safety features and an unparalleled level of comfort. Baltic Workboats is a growing shipyard with modern facilities and a skilled workforce of 200+ people.

Over the last 19 years, they have designed, built, and delivered over 200 versatile vessels. Operating under ISO 9001 and ISO 14001 certificates, Baltic Workboats US Shipyard is located in Tampa, Florida. Baltic Workboats portfolio includes pilot vessels, search and rescue, patrol, defense, research, and ferry vessels. The recent delivery of a large-scale multi-role hybrid patrol vessel has established the firm as a builder committed to new technologies, efficiencies and minimal environmental impact. The 150-ft. vessel is capable of running in diesel, fully electric or hybrid modes at speeds over 30 knots. In 2019, the firm completed delivery of an 11 vessel order for 50-ft. pilot vessels to the Danish Pilots.

www.balticworkboatsus.com

Burger Boat Company


Burger Boat Company

Burger is building two sets of aluminum hull modules for the first ever all-electric passenger ferries built in the U.S. for Maid of the Mist in Niagara Falls, NY. In addition, Burger has built research vessels for the Wisconsin DNR and U.S. Geological Survey and passenger vessels used in Chicago. Burger is an established shipyard on the western shore of Lake Michigan between Milwaukee and Green Bay, WI. It offers new vessel construction, refit, repair and maintenance. Burger's facility, with eight large heated construction bays, can accommodate vessels to 200-ft. (60m). Burger recently delivered a number of vessels, including aluminum catamaran hull modules, an aluminum explorer yacht, an 89-ft. steel passenger vessel and a 78-ft. steel research vessel, and many other ferries, yachts, research vessels, and passenger vessels.

www.burgerboatcommercial.com

Marine Group Boat Works (MGBW)


Marine Group Boat Works

MGBW is an award-winning, eco-friendly full-service boat repair and new construction company occupying more than 25 acres of land and water across two facilities on the San Diego Bay and a third facility in Cabo. Featuring one of the largest travelifts in the U.S., MGBW specializes in refits, repairs and new construction of vessels up to 220 feet long. MGBW specializes in the construction of steel and aluminum workboats, tugboats, barges, training vessels and patrol boats. Within its repair division, it has a team of 170+ tradespeople cross-trained in welding, pipefitting, ship fitting, machining, mechanical and electrical work, propeller work, painting and fiberglass repair. On a routine basis, it hauls vessels up 665-tons to perform coast guard inspections, class surveys, preservation, refurbishments, refits, engine repowers, structural rein-forcements and hull extensions.

www.marinegroupbw.com

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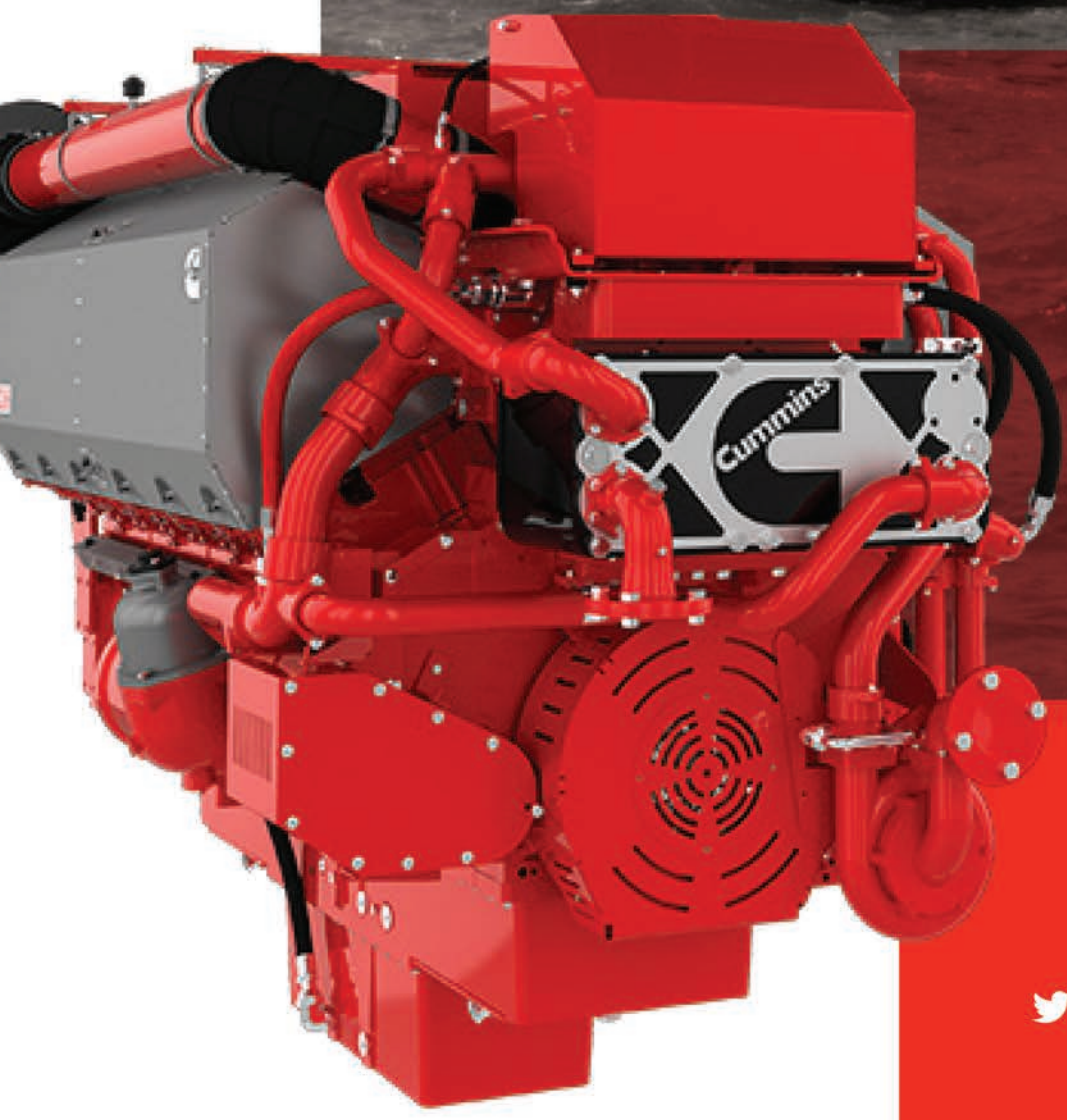

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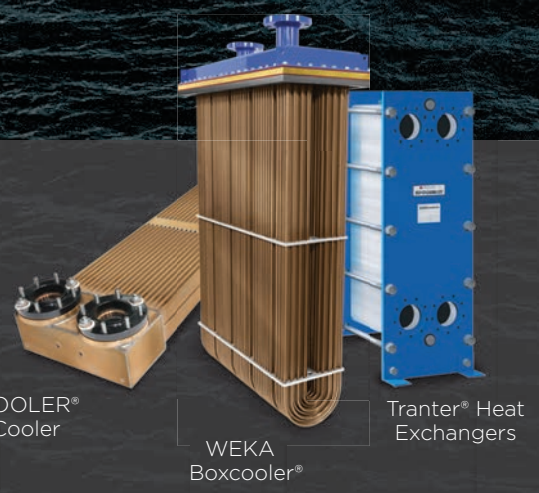

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