

January 2018

MARITIME REPORTER AND ENGINEERING NEWS

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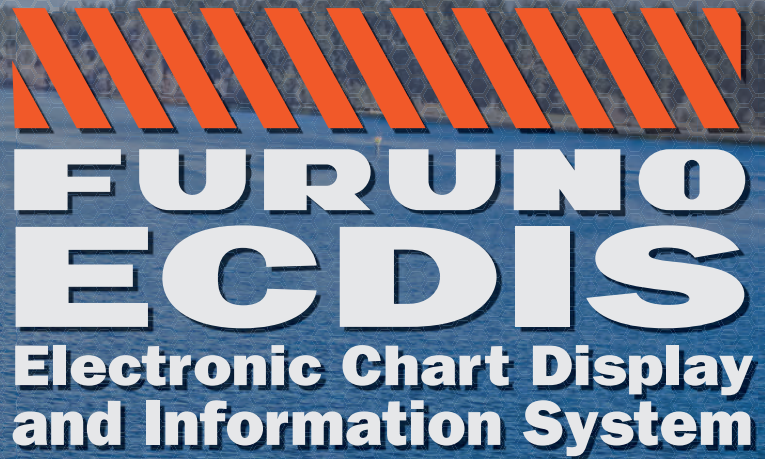
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THE COVER

A State of Repair

A dormant global maritime market has left companies large and small battling for business, perhaps none more so than the competitive ship repair sector. While struggles are widespread and well-recorded, there are pockets of activity and success, including a “robust” 2017 and “record” 2018 at Grand Bahama Shipyard, featured on this month’s cover. The ship repair yard report starts on page 36.

Photo: Grand Bahama Shipyard



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fleet from its current 279 ships to a minimum of 355. While the will and the interest among the shipbuilding and supply community are surely there, the end game will be to, as Rod Tidwell proclaimed in the movie *Jerry Maguire*, "show me the money."

• **Offshore Energy:** While full recovery in the traditional offshore oil markets are still far over the horizon, at press time the price per barrel was poking at the \$60 barrier, and the industry as a whole has taken four years to operate in the 'new norm.' There is increasing activity offshore in the North Sea, and as you'll see on page 9, even activity drilling in Alaska's Beaufort Sea. The current Administrations loosening of environmental rules and opening of fresh offshore fields will certainly help to expedite any recovery. But offshore energy is no longer the sole mandate of oil, as offshore wind continues to grow globally, with my backyard, the east coast United States presenting some of the biggest opportunities globally.

Gregory R. Trauthwein
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Going into December 2017, based on numerous C-Suite interviews, I must admit that I was decidedly bearish on the prospects for a broad-based maritime rebound in 2018. While it would be foolhardy to be brimming with optimism today, there are signs that the bears are going into hibernation and 2018 could be a watershed moment in the recovery of many things maritime. Here's some of the good news we see coming up the channel in 2018:

• **The Cruise Market:** While this is not exactly a Nostradamus-style pick, it appears that the cruise sector's torrid run will continue in 2018 and beyond. Having covered this market for more than a quarter of a century, I've seen more than my fair shares of peaks and valleys. The factor that makes this cruise build-up different than the past is the breadth of market. "Cruise" historically has been dominated by big ship, bigger ship, oceangoing. Today's cruise market is still firmly planted in the ocean, but the cruise industry is exploding globally in the big ship, small ship, inland, coastal, exotic locale and specialty luxury cruise segment. Just this week I had a nice conversation with industry icon Edie Rodriguez regarding her new stint at French luxury yacht cruise company Ponant. While the full interview will publish in our February 'Cruise' edition, Ponant is small but intriguing luxury brand to watch as it has a new fleet under constructions, including plans to build the world's first hybrid LNG fueled icebreaking cruise yacht.

• **The Bulk Market:** Yes, bulk. Bulk carriers are the poster child of maritime hard times, as the new ships were popping out at a record clip when the global economy came to a screeching halt in 2008, and this massive sector has languished ever since. But recent reports read that second hand ship sales have reached a 10-year high, and there is optimism, albeit cautious optimism, that one of shipping's deepest, longest downturns is nearing its end. According to published statistics citing Clarkson, by mid-December 2017 1,630 ships (\$19 billion) were sold versus 2016 when 1,276 for \$12.3 billion were sold. Seaborne trade is set to grow by 4% according to the WTO, and China is building again, but building with imported materials as the country comes under increasing pressure to clean up its own environmental signature. Need a bulk carrier quick? There an 80,000 ton unit for sale on Alibaba.com for \$18m!

• **The Navy Market:** With the change of administration one year ago there was great enthusiasm for the reconstruction of U.S. naval forces which, while still the most dominant navy in the world, had dwindled in numbers and capability. Now that 355 ship mandate is law, included in the 2018 National Defense Authorization Act (NDAA) signed by President Donald Trump is policy to grow the U.S. Navy

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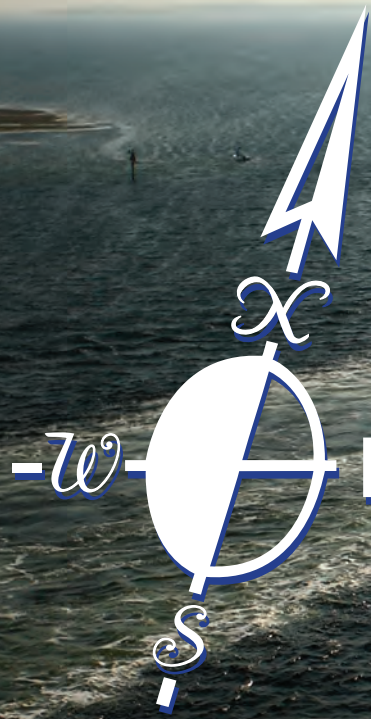


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Malaysia will allow a U.S.-based exploration firm to resume the search for Malaysia Airlines flight MH370, an airline support group told families of the victims on Friday, in a bid to solve one of the world's greatest aviation mysteries. Flight MH370, carrying 239 people, disappeared en route from Kuala Lumpur to Beijing in March 2014. Australia, China and Malaysia ended a fruitless search in January last year. www.marinelink.com/news/goahead-resume-search432673



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Questions Raised Regarding BWMS Testing



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Serious questions have been raised regarding the testing of ballast water management systems (BWMSs). In order for a BWMS manufacturer to sell its equipment for use on commercial vessels operating in US waters, the equipment must be tested in accordance with U.S. Coast Guard and Environmental Protection Agency (EPA) requirements and the equipment must then obtain a type approval certificate from the Coast Guard. To date, type approval certificates have been issued to six manufacturers and others are in the pipeline.

In accordance with Coast Guard regulations, the testing must be performed at independent laboratories (ILs) that meet Coast Guard requirements. There were, until 6 December 2017, five ILs available for this evaluation, inspection, and testing work. On that date, Dr. Mario Tamburri and the University of Maryland Center for Environmental Science (UMCES) withdrew the Maritime Environment Resource Center (MERC) from the program, citing the need to maintain scientific integrity.

Dr. Tamburri is a respected biologist and marine scientist and has been a leader in ballast water management issues for many years.

UMCES is concerned that the BWMS certification testing, as currently conducted, is not scientifically sound, predictive, consistent and transparent. While there are written regulations and formal protocols that govern the testing, questions have arisen regarding various specific testing procedures.

According to Dr. Tamburri, the Coast Guard personnel involved in the program have formally and informally provided different answers to different laboratories via ex parte meetings, tele-

phone calls, emails, and written letters, resulting in dramatically inconsistent approaches at the various laboratories. Because this guidance has not been shared with all of the approved ILs, the process is no longer rigorous, consistent and transparent. The Coast Guard has conceded that there are shortcomings in its BWMS certification testing and approval process. Questions raised over time by the various ILs and answered informally by the Coast Guard include:

(1) whether organisms connected in a colony or chain should be sized and counted as several small individuals or as one large individual;

(2) whether the regulatory requirement for an average of 'less than 10' live organisms per volume means 9.99 or 9.00 or some other value as regards statistical analyses and sample replication;

(3) whether a land-based commissioning test can count as a biological efficacy (BE) trial if it turns out to be successful, but left as a commissioning test if the trial is not successful;

(4) whether land-based ballast water hold times need to be a uniform fixed time of greater than 24 hours in length for all trials to provide statistical replication or can hold time during land-based testing vary from trial to trial;

(5) whether shipboard testing can or should be performed on non-cargo-carrying vessels that merely mimic ballasting operations;

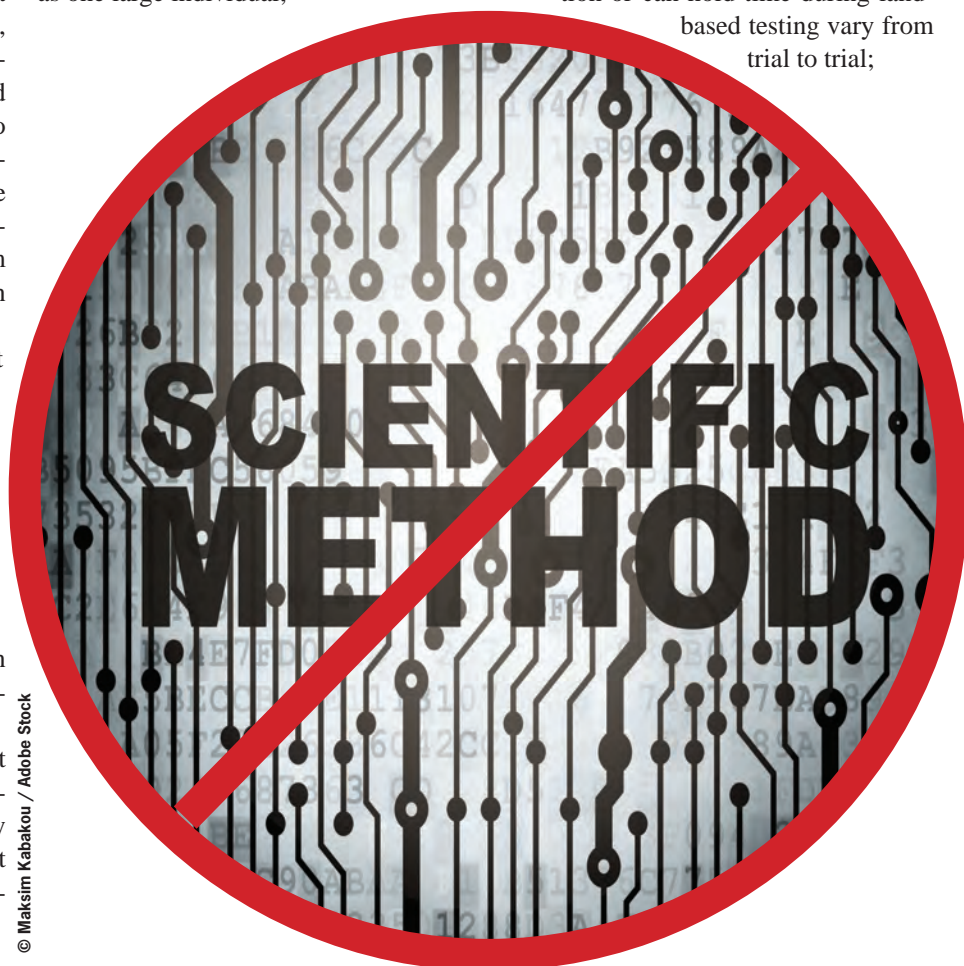
(6) whether physical, chemical, and biological challenge water conditions can be artificially manipulated (e.g., adding brine to change salinities, adding cultured non-native species, etc.) to meet required test conditions;

(7) whether methods that have not been formally validated or approved can be used and what is required for validation and Coast Guard approval; and

(8) what steps should be taken to ensure that unmoving but intact zooplankton (such as eggs, molluscan larvae, foraminifera, and large diatoms) found in discharged ballast water during a test are in fact dead.

Some of these questions might seem esoteric to the uninitiated, but different answers to the same question can result in a particular BWMS passing or failing its certification test. It is important that, to the maximum extent practicable, the test results at one approved IL be consistent with the test results at any other approved IL.

I do not personally know if the issues raised by Dr. Tamburri have substance. I can say, though, that an agency such as the Coast Guard administering an important program such as this should not be having ex parte contact with individual program participants on substantive issues at which the agency provides guidance to the participant. The proper procedure is for the agency to listen to all concerns; formulate uniform direc-



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According to Dr. Tamburri, the Coast Guard personnel involved in the program have formally and informally provided different answers to different laboratories via ex parte meetings, telephone calls, emails, and written letters, resulting in dramatically inconsistent approaches at the various laboratories. Because this guidance has not been shared with all of the approved ILs, the process is no longer rigorous, consistent and transparent.

tion or guidance in house; and then share that direction or guidance with all participants equally, thereby maintaining a level playing field.

I can envision how this situation, if it exists, could have happened. This is a complex program with many moving parts and many participants within the agency. Someone calls from one of the ILs and asks “what does it mean in the regulation where it says _____?” The recipient of the call (possibly a mechanical engineer), trying to be helpful and understanding the issue from that person’s perspective, answers the question and then turns his or her attention to a totally different matter, not recording the question or the answer. Later, someone from a different IL sends an email to a differ-


ent Coast Guard individual (possibly a marine chemist) about the same issue but approaching it differently, asking “as regards _____, is it OK if we do this?” This second individual also answers the question, but the answer is not the same as it was to the first question because the questions were presented differently and the individuals answering the questions approached the issue from their own perspectives. Neither Coast Guard individual tried to mislead the questioner and the answers were correct within the bounds of the Coast Guard individual’s understanding of the issue. The problem is that the recipients of the answers could now innocently adopt different methodologies for the same portion of the BWMS certification testing.

This fundamental issue arises on a regular basis in the Coast Guard. It has field offices all around the country. Mariners and other stakeholders contact those field offices on an almost daily basis seeking guidance. Eventually, it happens that the answer received from one field office is not the same as received from another field office. When the issue is inevitably elevated to Headquarters, it gets staffed and researched.

A considered approach is developed and approved. At that point guidance put in the form of perhaps a policy letter or Navigation and Vessel Inspection Circular (NVIC) is disseminated to all field offices and shared with the public. Thereafter, all interested parties are (or should be) aware of how the Coast

Guard will view a particular matter. This is somewhat similar to a notice and comment rulemaking.

The sooner a difference of approach between two or more Coast Guard field offices or individuals on a substantive matter is discovered, the sooner a unified approach can be developed. Assuming that this is what has occurred with regard to BWMS certification testing procedures, it appears to be time to match pointers and develop an agreed and unified approach going forward. This is too important an issue to be left to chance. As I said above, Dr. Tamburri is a respected scientist and has raised issues that must be taken seriously by both the Coast Guard and the maritime community.



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Subchapter M

Myths vs. Reality & The Top 5 Moves to Make Now

In 2004 Congress reclassified towing vessels as vessels subject to inspection. Thus began a lengthy process of regulation drafting by the Coast Guard, with a great deal of input from the towing industry. In 2011, the Notice of Proposed Rule Making was published giving the public its first look at what has become known as Subchapter M. Over 3,000 comments were received by the Coast Guard on the Proposed Rule. After five years of responding to those comments and revamping Subchapter M, on June 20, 2016 the Final Rule was published. This new regulation is expected to impact over 5,000 towing vessels, and they have until July 20, 2018 to get into compliance. With the years of discussion and debate behind us and many important compliance decisions to be made, for many in the industry these next few months represent their last chance to determine their optimum path to compliance.

☞

Subchapter M is expected to impact more than 5,000 towing vessels, and they have until July 20, 2018 to get into compliance. There are many important compliance decisions to be made.

SUB M MYTHOLOGY

As with other modern regulations that provide options and flexibility, Subchapter M has created a new industry, as well as a great deal of confusion for those not directly involved in the sausage making. This confusion has given rise to a number of myths about Subchapter M. Here I will try my best to dispel some of the major ones.

MYTH 1 Companies were not given until 2022 to get all their vessels into compliance. They were given until July 20, 2018 to get all of their vessels into compliance. The Coast Guard gave themselves until 2022 to issue Certifi-

cates of Inspection (COIs) to all those vessels.

MYTH 2 If a company currently has a safety management system (SMS) it does not have to go with the Third Party Towing Safety Management System (TSMS) option. The biggest decision for towing vessel operators will be whether they should go with traditional Coast Guard inspections of their vessels, or to adopt a Towing Safety Management System (TSMS) and use a Third Party Organization (TPO) to conduct their audits. The TSMS option is a choice which has nothing to do with whether a company has an SMS or not. Companies will



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be free to indicate their choice for each vessel on the Application for Inspection.

MYTH 3 Towing vessel crews will have to know, and prove that they follow, any policies and procedures in the TSMS that pertain to them. The regulations require the auditor to determine how well towing vessel crews are complying with their stated policies and procedures.

MYTH 4 Audits of the TSMS may not be the same as those of voluntary SMS programs due to the fact that the regulatory expectation is clear, and that TPO external auditors will be acting as agents of the government and will therefore have increased scrutiny and liability. Additionally, in the wake of the sinking of the Steam Ship El Faro, an Alternate Compliance Program vessel, the Coast Guard released the "Action by the Commandant" report on December 19, 2017. The report states, among other issues, that the Coast Guard failed to adequately oversee the Third Party in that case,

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and that the Coast Guard is fully committed to rectifying those shortcomings. The Commandant agreed with Safety Recommendation #30, contained in that report, calling for the establishment of headquarters level Third Party Oversight Office, as well as a Third Party National Center of Expertise, “to conduct comprehensive and targeted oversight activities on all Third Party Organizations and Authorized Classification Societies that perform work on behalf of the Coast Guard.”

In addition to this increased oversight of the Third Party Organizations, operators should bear in mind that the Coast Guard will come every five years to conduct an Inspection for Certification on each Third Party TSMS boat to verify Subchapter M compliance and conformance to the TSMS.

MYTH 5 All TPOs are not the same. A TPO should not be chosen by price, or perceived ease of use, alone. Careful research and review of processes are essential.

MYTH 6 Companies do not have to use their current, all-inclusive, SMS as their TSMS. Whatever is approved as the TSMS by the TPO, basically has the force of law. This is in addition to everything else in Subchapter M. A standard industry SMS can be reduced by 52% and still meet the regulatory requirements of a TSMS. Think risk assessment.

MYTH 7 It is not the Coast Guard’s position that companies should go with the Third Party TSMS option, although that may be the opinion of some Coast Guard individuals.

TOP 5 MOVES TO MAKE

Here are the top five moves to make now to get on the right course:

MOVE 1 Avoid groupthink and peer pressure and make a well-reasoned decision on the TPO v. Coast Guard compliance option which represents the optimum path to compliance for your company.

MOVE 2 Get each towing vessel surveyed for Subchapter M, preferably by someone with Coast Guard marine inspection experience.

MOVE 3 Establish a system of logs and records, such as a Towing Vessel Record (TVR), as well as a compliance management system. Compliance management is not safety management. Relying on a TSMS alone, unless it has been specifically designed to ensure comprehensive compliance with Subchapter M, may not cover all the regu-

latory requirements. Get the captains to start doing it now. They will not magically become experts on July 20, 2018.

MOVE 4 For companies choosing the Third Party TSMS option, streamline the TSMS to reduce the risk of noncon-

formities. Use a tool such as a Safety Management Workbook to get crews to learn the policies and procedures. For those captains that need reminding, let them know that not following the TSMS policies and procedures could not only get the boats shut down, but they could

lose their license for it under 46 CFR part 5.

MOVE 5 For those choosing the Third Party TSMS option, conduct careful research and interviews with all TPOs before signing that TPO agreement.

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Propeller Guards & Cutters

By Matthew Bonvento & Jawara Drigo, Intern, Vanuatu Maritime Services

As I was preparing for Thanksgiving dinner I put on *Indiana Jones and the Last Crusade*. While Indiana Jones and Doctor Elsa Schneider were being chased by the Brotherhood of the Cruciform sword through Venice and their boat was neatly shredded by the propellers of a larger vessel, it had me thinking of how much propeller technology has changed over the years. And how hopefully Indiana's boat did not actually damage that vessel's propeller.

Recently an article passed through my news feed about the first 3D printed propeller. This is indicative of the direction the industry is taking. With the advent of new technology, the methods of implementation will revolutionize the maritime world. However advanced we become though, certain perils are still prevalent. The methods of prevention will be dependent upon the type and size of vessel as well as the risk that is trying to be prevented.

Personnel Injury

Propeller strikes are a concern for vessels with large tonnage down to personal craft. From whales who still bear the scars of a decades old propeller strike to the unfortunate children that suffer this risk is one in which life is more at stake than property and the environment. Think of the propeller guard as a steel cage that surrounds the propeller. Propeller guards are designed mainly for vessels of a smaller tonnage down to recreational to safeguard from potential accidents that could occur such as an individual falling off the boat. Due to the strong steel structure of the propeller guard, it is effective any protecting anyone who would otherwise get cut by the

propeller. There have been several cases of propeller related casualties.

One particular case occurred a in 2017 and involved a 12 year boy from the Centerport Yacht Club in Suffolk County, New York who was killed by a propeller after accidentally falling off a boat while taking a sailing lesson. This tragedy is possibly going to force a change in Suffolk County law forcing all small vessels to have propeller guards. This law may even be applicable to smaller vessels such as fishing vessels and tugs operating in Long Island. Casualties such as this drive home the importance of installing propeller guards on all types of small craft for the safety of people aboard as well as any swimmers, snorkelers or other living creatures or structures that may be near a vessel.

As effective as they are, propeller guards will not be efficient on larger vessels due to the excess weight. It would be interesting to see if propeller guards made of lighter weight material could do the same job effectively.

The Kort Nozzle is a round hydro-dynamically designed shroud that encircles the propeller. The concept of the Kort Nozzle, also known as the ducted propeller was originally developed by 20th century German engineer Ludwig Kort. Since its inception, the Kort Nozzle has been used strictly on vessels that are required to operate with high thrust at low speeds including tugs and trawlers. With the Kort Nozzle, a vessel's speed is kept at below 10 knots. If the vessel's speed exceeds ten knots, water flow to the propeller decreases and therefore, there will not be enough thrust generated to allow the propeller to rotate efficiently. It is not uncommon to find Kort Nozzles with

nets and lines wrapped around the outside as their net guards only catch, and don't cut fishing lines and nets.

Generally, propeller cutters are designed for the purpose of clearing any obstructions at sea that would significantly reduce the speed of vessels or render them inoperable. Propeller cutters are designed for marine growth and fishing gear, which due to their smaller diameter can easily be wound around a shaft causing significant damage, loss of time and possible environmental pollution.

The shaft mounted cutter or rotary cutter which is made of hardened stainless steel, works through a screw action which is generated once the shaft rotates. At the turning of the propeller, lines, nets and weeds are automatically drawn into the cutter blades.

The shaft mounted cutter is used for small vessels with shafts of 20mm to 255mm and cuts in both the forward and reverse directions. It is usually used on yachts, tug boats, pilot boats and super yachts and is currently installed on more than 100,000 vessels. One of the main advantages of the shaft mounted cutter is during its cutting action, there is little to no reduction in the speed of the vessel.

The mounting of such equipment is a simple process. There are a set of blades mounted around the shaft rotate with the blade cutting any line that is drawn in by the propeller suction. Requirements for shaft mounted cutters is a factor of the spacing between the strut hub and the propeller, requiring enough room between the two so as to not have the blades come in to contact on each rotation.

The propeller mounted cutter has a



About the Authors

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Jawara Drigo is an Intern at Vanuatu Maritime Services. Drigo is completing his undergraduate degree in International Transportation and Trade at SUNY Maritime College.

fixed blade mounted on the strut hub with other blades mounted on the propeller. During each rotation lines are cut as if with a scissor, making use of the fixed blade and rotating blades to slice the line. If aft seal rupture occurs, it can result in oil pollution and other damage to the vessel which would require expensive repairs.

In contrast to the shaft mounted cutters, the propeller mounted cutters are used in medium and large sized vessels and designed for propeller hub sizes of 300mm to 1000mm. The propeller mounted cutters are installed on all types of commercial and naval vessels including tankers, OSVs, cruise ships and semi-submersible drilling platforms. In general, the propeller cutters serve as a huge asset to vessel owners because they save them from facing serious penalties such as towage of their vessel by the Coast Guard as well as eliminating the need to send divers down into the sea to manually cut these lines, nets and weeds

or worse yet haul the vessel out of the water to conduct repairs.

Shaver cutters are line cutters that work by continuously shaving rope, line or other debris caught by the propeller. As a concept, this is a radical departure from scissor and disc designs which attempt to slice clear through line or rope at first strike.

Shavers employ fixed position vertical blades that skim closely over a cylindrical, smooth surfaced concentric rotating spool. The spool serves a number of important functions. First, line is prevented from sliding off the propeller hub and wind onto the shaft. Second, line is prevented from radial slipping. Third, to cause rotating line to press lathe-like against stationary radial cutting blades. The result is a substantial portion of line is progressively rendered harmless as it is converted to shavings. The blade angles are positively raked and rapidly remove line whenever line presses against



Photo: Spurs Marine Mfg.

the blade edges. With this arrangement debris has no alternative other than to be cut away.

On a typical shaver line cutter, there is at least one forward and one reverse blade, so the debris is cut no matter which direction the propeller turns. Faced with a severe propeller entanglement such as a large cluster of rogue rope, line, or net, by rotating and counter-rotating the pro-

PELLER, a shaver cutter has excellent prospects of freeing the propeller. Faced with a simple entanglement involving a single floating rope or line, a skipper probably would be unaware the cutter had done its job.

Using this type of cutter, a skipper's prospects of keeping a vessel's propeller free of rope or line are significantly improved.

Most modern cutters do not cause a significant amount of drag or reduction in speed. In addition most can be installed as an after market add on while in the shipyard, without a significant cost.

Risks of not installing this equipment can be catastrophic. One such case involved a cruise vessel which had two azipods entangled.

This job cost upwards of \$800,000 for each azipod. Unfortunately however the work did not end there. With the seal rupture there was a resultant loss of non-bio friendly lubricant in to the water, which necessitated a cleanup as well as a reporting to the coastal authorities. This whole situation could have been avoided for a price of approximately \$15,000.

Although not yet in widespread use, propeller cutters can prevent significant damage and downtime to vessels. As my mentor, Captain Michael DeCharles, always says "pay me now, or pay me later."



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Alison Nolan, GM, Boston Harbor Cruises

NOLAN



Photo courtesy Boston Harbor Cruises

Alison Nolan is General Manager and a fourth-generation owner of Boston Harbor Cruises (BHC), a company that moves more than 2.5 million passengers annually on its fleet of 60 vessels with more than 600 daily departures seven ports and more than 30 facilities. But the story of BHC and Alison Nolan transcends raw numbers; as the company and passenger vessel industry are in her DNA, more of a lifestyle than a career. She spoke with Maritime Reporter & Engineering News recently to address the rewards and challenges inherent in her position.

BY GREG TRAUTHWEIN

We understand your family has a long history operating passenger vessels in the Northeast U.S. Please give us a brief historical overview of the Boston Harbor Cruises.

In 1926, soon after becoming the youngest licensed captain in the history of the port of Boston, 16-year-old Matthew "Matty" Hughes founded Boston Harbor Cruises (BHC). BHC's first venture, with only two full-time employees, was a 30-minute Charles River cruise for 10¢ with a boat borrowed from a friend. This continued until 1942 when service was interrupted as Matty enlisted and served as a USN Seabee in World War II.

After the war, Matty expanded operations to include vessels inside Boston Harbor – \$2 sightseeing tours running three times a day. It was during this era that BHC became a true family-run enterprise with Matty's daughters, Rookie and Rita (second generation), coming on board, followed closely by their children. Backed with the arsenal of experience and expertise he had built during his time in the Seabees, he grew the fleet by purchasing and refurbishing U.S. military surplus vessels.

In the early 60s, the family switched its emphasis to deep sea fishing expeditions. Passengers would charter day and overnight trips to Stellwagen or Georges Bank for just \$6 for a full day in search of cod, haddock, halibut, blue fish, tuna and more.

In the late 1970s, recognizing the opportunity that a new influx of visitors brought about by newly developed tourist attractions such as the New England Aquarium and Faneuil Hall Marketplace, BHC moved back into the sightseeing market. But this time it would be Matty's grandchildren, including current principals Rick and Chris Nolan (third generation) who would be at the helm.

In the 1980s, their leadership was instrumental in BHC securing a contract with the Massachusetts Bay Transit Authority to provide water transportation services between downtown Boston and Charlestown, a heavily

traveled commuter route. This transformed BHC from a seasonal business to a year-round venture for the very first time in our history. Since then, the MBTA has awarded additional commuter ferry contracts to the company, the largest carrying 5,000 passengers per day.

Today, the company continues to grow with Partners Rick, Chris and myself, Matty's great-granddaughter and Chris' son Patrick.

In addition to commuter runs, current service offerings include Whale Watches in partnership with the New England Aquarium, the Provincetown Fast Ferry, nine different Sightseeing Cruises including Brunch and Sunset Cruises, the Salem Fast Ferry, Ferries to the Boston Harbor Islands National and State Park, Private Events, Codzilla high speed thrill ride, an on-call Water Taxi Fleet, Star

Gazing Cruises in partnership with the Museum of Science, Commuter Ferries and more. BHC also launched a specialized Offshore Logistics Division which operates five OSV's including a 240-ft. DP2 vessel in support of geophysical research and survey, UUV testing and recovery, LNG and Offshore Wind support and commercial dive services.

How long have you been with BHC, how did you start and when did you first realize that your family business was indeed your destiny, too?

Since BHC is a family business with a 90-year history, I have quite literally been with the company all my life. So, to say it's in my blood would be an understatement. As a young child, spending time with the family in season, meant spending time on Long

Wharf at BHC. They'd give me little jobs to keep me busy and out of everyone's way like sweeping the docks or picking up trash. I remember feeling a real connection to BHC and the waterfront even then and learned through my small jobs that to work at something was to make it better. From then on, I worked my way through the ranks as a deckhand, galley attendant, ticket agent, cash management, IT, business development and more. Gaining varied experience and an insider's look every step of the way. I developed a deep love of and respect for the company, our passengers, the city of Boston, the Harbor, our industry and so much more. After college, I came to work at BHC full time. In 2006, with my hands-on experience as a strong foundation, I earned ownership in the company and was named to my current position of Principal and General Manager.



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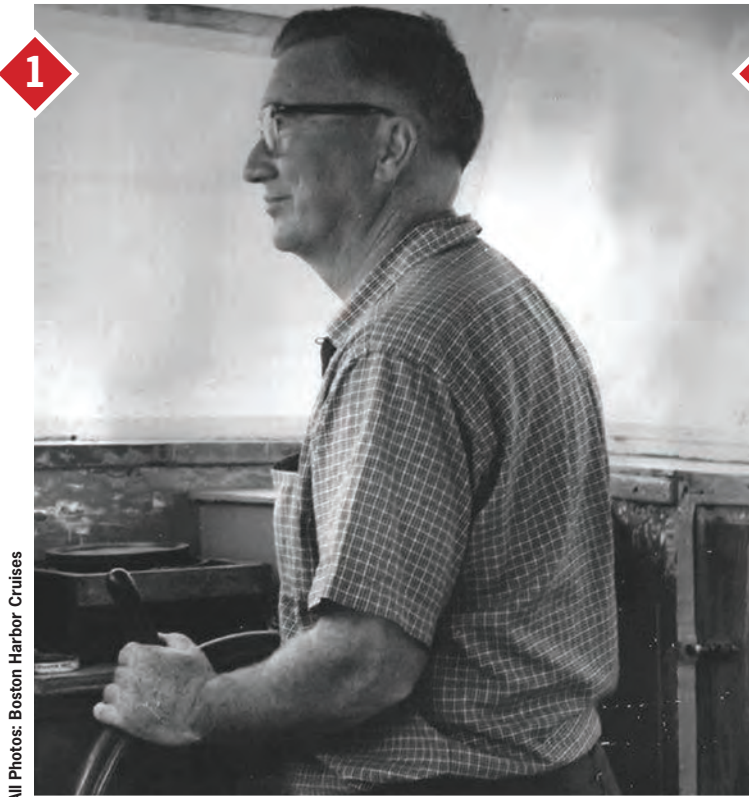

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BOSTON HARBOR CRUISES: THE PEOPLE



All Photos: Boston Harbor Cruises

“

*Because BHC is a longstanding family business, it has been run – and flourished – as a labor of love. **My father and uncle are great mariners and know their way around almost any engine room.** However, because the needs of the business took me off the boats ... that wasn't me and for many years I harbored insecurity about not possessing those same qualities. Eventually I realized that my particular style and talents were things that the business needed, and in fact our diversity in expertise and passion was a source of strength. **This was a game changer for me and the point at which I knew what I was going to contribute to the future of BHC.***



1. In 1926, soon after becoming the youngest licensed captain in the history of the port of Boston, 16-year-old Matthew "Matty" Hughes founded Boston Harbor Cruises (BHC).

2. After the war, Matty expanded operations to include vessels inside Boston Harbor – \$2 sightseeing tours running three times a day. It was during this era that BHC became a true family-run enterprise with Matty's daughters, Rookie and Rita (second generation), coming on board.

3. Since BHC is a family business with a 90-year history, Alison has literally been with the company all of her life. As a young child, spending time with the family in season, meant spending time on Long Wharf at BHC, where she was given little jobs – like sweeping the docks or picking up trash – to keep her busy and out of everyone's way.

4. (L to R): Patrick Nolan, Alison Nolan and Mark Nolan

5. (L to R): Patrick Nolan, Chris Nolan, Alison Nolan and Rick Nolan

5



What do you enjoy most and least about your job?

Most: Both at BHC and through my active participation on numerous Boards and committees, I feel that I can directly contribute to not just my company but to our community itself. By activating and advocating for Boston Harbor, our National Marine Sanctuary, State and National Park Areas and for the expansion of and use of water transportation to mitigate growing population density, I am able to contribute in a way that is making my community a better place to live work and play. BHC is only as successful as the health and vibrancy of the Massachusetts' economy and tourism industry. To work to improve our city and state has a direct impact on the future of BHC itself.

Least: As BHC has grown, I am more removed from the day-to-day operations and core business. With more time needed off site in meet-

ings and behind the desk, I get to spend less and less time out on the boats and docks. I don't often get to see our guests enjoying their cruises and I find it harder to get to personally know our ever-expanding crew. I understand that it's a natural part of a growing business, but I do miss the days where I could be more closely involved in the core of our purpose – creating memories with family, friends and colleagues on Boston Harbor.

Looking at the fleet of boats, how has it grown in recent years, do you have any vessels on order?

Our last new build vessel was in 2000, with the launch of our Provincetown Fast Ferry Salacia, a 600-passenger high speed catamaran at Gladding-Hearn Shipbuilding. Since that time, with the company's growth and expansion of services, our fleet has also needed to expand - more than doubling to

its current high of 60 vessels. The fleet's sizeable growth has been accomplished through the acquisition of other passenger vessel operations and assets, as well as the purchase of pre-owned passenger vessels from across the country. Throughout this process, BHC has returned to our roots of when Matty converted U.S. military surplus vessel. We have become an industry leader in recognizing the economic value and potential of available equipment and repowering and refurbishing these vessels in-house to bring them back to life.

Today our diverse fleet of 60 vessels encompasses a 240-ft. DP2 OSV, a 40-knot, 600-passenger high speed catamaran and a small fleet of water taxi launches. To give an idea of the scale the BHC fleet, it encompasses 326 pieces of major machinery representing over 13 major manufactures. No other passenger vessel fleet in the country rivals the

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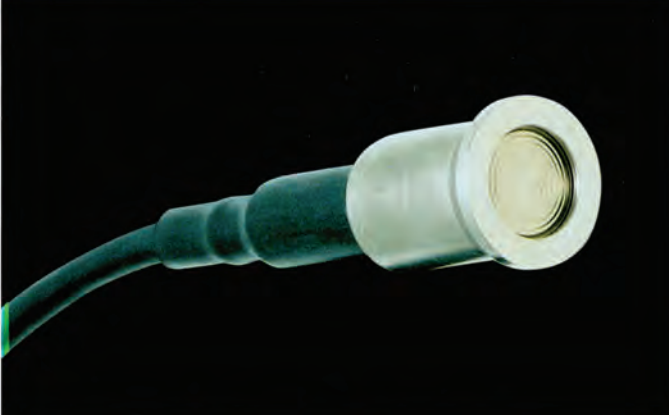
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BOSTON HARBOR CRUISE ON THE SIGHTSEEING YACHT RICKIMARK

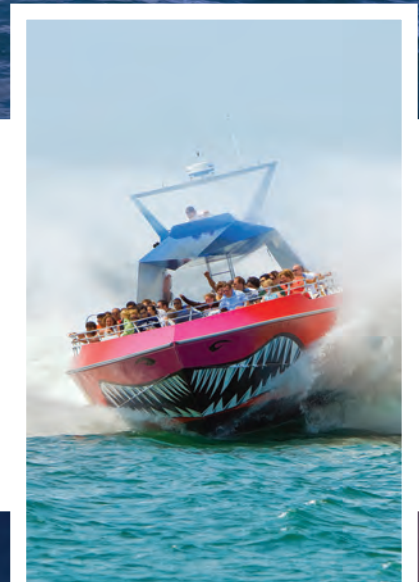
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All Photos: Boston Harbor Cruises

In addition to constant routine and preventative maintenance, you will always find a variety of capital projects underway at the BHC maintenance facility each winter. Over the past five years, BHC has reinvested almost \$10m into capital fleet retrofits and repowers.

shear diversity of vessels and equipment seen here at BHC.

What is the biggest challenge to running an efficient and profitable fleet of tour boats?

First, since we are located in New England, our excursion offerings – and the resulting excursion revenue – are highly seasonal. With excursion services making up about half of our overall operations, the seasonality can bring about challenges with fluctuating cash flow, changing staff requirements, maintenance planning and more.

Second, operating and maintaining a large and vastly diverse fleet of passenger vessels is a significant responsibility and financial commitment. A fleet like ours requires a substantial capital maintenance and machinery replacement program in order to ensure on time performance, passenger safety and the highest quality of service year after year. The BHC fleet requires scheduling 60 annual Coast Guard inspections and on average 30 out of water Hull inspections each calendar year.

In addition to constant routine and preventative maintenance, you will always find a variety of capital projects underway at the BHC maintenance facility each winter. Over the past five years, BHC has reinvested almost \$10m into capital fleet retrofits and repowers. This becomes even more impressive when you consider that these projects occur in our diminish-off season of November to April.

What regulation has had the greatest impact on your business ... or promises to have the greatest impact on your business?

For nearly a century, The Jones Act has regulated the U.S. domestic passenger vessel industry. As the world has become an increasingly global marketplace, Jones Act compliance has created its own set of special challenges for U.S. passenger vessel operators when sourcing new construction. The increasing cost of domestic vessel construction has required privately held passenger vessel operators like BHC to think very carefully about new construction. At BHC, for nearly two decades now, this has led us to grow our fleet exclusively through the purchase and refurbishment of previously owned vessels. The contracts, services and routes available with conditions favorable for privately financing new construction vessels are few, particularly in seasonal areas like the Northeast.

In addition, the passenger vessel industry and individual operators are subject to a variety of regulations from multiple agencies such as the U.S. Coast Guard, FTA, EPA, as well as Federal and State employment laws. Keeping up

with, and implementing new regulations in an efficient, timely and cost-effective manner can prove to be a challenge for operators big and small. Today as an industry, we are watching with particular interest the implementation of Tier 4 and what it will mean for our small passenger vessel industry regarding repowers, new construction and available compliant machinery in the marketplace.

What technology do you consider to be the most transformational in terms of making your operations safer and more efficient?

At BHC we are excited about technological advancements and how we can use them to manage a safer and more efficient fleet. Technology is at home here in every aspect of our business from human resources to websites, maintenance monitoring to insurance reporting and crew training. As our company and fleet becomes larger and more diverse, BHC must increasingly rely on technology as a tool in managing and monitoring our business.

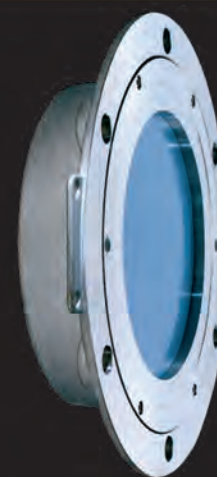
Most recently we implemented Wheelhouse Technologies across our fleet, a preventative maintenance and compliance tracking program that provides alerts and reminders regarding vessel maintenance and compliance milestones. In addition, the use of Wheelhouse allows for an informative data collection source that can be analyzed for future operations and planning. As our fleet has grown larger with higher hour and higher horsepower vessels, tools like Wheelhouse Technologies are increasingly important to hitting our maintenance milestones, managing operations, interdepartmental communications and empowering our managers, Captains and crews. Without technologies like Wheelhouse, managing a 60-vessel fleet like BHC's which encompasses 326 pieces of major machinery representing over 13 major manufacturers would be a monumental task.

What do you consider to be the greatest "lessons learned" about running the business from your family?

Over 90 years our family has learned the perspective of the long haul. There will be good years and bad, but the key to success for any business is all about prioritizing and remaining focused on the people you serve. Without sustainable ridership and revenue, you cannot accomplish any growth or improvements. The single most important thing at BHC is to make sure our passengers are safe and happy, so our hard-earned reputation and repeat ridership endure. Customer service has always been, and continues to be, our top priority. And, we consistently strive to do everything we can to ensure that each person's experience at BHC is

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How is your management style most different from that of previous leaders of the company?

Because BHC is a longstanding family business, it has been run – and flourished – as a labor of love. But, I feel that what makes my management style different is that I have looked at the company from a more traditional business and community perspective. My father and uncle are great mariners and know their way around almost any engine room. However, because the needs of the business took me off the boats before I gained those years of experience, that wasn't me and for many years I harbored insecurity about not possessing those same qualities.

Eventually I realized that my particular style and talents were things that the business needed, and in fact our diversity in expertise and passion was a source of strength. This was a game changer for me and the point at which I knew what I was going to contribute to the future of BHC.

For example, early on I recognized the need for, developed and implemented a comprehensive, creative branding and marketing campaign aimed at not just filling seats but positioning BHC as a cornerstone organization within Boston.

I knew we already were one, the problem was nobody else did. This focused marketing approach was a major element in establishing top-of-mind brand awareness that had not previously been experienced in the company's nearly-90-year history.

I also saw the opportunity for BHC to be a voice and convening force for our waterfront and tourism communities. We needed to be more connected to our tourism neighbors and the fabric of our waterfront community. By forging new partnerships, growing our offerings for local recreation, establishing a philanthropic profile as well as personal involvement in many boards and committees, BHC became an undeniable part of the fabric of Boston.

BHC is fortunate to have a flourishing corporate culture where employees are indeed like family. Through my management style I aspire

"Today as an industry, we are watching with particular interest the implementation of Tier 4 and what it will mean for our small passenger vessel industry regarding repowers, new construction and available compliant machinery in the marketplace."



to be an example of determination, passion, business sense, partnership, community responsibility and innovative tactics. But, as a leader, I also recognize the importance of delegation and trust in others to get the job done right.

Most importantly, I do everything I can to nurture the company's long-established reputation of doing business with integrity, experience, commitment and responsibility, while also safeguarding the company's viability with sustainable business practices and a resourceful and ever evolving business plan.

The environment: Obviously maritime is under the microscope more than ever from an environmental regulatory standpoint. Give an overview, if you can, regarding the importance of environmental initiatives and compliance from when you started to today?

In addition to our external stewardship, we review our operations each winter and adopt changes large and small that can lessen our own environmental footprint. From things like retrofit material selections, packaging at our galleys, environmentally friendly cleaning solutions, elimination of paper in the course of business and more BHC takes an annual look at our blue policies and what we can do to continually make improvements. The Passenger Vessel Association's Waters Best Green Practices Program has also been a valuable peer resource.

We are also very proud of our programs inspir-

ing blue stewardship though public information that raises awareness of the issues that confront our oceans. Our Whale Watch and State and National Park ferry programs in particular give time and thought to our conservation messaging and how we can engage our passengers in a way that is informative and effective. Our Whale Watch naturalists also compile and maintain a significant humpback whale database which we share freely with research organizations.

Every business has its challenges ... looking outside of the fleet of boats, what do you consider to be your biggest challenge to running and maintaining a successful passenger boat business today?

I think our biggest challenge is the increase in new competition for people's leisure time. With technology, new urban development, ease of travel and other factors, entertainment options are ever expanding and can often be immediately accessed on a phone or tablet. Because of this, we must look ahead and seize new opportunities to keep BHC fresh. We understand that business success is a marathon, not a sprint but most importantly you cannot stand still. As long as we continue to evolve and change with our environment and understand the needs of our guests, BHC is firmly planted for the long haul and expects to continue to prosper through hard work and a dedication to the company's core values.

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Chia Yoo Soon, Chevron Marine Lubricants



Photo courtesy Chevron Marine Lubricants



Five Minutes with
CHIA YOO SOON

General Manager, Finished Lubricants – Marine, Chevron Marine Lubricants

OK. Full disclosure. We spent more than ‘Five Minutes’ on the phone with Chia Yoo Soon, General Manager, Finished Lubricants – Marine, Chevron Marine Lubricants. But given that we are based in New York and he is based in Singapore, the time difference mandated an efficient conversation for both. Without overstating the obvious, ship owners are under tremendous pressures. A relentless regulatory hammer continues to pound out new and ever stricter environmental and emission rules, while at the same time many sectors are in the midst of a historic and prolonged slump. Relief can be hard to find, and owners increasingly turn to their suppliers for answers. So the leader of Chevron’s global marine lubricants division seemed a natural for topical insight and perspective regarding the new IMO fuel rules coming in 2020.

BY GREG TRAUTHWEIN

I have your biography, but please briefly describe how you came to a career in the lubricants business.

Chevron believes in investing in its people, and it is common to move people across business units for career and leadership development. Lubricants are not new to me. Thirty-one years ago I started my career in the oil industry in the lubricants business (in automotive and industrial lubricants).

What brought you to this position in maritime.

The move came about as a part of a wider leadership change within Chevron in 2016, and a point was to provide more focus to the Asia Pacific region in terms of marine. Chevron decided to move the global marine leadership role, which I hold, to Singapore in 2016.

What are some of the main differences and similarities in the lubricants business when comparing different transport modes?

The main difference is the product range. Aviation is relatively straight forward and simple: it’s jet fuel. On the marine lubricant side there is a lot more complexity in the product range, and



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Photo courtesy Chevron Marine Lubricants



*We don't see any one driver – from energy efficiency to emissions reduction to alternative fuels – as bigger than the other, but if you stand back and look at drivers in totality, most likely the **2020 IMO low sulphur regulation is going to be the biggest driver going forward**, affecting all of the factors just mentioned in one way or the other.*

Chevron Marine Lubricant's DOT.FAST service exemplifies its strategy to offer customers value added service. DOT.FAST is designed to optimize the efficiency of a ship's engines with fast, accurate drip oil analysis



likewise going forward on the marine fuel side I think we will be seeing much more complexity within alternative marine fuels in the future.

There are similarities to the aviation and marine business, specifically to the way in which airlines and ship owners procure – centrally and globally: they procure centrally for products to be delivered on a global basis. Both are business-to-business customers involving key account management. So while the aviation and marine products may be different, the way that we manage them within Chevron is similar.

Obviously many maritime sectors today are challenged. When you look at the world of maritime, what do you see?

Since I came into this role 18 months ago I have had the chance to sit with and meet many customers around the world. Among the industry veterans that I've spoken to, this is clearly the longest down-cycle in the shipping industry in

recent history. The consensus seems to be that we have reached the bottom; but the outlook for the recovery is mixed.

Lately we have seen some positive reports on certain segments and regions, and some encouraging third quarter earnings reports from publicly listed companies.

We see slow recovery in the global economy, leading to a positive outlook for the maritime industry as a whole. We are seeing some shipping companies investing in new builds, although there remains the view that there is still too much capacity in the industry as a whole.

While no one region stands out among the rest, we see Asia as showing the most optimism globally.

That said, the global energy markets have been in a long, deep slump for nearly four years. How has this energy swoon impacted the lubricants side of the business?

The oil industry fluctuation is also in a prolonged down cycle, with companies

adjusting to the 'new normal.' But the oil downturn has not been as bad as the shipping slump.

Even though crude oil prices have remained low, we are seeing increases in lubricant component costs. As you know, lubricants are comprised mainly of two major components, base oils and additives. But these are not directly correlated with crude oil prices. Base oil has not followed the prolonged down cycle, and in fact have been increasing steadily over the last few years. Combined with other increased supply chain costs, it continues to make for a difficult market.

However, Chevron is not alone in feeling the adverse affects of the current market. We are responding by offering added value for our customers. We appreciate that our customers are feeling the pinch in the shipping industry, so we have continued developing products that are fit for purpose. In 2018 we will expand our services as well, to maximize the use of Chevron lubricants by introducing a range of features that are

designed to help our customers evaluate the total cost of ownership and operations, monitoring consumption and helping to protect their most valuable asset.

So what exactly will the industry see new from Chevron in 2018?

The key term here is partnership, as we work with our customers to monitor the lubricants, predominately on the cylinder oil side. We will help them to monitor their feed rate, a new service to help them optimize the overall cost of ownership of the lubricants. There will be a service to monitor and use database information for analysis, our tech team will help to optimize the use of cylinder oil, which is a major chunk of their operating cost, besides bunker fuel.

When you look at the drivers for the marine lubricants today – Energy Efficiency, Emissions Reduction, Alternative Fuels, Cost, Performance – which one do you see as the biggest driver for the development and delivery of lu-

bricants to the marine market?

We don't see any one driver – from energy efficiency to emissions reduction to alternative fuels – as bigger than the other, but if you stand back and look at drivers in totality, most likely the 2020 IMO low sulphur regulation is going to be the biggest driver going forward, affecting all of the factors just mentioned in one way or the other.

Can you give an example of how one of these drivers has had a material impact on your business?

The demand for energy efficiency has led to new engine design and practices, such as slow steaming, which led to conditions such as cold corrosion that we've never seen before. We had to come with new products that meet the new challenges. Modern lubricant development has to be agile and keep up with changing demands. Our primary focus is to respond with solutions to new challenges quickly and cost efficiently.

It is evident that change today is coming more rapidly, and for us, having the right product range, approved by the OEM's, is essential to maintain our position in the market.

With that, can you give an overview of your investment in Research and Development to keep pace?

A few years back the cylinder oil range was pretty straight forward. There was 70BN that would meet the requirement of most ships around the world. We saw, with the introduction of slow steaming and new engine design, many new issues cropping up. This led to – in addition to new alternative fuels such as LNG, methanol and hybrid fuels – the need for Chevron to invest in product development and technology to come up with a product range that can meet all of the different fuel and BN requirements in the market.

Going back about 10 years there was a requirement for only one cylinder oil. Today, with the ECA and SECA zones and all of the new fuels, you are looking at a cylinder oil range from 25BN to 140BN. That is where the investment is going, in coming up with the products that can meet the requirements and help our customers solve the problems associated with new legislation and new fuels.

So I think it is safe to say that Chevron is not a party to the 'one size fits all' solution.

Thank you, because that in a nutshell sums up our product strategy. We do not believe that one product can meet all re-

quirements in the current or future market, especially post-2020 IMO.

New fuels present challenges and opportunities. There are many schools of thought on fuels of the future. What do you see as the emerging trend?

The range of fuels is growing, and it adds complexity. It is a challenge and an opportunity. Before I address the fuel of the future, we are proud to supply the largest fleet of methanol fuelled vessels with our lubricants, and we are also on the majority of the LNG fuelled two-stroke vessels operating today.

With 2020 approaching, and with the ECA and SECA zones, alternative and hybrid fuels are becoming more important, but cost and availability is still an issue. I think it's clear that LNG is a clean fuel that will undoubtedly be one of the future forerunners, as cost-of-conversion and availability is achievable.

The issue with LNG is that bunkering infrastructure currently is quite limited, however we are seeing increasing investment in this infrastructure globally. In Chevron we are preparing now for a more widespread uptake in the technology. Then you have to look at scrubbers, or exhaust gas cleaners, and these are serious options as well. The retrofit market has been limited, but when you look at the newbuild market, scrubbers built-in are more prevalent. The only issue really

is the high capital investment for these scrubbers, particularly in today's shipping industry.

I think the jury is still out as to what will be the 'fuel of the future,' but increasingly we will see more and more legislation on emission reduction. Cleaner fuels will probably be the way to go.

IMO 2020 and the pending new fuel rules. In brief, how are you advising ship owners.

Most of our clients are in varying stages of readiness for 2020. Some customers that have taken a position in terms of fuels or, alternatively like you see in the cruise sector, which has invested in scrubbers. We're working hard to help them make key decisions, mainly in regards to fuel choice after 2020. At Chevron Marine Lubricants we are ready for 2020 with our range of cylinder lubricants, as well as trunk piston engine oils, that can support the fuel decisions that our customers decide to take. We are a long way ahead on two-stroke LNG testing, and we have more experience than most in terms of methanol applications.

The maritime industry is 'global and mobile.' From Chevron's perspective, what are the keys to building and maintaining an effective, efficient and profitable distribution and service network.

Our delivery network is in more than

700 ports worldwide, and we are recognized as being world-class by our customers for providing solutions; I want to emphasize the word 'solutions.' As the marine arm of a global lubricants business in Chevron, we are supported by a global supply chain organization to ensure reliable supply to our network. We made a conscious decision to not centralize our customer service teams in call-centers, rather we have left our CSR teams in the regions to maintain relationships with local owner operators, in most cases in the local language. This helps to form a long-lasting relationship and the ability to understand our customer's business. We build partnerships, and it is our goal to be the partner of choice.

Every business, every position has its challenges. What is your biggest challenge, and how are you addressing it?

The biggest challenge is to lead the organization to navigate this current down cycle, and to position Chevron Marine Lubricants for growth during the impending recovery. As we discussed, the maritime industry is changing rapidly, whether it is through environmental legislation, industry consolidation, digitalization ... perhaps even disruptive technologies. My job is to make sure our organization is agile, and that we can quickly adapt and respond to changes in the industry.

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The Navy's Fundamental Problem

Surface Force needs a fix on navigation, seamanship, watchstanding & leadership ... and knowing when to say "No."

By Edward Lundquist

A series of mishaps at sea has prompted the U.S. Navy to examine the way it conducts business. The accidents shared some similar contributing causes such as fundamental watchstanding and seamanship, and each of these incidents were preventable.

The four incidents involved surface combatants in the Seventh Fleet area of responsibility.

- On January 31, 2017, the Yokosuka-based Ticonderoga-class guided missile cruiser USS Antietam, while anchored in high winds, dragged anchor and ran aground in Tokyo Bay. 1,100 gallons of hydraulic fluid spilled into Tokyo Bay.
- On May 9, 2017, the San Diego-based Ticonderoga-class guided missile cruiser USS Lake Champlain (CG 57)

collided with fishing vessel Nam Yang 502 off the Republic of Korea

- On June 17, 2017, Yokosuka-based Arleigh Burke-class guided missile destroyer USS Fitzgerald (DDG 62) collided with ACX Crystal off the coast of Japan. Seven Sailors died.

- On August 21, 2017, the Yokosuka-based Arleigh Burke-class guided missile destroyer USS John S. McCain (DDG 56) collided with merchant vessel Alnic MC while preparing to enter the Singapore Strait for transit to Sembawang, Singapore. 10 Sailors were killed.

Several investigations were conducted, including one by Secretary of the Navy Richard Spencer, which is ongoing.

The investigations acknowledge that there may be mitigating circumstances

as to the weather (the ground) or the actions of the other ships. But that is not the issue. U.S. Navy combatants have the best sensors and systems in the world, and are highly responsive and maneuverable. The watch teams in combat information center (CIC) and on the bridge should have had the necessary situational awareness of what was happening, and what should happen next. It all comes down to fundamental watchstanding and seamanship.

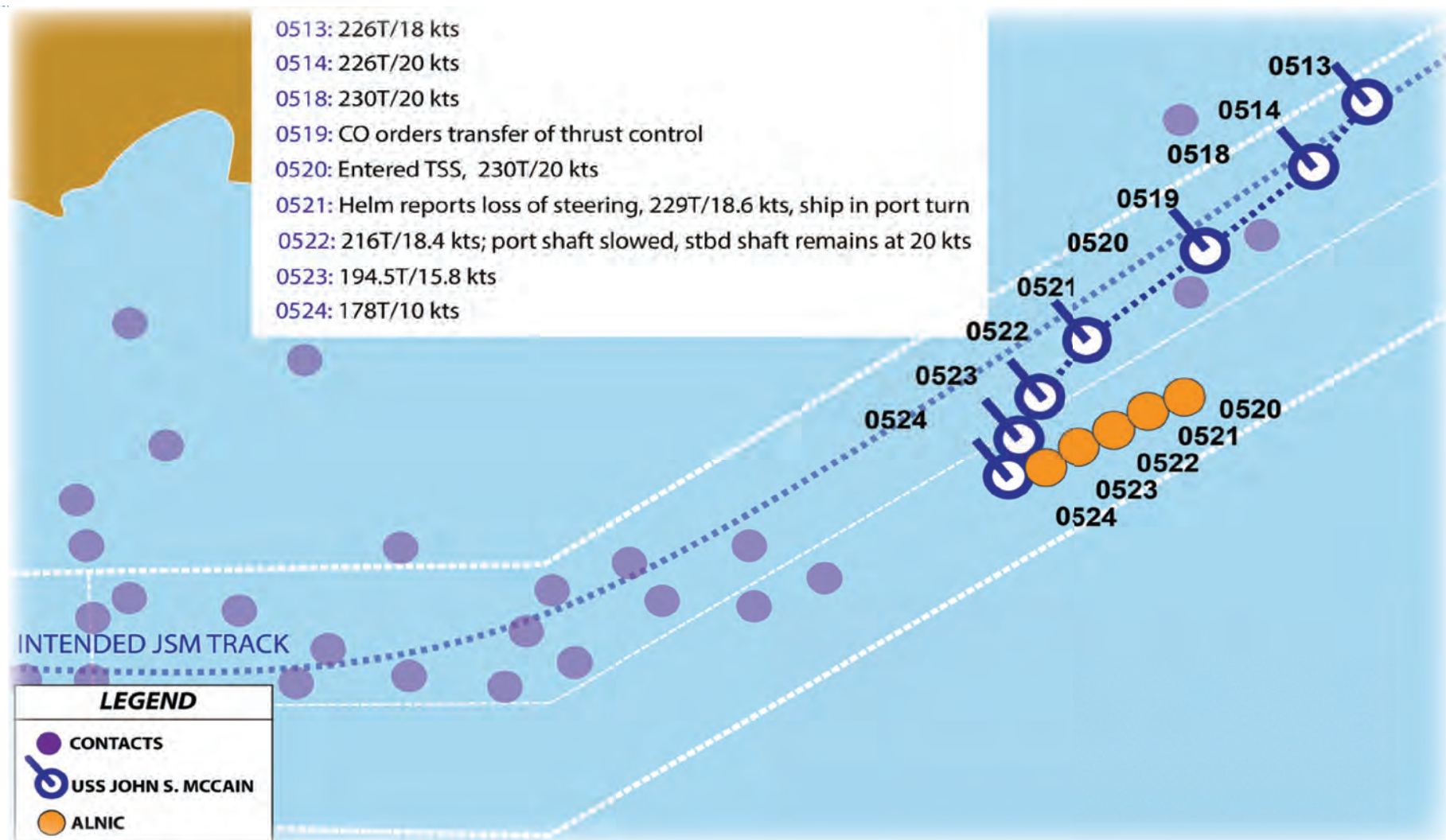
Chief of Naval Operations (CNO) Adm. John Richardson said in his investigation that in the case of both the USS Fitzgerald and the USS McCain, he came to the same conclusion:

Collisions at sea are rare and the relative performance and fault of the ves-

sels involved is an open admiralty law issue. The Navy is not concerned about the mistakes made by [the other ship]. Instead, the Navy is focused on the performance of its ships and what we could have done differently to avoid these mishaps.

In the Navy, the responsibility of the commanding officer for his or her ship is absolute. Many of the decisions made that led to this incident were the result of poor judgment and decision making of the commanding officer. That said, no single person bears full responsibility for this incident. The crew was unprepared for the situation in which they found themselves through a lack of preparation, ineffective command and control and deficiencies in training and prepara-

Damage to the portside is visible as the guided-missile destroyer **USS John S. McCain** (DDG 56) steers towards Changi Naval Base, Republic of Singapore, following a collision with the merchant vessel *Alnic MC* while underway east of the Straits of Malacca and Singapore.



tions for navigation.

In the case of the USS Fitzgerald, the Navy determined that numerous failures occurred on the part of leadership and watchstanders as follows:

- Failure to plan for safety.
- Failure to adhere to sound navigation practice.
- Failure to execute basic watch standing practices.
- Failure to properly use available navigation tools.
- Failure to respond deliberately and effectively when in extremis.

In the case of USS John S. McCain, the Navy determined the following causes of the collision:

- Loss of situational awareness in response to mistakes in the operation of the JOHN S MCCAIN's steering and propulsion system, while in the presence of a high density of maritime traffic.
- Failure to follow the International Nautical Rules of the Road, a system of rules to govern the maneuvering of vessels when risk of collision is present.
- Watchstanders operating the JOHN S MCCAIN's steering and propulsion systems had insufficient proficiency and knowledge of the systems.

- Vessels were passed at distances well within the distance where the commanding officer required to be notified in accordance to the standing orders, and neither the bridge steam or CIC team were determining course or speed on these vessels.

According to October 26, 2017 "A comprehensive review of recent Surface Force incidents," issued by Commander Fleet Forces Command (CFFC) Adm. Phil Davidson, "In each incident, there were fundamental failures to responsibly plan, prepare and execute ship activities to avoid undue operational risk. These ships failed as a team to use available information to build and sustain situational awareness on the Bridge and prevent hazardous conditions from developing. Moreover, leaders and teams failed as maritime professionals by not adhering to safe navigational practices."

"In each of the four mishaps there were decisions at headquarters that stemmed from a culturally engrained 'can do' attitude, and an unrecognized accumulation of risk that resulted in ships not ready to safely operate at sea," the report said. "The pressure to meet rising operational demand over time caused commanders,

staff and crew to rationalize shortcuts under pressure."

"Yet, in periods of chaos and extreme conditions, Sailors rushed in to take emergency actions to save the ship, their shipmates, and restore critical systems," the investigation stated. This does not happen without effective training, proficiency, discipline and toughness."

Triple-whammy

In a Sept. 2017 report to Congress, the Government Accountability Officer stated that Fitzgerald and McCain had expired certifications for vital mission areas, and while ships that deploy from the West Coast or Hawaii spend months preparing for deployment, the FDNF ships did not have dedicated training periods built into their operating schedules. The irony is that the Yokosuka-based ships conduct virtually continuous real-world operations when they get underway in Seventh Fleet are of operations.

Vice Chief of Naval Operations Adm. William Moran told members of Congress that he had maintained a "wrong assumption" that the Yokosuka-based combatants were more proficient and better trained because they were operating all the time.

Richardson testified about what he referred to as the "triple-whammy," which he said was the "the corrosive confluence of high operational tempos, inadequate budgets and budget uncertainty."

Training and maintenance is necessary to sustain readiness. Certifications and milestones had lapsed or were bypassed in the name of getting the mission done. There must be a balance. If ships operate too much the training and maintenance will suffer.

This problem is not new. The GAO also reported in 2015 that the Navy was deficient in its training and maintenance for the FDNF ships in Japan.

THE RIGHT WAY

In a message to the Surface Force, Commander Naval Surface Force (CNSF) Vice Adm. Tom Rowden directed commands, immediate superiors in the chain of command (ISICs) and type commander staffs to "assess manning, training certification and accomplishment, and most of all, proficiency. Chains of command will validate the effectiveness of subordinate units in carrying out this direction, and the type commander staffs will be the ultimate

The Arleigh Burke-class guided-missile destroyer USS Fitzgerald (DDG 62) sits in Dry Dock 4 at Fleet Activities (FLEACT) Yokosuka to continue repairs and assess damage from its June 17 collision with a merchant vessel.

U.S. Navy photo by Mass Communication Specialist 1st Class Leonard Adams/Released



adjudicator of assessment completeness and proficiency.”

“Based upon the need to ensure that all ships conduct bridge watchstanding one way (“the right way”), I will promulgate standard CO standing orders, engineering standing orders, and battle orders that will ensure simplicity, directivity, and commonality.”

While the documents would respect the need to address unit-specific equipment configurations, they will provide common business rules and engineering watchstations.

For example, in addition to the capabilities of search radars to plot tracks and determine closest points of approaches (CPA), the directive states that maneuvering board solutions will be calculated by both bridge and CIC watch teams for all surface contacts bearing an initial CPA of 5,000 yards or less. It also directs the Navy ships to activate the AIS (automatic identification system) in traffic separation schemes or high density traffic areas unless there is a tactical reason to remain stealthy, allowing other vessels with AIS to be aware of the Navy ships presence and its course and speed.

Greater attention must be directed to the individual qualification and proficiency of watchstanders and the under-way and special evolution watchbill as-

signments to ensure what Rowden called the “optimal match of talent to task.”

There is the potential for danger when watchstanders focus on electronic charts and radar track displays instead of being the eyes of the ship, potentially causing more confusion rather than less. One harbor pilot wryly noted that on one Navy ship coming into a port, the bridge windows that hadn’t been cleaned, making it virtually impossible to see outside, but that the watch team had their heads glued to their screens. The reliance on automation and electronics is no replacement for the OOD being the “eyes of the ship.” The Navy has professional qualification standards (PQS), with tests and exams and boards to qualify personnel to be OODs. One retired surface warfare officer said, “I only had two questions, and I answered them myself. ‘Do you understand relative motion? And do I trust you to call me when you aren’t comfortable?’ If I couldn’t say yes to both, you weren’t going to stand an OOD watch on my ship.”

TIRED EXCUSES

It’s easy to point fingers. Some aviators and submariners have claimed that something like this couldn’t happen in their communities. But, of course, it does happen. That said, there are some

differences. Aviators are well paid, all volunteer forces with mandated crew rest. Whatever their additional duties, flying is the only one that trumps all. Submariners are all volunteer, highly paid forces that have unlimited funds to fix material issues and assure propulsion plant and subsafe safety. They have between one and three missions and are rarely forced to compromise.

Surface combatants are the most complex platforms of any community. Multi-mission systems support at least five warfare areas and the same crew does them all. One cannot argue that a modern aircraft carrier isn’t the most complex combatant built, but surface combatants support more missions in a ship half the length of a carrier and with less than a tenth of the personnel. The surface force does not have priority funding, cannot guarantee its personnel are all volunteers for the community and can never say we’re all caught up. The can-do attitude certainly prevails, and nobody dares to say “we can’t” or “we shouldn’t.”

In many accidents, fatigue is a contributing factor. In September, CNSF issued a message to the force directing ships to adopt “circadian rhythm watchbills” that permit crewmembers to get more sleep and better manage fatigue. Ships

that have adopted such schedules report better performance. Ships with the five hours on-ten hours off “five and dime” schedule are more taxing on the crew, where they must stand their watches, eat, and sleep, in addition to doing their normal assigned jobs. With a circadian schedule crewmembers can expect to get sleep on a more regular basis at the same time each day. But there is no clear connection between fatigue and these accidents, or that circadian watchbills are the solution. The CNSF directive was promulgated as a result of the accidents, and potentially long overdue, but the results clearly point to lack of enforcement of standards and lack of knowledge of systems and procedures.

Many things have to happen, or not happen, to result in a disaster. When pondering accidents like these, there are probably 359 courses a crew could have taken that would avoid a collision. The investigations point to significant lapses in qualified people making proper decisions. But there is also a heavy burden on those forward forces to provide presence, at the expense, it appears, or training and maintenance. Even if the budget were increased, and forces augmented, there would still be a heavy demand signal for ships on station. Maybe it’s time for the fleet to say “No.”

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Image: Wärtsilä

Driving the Digital Ecosystem

By Kira Coley

As one of the most important megatrends this decade, digitalization is already moving beyond the concept of connectivity and data gathering towards a greater and more integrated future where the entire industry coexists as one digital ecosystem. As this vision becomes a reality, we will see a new era of partnerships, knowledge sharing, and AI-led practices. Disruptive technologies and ground-breaking projects have begun to transform the maritime landscape, and the opportunities that emerge from this transition will avail the innovators and organizations that are already embracing the digital frontier.

“Digitization and cloud computing are enablers for an industry that needs to re-

main relevant, cost-effective and drive value to all of its customers. We are an industry in change. But one thing is clear, digitalization is no longer the future, it is the present,” said Marco Ryan, Wärtsilä’s Chief Digital Officer and Executive Vice President.

In every corner of the maritime sector, organizations are talking about big data, digitization, and cloud computing. As a deeper understanding develops around these topics, many have begun to actively seek new ways to work across the value chain, discover new roles and solidify a place in an imminent, unfamiliar future.

Ryan explains, “Smart technology allows a much broader and horizontal ap-

proach to be taken across the industry, replacing the vertical view traditionally followed today. This means soon enough we will see a different approach to collaboration, competition, security, safety, and technology. And it really is something that is relevant to everybody because the entire industry is trying to work out what their role is in a slightly uncertain future where smart technology will no doubt impact the current business models, and change how we work day-to-day.”

In November 2017, Wärtsilä announced its vision for a Smart Marine Ecosystem. By taking a broader and horizontal perspective, the ability to optimize across the whole process, from

shipbuilding to operating ports, will add value and create greater efficiency for both customers and suppliers.

For example, operators at one major European port wanted to know if they could be informed when a vessel starts up. Rather than relying on the ship crew to tell port operators when they are about to leave, information about engine activity would provide a useful proxy and allow staff to prepare for the vessels departure in advance. For Wärtsilä, using ecosystem thinking, new value can be found in existing data that perhaps was considered unhelpful before, driving efficiency and modernizing the industry.

“There will be more of this ecosystem thinking and integration between what



“For example, the use of sensors on toilet seats. If you look at it as a stand-alone issue, it has little value. As part of environmental ecosystem of a cruise vessel, then whether a toilet flushes 15 liters or 16 liters is important. Especially if there are 4,500 of them onboard and each toilet is used 4 or 5 times a day.”

Marco Ryan, Wärtsilä’s Chief Digital Officer and Executive Vice President

I call 'frenemies.' For example, not all ships are Wärtsilä top to bottom, they may have Wärtsilä engines but a competitor’s E&A systems or they might have a competitor’s engine and a Wärtsilä E&A, and sometimes there are hybrid technologies. The commercial value comes out of not just technology innovation and the use of that data to drive different commercial outcomes, but also in the ability for it to plug and play. As such, we will increasingly see a need for more partnerships between key players and competitors in the industry around specific standards and capabilities,” said Ryan

“But also, when you have such a broad product range like ours there is a responsibility to help the industry modernize and change safely, in line with regulation but also at a good pace. Part of our Smart Marine strategy is to encourage that dialogue, open up to new partnerships and make sure that the hygiene factors around data interchange, cyber security, and infrastructure are available to support the business needs and the business values they create. This isn’t about being seduced by technology, it’s about focusing on the economic value that will help the industry transform.”

DATA: THE OIL OF AI

The arrival of digitization and big data has opened doors to new innovators in recent years. The low barriers to entry have seen a rise in the number of start-ups that now have access to an industry that has been historically difficult due to the significant capital investment required for long-life assets such as ships. Ryan said, “We are seeing a lot of start-up activity where they are taking advantage of digitalization and lower entry barriers by using an asset-light model such as Uber. I don’t think there will be an Uber of the seas just yet, but a lot of companies, including Wärtsilä, are now

actively involved at different levels with both start-ups and smaller businesses as they try to remain relevant and use new technology to provide a better experience at lower costs.”

“But many are still focusing on the wrong question: who owns the data? The question should be: what rights do you have to use or collect the data to drive some commercial outcome? That is important because while there is a mass of data available it is in very different formats, very different timestamps and very different levels of data cleanliness and usability. And this is one of the big problems with cloud computing. Data

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*In November 2017, Wärtsilä announced its vision for a **Smart Marine Ecosystem**. By taking a broader and horizontal perspective, the ability to optimize across the whole process, from shipbuilding to operating ports, will add value and create greater efficiency for both customers and suppliers.*

hygiene and the concept of treating data as an asset on the balance sheet is missing in the industry.”

Information such as GPS or basic routing is readily available to any start-up or organization. What is more difficult to obtain is automation and mechanical data around areas of asset management. It also tends to be in a less user-friendly format partly due to the age of the assets that includes vessels up to 25-years-old.

Cloud computing allows the industry to scale data and be more cost-effective, driving efficiency and allowing flexibility in how that technology and data is shared. But first, organizations must decide what part of their assets they need to have data on, to what level and the context in which that data is going to be used. “We get terabytes of data every day. Most of it we simply don’t store or use because within seconds it’s irrelevant. For example, do I need to record every millisecond of information on an engine during research perhaps, but during operations do I need just 5 minutes or hourly intervals? What level of data do we need to keep and for how long? But it’s not just the ability to record data from a sensor or just share that data, it’s also the security of that data, and the relevance of that data. This is where big data is important. For example, the use of sensors on toilet seats. If you look at it as a stand-alone issue, it has little value. As part of environmental ecosystem of a cruise vessel, then whether a toilet flushes 15 liters or 16 liters is important. Especially if there are 4,500 of them onboard and each toilet is used 4 or 5 times a day,” said Ryan.

In the industry today, Ryan believes the lack of people focused on data creates another challenge that organizations must address. As start-ups and innovators continue to gain entry, we could find that data-focused services become more available in the future. This will be vital as cloud computing and modernizing services are not possible without ‘good data’. As such, creating data standards will also be important in order to achieve industry-wide benefits.

Ryan explains, “Organizations such as Wärtsilä, Maersk, and RCCL, Carnival and others are all working on cyber security, artificial intelligence, cloud computing platforms, etc. But some of these things need more of an industry-wide approach and to be developed in partnership. There’s no immediate commercial or competitive value for things like cybersecurity for example, so we need to stop thinking vertically and behave more like a united industry. The industry cannot evolve without digi-

talization and cloud, but likewise, those are just enablers as the industry and organizations change.”

FULL STEAM AHEAD

In October, Wärtsilä opened its first Digital Acceleration Center (DAC) in Helsinki with the objective to speed up innovation and co-create with customers a range of new business models and solutions. A second DAC was opened in Singapore in December, and during 2018 two more will be opened in Central Europe and North America.

Ryan said, “We have many projects going through the DACs, and they range from using artificial intelligence and machine learning to identify patterns in marketing activity to new ecosystem business models.

For all, understanding our customers’ activities better so we can have a better conversation around data in the right context is critical. In a matter of weeks we can test, pilot, learn and understand what works and what doesn’t at very low cost. If something is working and adds value, we can then commit more resources and scale it, creating relevance to the customer at a great pace. It also means that we are prioritizing and working on the right propositions that drive the right value during the industry’s transformation.”

One example of a project undertaken by Wärtsilä in collaboration with a vessel owner is the remote controlling of a ship’s operations by satellite from 8000 km. There is also the Wärtsilä HY: a fully integrated hybrid power module combining engines, an energy storage system, and power electronics optimized to work together through a newly developed energy management system.

“The value propositions will change in the future because of smart technology, and a good example will be manufacturing and 3D printing. As the cost comes down in metal printing, you could conceive of having 3D printers on board vessels. If a vessel can print its own parts as it travels around the world the implication on local manufacturing, supply chain and logistics in the industry is enormous.

Big data, digitalization and cloud computing is the present, not the future and it will just be increasingly part of the fabric of the industry as we become more digital, more integrated, and much more scalable. The challenge for the industry now is that in some spaces we are playing catch up, and the question we should be asking ourselves is how quickly are organizations able to adapt to remain relevant as we embrace this new frontier,” said Ryan.

Ship Repair

New Ship Repair Yard Coming to Brazil

By Claudio Paschoa

The total volume of cargo transported by sea in Brazil from January to September 2017 was pegged at 800 million tons, according to a survey by the National Agency of Waterway Transportation (Antaq). A large number of oceangoing and cabotage ships are needed to move such a volume and many of these ships will need repairs of various kinds. Having identified a positive demand for international standard ship repair facilities in the South Atlantic basin, McQuilling Services, headquartered in New York, will be leading a project to invest nearly a billion in Lucena, on the coast of the northeast state of Paraíba, for the installation of the Brazil Basin Drydock Company (BBDC) repair yard projects. Designed to compete with the best repair yards in the world, this will be the first dedicated ship repair yard for medium and large-sized ships in the South Atlantic basin. McQuilling Services is the New York based marine transportation consulting and advisory group of McQuilling Partners, Inc.

“Negotiations for the BBDC project were initiated more than five years ago, the project gained momentum in late 2016 when it received a preliminary environmental license and after the Merchant Marine Fund awarded priority to the majority of its financing plans, which may be contracted with BNDES’ (Brazilian Development Bank) financial agents,” said David Saginaw, BBDC Project Director in New York. The enterprise was named the Pedra do Ingá Docking Company (EDPI), in reference to the important archaeological site located in the State of Paraíba and known worldwide. The location chosen for the implementation of the project was at the mouth of the Paraíba River and opposite the Port of Cabedelo.

“The beginning of the construction of the EDPI, is slated for 2019 and should be completed within three years. In 2021 it will be able to start operating with a Hydro-lift system. 2018 will be spent on design and engineering and once that’s complete we will proceed to the EPC contract and then the construction process,” said Saginaw. The ship repair yard will be located within the harbor of the Port of Cabedelo, a location adjacent to the main sea transport routes of the South Atlantic basin. With more than 660,000 sq. m. of total land area, and designed for the sole purpose of ship repair and maintenance, with two dry docks and an efficient, Portuguese designed Hydro-lift system, it will be able to service any ship of the global merchant fleet. Discussions on the concept of the new repair yard began in 2010, with initial funding for feasibility analyzes being carried out in 2012. In 2013, Promon Engenharia, a Brazilian company with 53 years of experience in engineering and project management, joined the project and in 2015, additional funding was secured with the participation of a large international ship owner. Ship repair operations are expected to begin in 2021.

Generally there are no modern, international standard, specialized ship repair yards for medium and large ships in the South Atlantic. There are only facilities for minor ship repairs in Argentina and Uruguay and several smaller yards

in Rio de Janeiro and in the North of Brazil.

Timely ship maintenance is not only good business practice, it is necessary to keep the assets in good standing with financiers and insurers. “Under international law, new ships, have to stop to make repairs every five years, but actually they go every two and three years on average,” said Saginaw. In this way, the EDPI will be a great relief to international ship owners, who are presently forced to send their ships from the South Atlantic routes, when their maintenance dates approach, to Singapore, China, the Middle East or Portugal. With ships remaining in the South Atlantic for repairs, when they are empty, shipowners will be able to save on the cost of taking their empty ships abroad. According to some estimates, these savings may reach the tune of \$200,000 to 400,000 per ship.

THE NEW REPAIR YARD

The repair yard will also have an area of 83,000 sq. m. of sheds and workshops, being able to attend any ship with a draft of up to 9 meters (empty of cargo), smaller vessels such as OSVs, fishing vessels, and 75% of the semi-submersibles in the global market. The project also counts on the participation of a team of designers from Portuguese companies with extensive experience in the construction and operation of repair yards. “No other ship repair yard in the South Atlantic Basin will have these resources. At its maximum capacity, it will be able to dock more than 120 ships per year, which includes cabotage, import and export ships and in-transit vessels passing by Brazil on the main trade routes of the fleet segments of bulk carriers, oil tankers, containerships and offshore support,” said Celso Souza, McQuilling’s project manager in Brazil. It is estimated that 2,000 jobs will be created during the construction phase and in the operational phase, when at full capacity, the unit is expected to employ approximately 1,500 workers, generating more than 4,500 indirect jobs. The construction will be carried out in phases with the expected duration of 36 months. According to the Executive Secretary of Industry and Commerce of the State of Paraíba, Marcos Procópio, the venture is the one with the largest projection in the state in terms of investment value and for the emergence of a new development matrix. “It is a project of values and location that puts Paraíba as a reference for ships and vessels that travel through the Atlantic and need, every few years, to make revisions and repairs,” commented the secretary.

LICENSING

In July 2016, the Preliminary License (LP) was given to the Brazil Basin Drydock Company (BBDC) project, a key milestone for the implementation of the Pedra do Ingá Docking Company (EDPI) repair yard. In October 2015 the BBDC applied for the license at SUDEMA, the state environmental agency, which, through the issuance of the Term of Reference (TR), established the requirements for the preparation of studies and analyses to evaluate the en-



Image: BBDC

Above: Full view of the EDPI ship repair complex.

Below: Location of the EDPI yard on left of image across the harbor from the Port of Cabedelo.



Image Port of Cabedelo

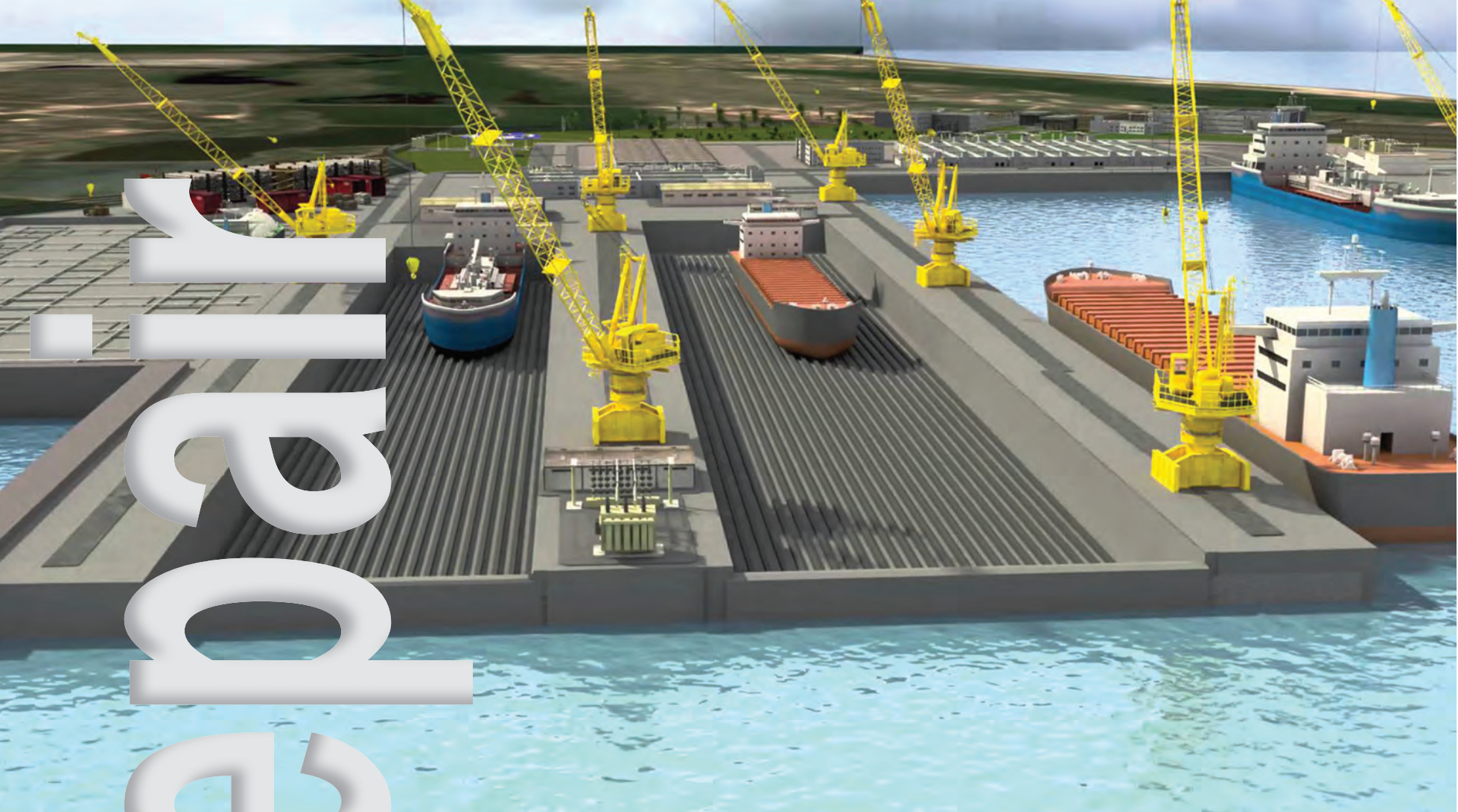


Image: BBDC

Ship Repair

Environmental impacts of the project. The documentation of the EIA/RIMA (Environmental Impact Study/Environmental Impact Report) was prepared by Real Consultoria e Soluções and submitted to SUDEMA in April 2016. The public hearing of the project was held in Lucena in early June 2016, and in July all required approvals were issued. The LP concession certifies the environmental viability of the project and marked an important step for the EDPI project regarding the transition between its planning and execution. At the time BBDC's project manager for the implementation of the EDPI shipyard, Celso Souza, stated: "In the EDPI project team in Paraíba, Rio de Janeiro and New York, everyone is very enthusiastic about this result", and also noted: "We have reached an important goal for the development of the project, but we recognize that there is still a lot to do." According to Saginaw, "The preliminary license was a key point for us. Based on the results of the initial environmental studies we conducted, we expected to get the license, but it was important to have it on hand to provide security to the process of financing the project. We have talked with several regional actors achieving good results, and now we are intensifying the discussions with interested investors, both in Brazil and abroad. We are advancing on several fronts with potential strategic partners who are interested in the project. We are confident in the project - as well as on the overall picture of the country, which has passed a critical point along the way, and we are optimistic that we will be able to start the works in 2019, with the first repairs services already provided in 2021."

FINANCING

The board of directors of the Merchant Marine Fund (FMM), at Brazil's Ministry of Transport, Ports and Civil Aviation, has granted its approval to provide R\$2.15 billion in finance to build the new ship repair facility in the country. As part of the deal, the BBDC will use the basis fund to construct the EDPI ship repair yard facility. The new ship repair facility will be constructed as part of an

R\$9.15 billion program for new and existing government projects. Additionally, the latest approval has enabled BBDC to contract the financing of \$635 million with its already agreed financial agent, the Brazilian Development Bank (BNDES). Both the equity investors and the banks seek comfort from a predictable revenue stream, which EDPI's potential for attracting, international ship owners, in need of ship repairs appears to guarantee.

DEMAND

"Apart from drydocking, vessels require ship repair yards for fixing collision damage, grounding damage, severe weather damage as well as newbuilding faults and installation of capital items (BWT systems, Scrubbers, etc.). The vast majority of ship drydocking and repair contracts are negotiated on a spot basis, making the investment decision dependent on an extremely robust characterization and quantification of drydocking demand," explained David Saginaw. Four factors play a major role in winning the repair contract: proximity, price, promptness and performance. The EDPI yard primarily targets the global merchant marine fleets that require a repair yard of international standard, which can accommodate a full range of repair services, with high quality standards and quick service. It is estimated over 90% of drydocking and ship repair revenues for the EDPI will be denominated in US dollars, sourced from international ship owners. It is forecasted that there will be a growing regional market potential though cabotage and OSV repairs. With the ongoing development of the adjacent Equatorial Margin oil and gas exploration projects, the number of ships of all sizes needing repair in the region is guaranteed to grow. Even with some large newly built local shipyards gravitating to ship repair due to the scarcity of new ship orders, it is perceived that EDPI will still be a competitive facility due to location, design and modern work processes and the largest facility in the South Atlantic basin, purpose built for ship repair and drydocking.



Images: BAE Systems

Ship Repair's "Destination of Choice"

Above: BAE Systems ship repair yard in Jacksonville, FL.
Left: David M. Thomas Jr.

From government to commercial to megayacht owners and everything in between – the BAE Systems ship repair yard in Jacksonville, Florida is well-positioned to prosper. David M. Thomas, Jr.'s, who at the time of our interview was Vice President & General Manager, Southeast Shipyards, Ship Repair, BAE Systems, explains.*

No matter where the conversation starts with David M. Thomas, Jr., it always seems to end in the same place: people. Particularly the importance of people to the operation and success of BAE System's Southeast Shipyards, Ship Repair yard.

"Safety is one of our core values," said Thomas. "By that, we empower everyone in the yard to stop the work if something's not right. But we take it to the next level. It is not that you have the ability to stop work, you have the responsibility to do so if you recognize something as potentially bad or unsafe. People are accountable for being a part of the solution."

Closely in step with core value number one is the second, in that everyone's voice matters. "From a temp to a new hire to a visitor, your voice matters; which leads our third core value in that we must constantly look for ways to improve. Speak up, make your voice heard, and look for constant improvement are my three core tenants for safety."

And not by coincidence, all of the core values revolve around people. "If this is not a safe place to work, I am not able to attract the employees that I need, I am not able to attract the customers to trust us with their ships," Thomas said.

In fact, since Thomas took command of the yard in 2014 (*Note: David M. Thomas, Jr., was recently named to lead BAE ship repair yard in San Diego after three years as Vice President & General Manager, Southeast Shipyards, Ship Repair, BAE Systems in Jacksonville, FL), he credits a change in people skills as one of the leading changes at the yard during his tenure.

"One major improvement has been customer dialogue, that interaction with all of our customers to discover their needs

and how we can fulfill those needs," said Thomas. "It is a willingness to not simply listen, but to leverage past experience to help with current needs."

Thomas realizes that the business of ship repair transcends tools and technical capability, as he looks to foster a true dialogue and relationship with customers, aiming to make his facility the preferred choice.

"I want to do great for all of our clients, and the phrase I like to use is 'destination of choice.' We want our customers to come here and see what we do – I'm happy to give them a tour – and then to come here with their work, and then to come back again."

And his means to achieve this end? You guessed it, an investment in people.

"We have invested in proactive outreach to our customers, which is an investment in having the right staff and ensuring they are trained properly," said Thomas. "This is a deliberate investment of our human capital."

Making his job and that of his staff all the more challenging is the diversity of BAE System's client base, which includes navy, other government customers, commercial repair and yacht owners.

"All (customers) are very similar in some regards, but each group has specific desires and standards," said Thomas. "Balancing that is critical. We have a staff with varied backgrounds and talent bases, and if this were football it's like having people that can go both ways: offense, defense and maybe even punt! So our team members have specific skills as well as the ability to adjust."

BAE Systems Jacksonville Ship Repair Capabilities

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- Docked more than 800 vessels

1,000T Marine Railway & Side Transfer

- Designed by Crandall Dry Dock Engineers
- Third Party commercially certified
- Side Transfer Capacity of 900 Long Tons
- Docked over 660 vessel



Shipyards facilities and tools are essential to the job, but in the end ship repair is a relationship business, and Detyens invests in making life-long friends and partners both inside and outside of the company. **Pictured below are (L to R):** Loy Stewart Jr.; Mr. Gaskins, a DSI employee with 55 years of service; Mr. Stokes, ex-VP with 40 years of service; and Mr. Ward, a machinist Machinist Department head with 53 years of service. Combined with Loy Stewart Jr.'s 30 years of experience, this is a cumulative 174 years of service.



Images courtesy Detyens Shipyards Inc.

Five Minutes with LOY STEWART JR.

President, Detyens Shipyards, Inc.

Finding success stories among shipyards today can be a challenge, but we found one in Charleston, South Carolina at Detyens Shipyards, which is coming off of a strong 2017 and investing for the future, as Loy Stewart Jr., President, explains.

BY GREG TRAUTHWEIN

The maritime market has had a difficult few years, but it appears that Detyens has prospered. Can you give a recap of your business?

The past 12 months have been extremely busy for us, and we have been fortunate with repeat customers and a great team to service their needs. This year has included a wide spectrum of vessels including harbor tugs, barges, dredges, ferries, cruise ships and government auxiliaries. The list includes both international and domestic customers in the commercial industry.

As we look ahead into the very near future, we do have some bookings for early 2018. This is very fortunate because in the repair business we generally don't see bookings out more than two or three months. In our experience some ship owners wait until the last minute to schedule their dry dockings based on the uncertainty of their routes.

By vessel type, who is your 'typical' customer?

We don't have a "typical" vessel type. What we do have is a "typical" customer type. They are ones that want their ship out on time and budget. The majority of them are repeat customers. We have a saying, "the work is hard enough, we aren't going to fight over it." I would say that our customers are commercial minded. We choose not to do U.S. Navy combatant vessels. Although we do approximately 50% government work, these vessels are classed and have commercial missions to perform. A snapshot of the yard at any given time will show a wide variety of ship types and owners.

We note that 2017 has been particularly vibrant for small cruise and passenger vessel repairs. Why?

Yes, there has been an increase in

the smaller cruise ships and passenger ferries visiting the yard. I believe the answer is twofold. There has been an increase in popularity for these smaller vessels in and around the Caribbean. The second part could be that these operators feel more comfortable in a small yard such as Detyens.

Running a ship repair operation is obviously challenging. What do you consider to be your biggest challenge(s) in running a safe, efficient and profitable ship repair operation?

Running a shipyard is extremely challenging. Finding the right people is

the key to our success. We are always looking for employees with repair experience that fit our mold, and these are few and far between. We have several apprenticeship programs to train employees for a trade, but most importantly, for our core values.

Same question as above, with the words added: "in the U.S.?"

In the international market, there is a stigma that U.S. shipyards are overpriced and unable to deliver on time. In a head-to-head analysis Detyens matches up with any yard in the world. We have a permanently employed pool of highly skilled craftsmen that covers all trades and disciplines. It's not just our world class facility, but our team of employees that makes us safe, efficient and profitable.

Looking back, what do you consider to be your most challenging, interesting or unique specific ship repair job?

We believe that every vessel we repair is interesting, unique and challenging. The biggest challenge is always getting the vessel back sailing on time and in budget. The uniqueness of each spe-

cific job is the people that come to manage the vessels and their crew. We really enjoy getting to meet all the unique individuals and characters that come with each project. It's really hard to single out one specific project, to us they're all special.

You've had a long career in ship repair: of what are you most proud?

I am most proud to be able to follow in my father and grandfathers footsteps and to be able to continue what they started. My earliest memories as a child were of a small shipyard out in the country that did primarily U.S. Navy work. Looking back, it's those roots that have brought us to where we are today.

How will Detyens invest in the coming year?

We are currently building a new enclosed paint facility and we are in the process of expanding our hull shop and pipe shop facility. We are investing in our job-training and apprenticeship programs to perpetuate our talented workforce. Our ultimate goal is safety and efficiency with any investments that we make at Detyens.

30" CSD "ROBERT M. WHITE"
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Grand Bahama Shipyard ...



... a "Robust" 2017 & a Record 2018

Vigor: New \$20m Drydock

Vigor built on its ongoing investments in critical infrastructure in the Puget Sound in 2017 with the **\$20 million investment in another drydock**. At 640 ft. long with a clear width of 116 ft., the new dock will be the third, and largest, at Vigor's Harbor Island shipyard. The drydock is expected to be operational in early first quarter 2018 and is part of Vigor's ongoing commitment to make Harbor Island a primary destination for ship repair and conversion on the West Coast for both commercial and government customers.

Major repair and conversion projects completed at Vigor's Harbor Island facility in Seattle in 2017 include a mid-life extension and re-power for R/V Thomas G. Thompson, the 274-ft. research vessel operated by the University of Washington. The \$45 million project was funded by the U.S. Navy's Office of Naval Research and the National Science Foundation and included a complete overhaul of the propulsion, navigation and core engineering systems as well as improvements to lab space and sci-

ence upgrades. The vessel was delivered to the University of Washington in December.

The Vigor Seattle team has also been busy for the **U.S. Coast Guard**, performing structural enhancement drydock availability (SEDA) for National Security Cutters Bertholf and Waesche. Completion of the complex structural enhancements is designed to prevent long-term fatigue damage which would result in additional life cycle maintenance costs. The USS Frank Cable, a US Navy submarine tender, underwent \$56 million of improvements and maintenance, including more than 600,000 pounds of steel renewal at Vigor's Portland, Oregon shipyard returning the near 40 year old ship to its designed mission capabilities.

In 2018, Vigor said it will be busy with a wide variety of commercial and government vessels of varying complexities. This includes re-powers and ship conversions, several cruise ships, fishing trawlers, dredges, tankers, container ships and many other vessel types.

A vibrant and growing cruise business spells good news for Grand Bahama Shipyard (GBS), which in 2017 recorded a “robust” year with 23 cruise ships in for repair, and in 2018 is eyeing a “record” year with 29 cruise ships scheduled to come into the yard for repairs, refurbishments and revitalizations.

In the year past, generally the scope of works included propulsion and technical systems overhauls, hull treatment, accommodations and public spaces upgrades and the addition of onboard attraction facilities. However, work on Carnival Elation, which graces the cover of the January 2018 edition of Maritime Reporter & Engineering News, was a project completed in the fall of 2017 and termed “pivotal” for GBS as it was a “first” for the yard to fully provide CCL a turn-key solution of complex steel fabrications for a major revitalization project.

In total, Carnival Cruise Lines dry docked five vessels within the first half of 2017. Similar on each dry-dock project were full hull blasting and application of silicone coatings; major technical projects including major steel replacement in underwater areas and pipe replacements on multiple systems throughout the vessels. GBS supported the overhaul of thrusters and stabilizers, as well as fabrication and installation of sea chests that were fitted into hulls to support the requirements of newly installed scrubber systems. Other major technical projects were the positioning of additional diesel generator modules (ADG) on four vessels and the installation of cyclo-converter, the latter being a major co-op project with GBS/ABB/

Carnival.

On the hotel side, GBS supported the Carnival Hotel Refurbishment Team with interior structural modification works on several vessels and the construction and installation of the “Water Works” attraction. The late 2017 repair season welcomed additional CCL ships including the the Carnival Elation project, which included deck fabrications for cabins and passenger areas and other complex steel fabrications, along with the installation of a ducktail and sponsons to aid buoyancy. The level of expertise required for successful installation of the ducktail and sponsons involved detailed “mapping” of the existing hull form, then matching existing frames to the frames on the new structures. Work at GBS in 2017 included several other cruise majors and brands.

RCCL’s Grandeur of the Sea received a scrubber system, enhancements to aluminum and steel structures of the upper deck and complete hull blasting plus application of silicone coating. A project of note undertaken by the yard was the erection and maintenance of an impressive 1500 cu. m. complex scaffolding structure to support interior renovations. Two additional RCCL vessels arrived for late 2017 dry dock period to receive similar works. Princess Cruise Line’s returned with two vessels, Caribbean Princess and the Pacific Princess. Both replaced approximately 11 tons of steel in structural projects on the hull and upper decks. Other projects of note included the application of the intricate Princess livery on the bow of each vessel by a team from the GBS Hull Treatment Department.

Celebrity ‘Summit’ visited in April for a major azipod overhaul. The yard team are so experienced in this work that the vessel was ready to return to operations within seven days of going dry.

Norwegian Cruise Lines dry docked five ships within the first half of 2017. NCL’s ‘Sky’ dry-docked for works that included UTM on pool structures, replacement of galley equipment. GBS supported Rolls-Royce on the overhaul of CPP and thrusters, and GBS further assisted by constructing and maintaining complex scaffolding in support of interior renovation projects.

The Pearl’s and Jade’s extensive work programs included full blast and application of silicone coatings, the installation of new ballast water treatment system pipe lines; the overhaul of thrusters, stabilizers and azipods. Holland America dry docked four vessels during the late 2017 repair season. Works included the installation of the GBS fabricated sea chest, complete hull treatment and livery painting, UTM and steel repairs to various structures, hull and super structure, new overboard ballast water treatment system, thruster and stabilizers overhauls. GBS facilitated a new scrubber project and exhaust line replacement, laundry equipment replacement, ABB co-op Azipod repair, and constructed extensive interior and exterior scaffolding structures to support works throughout the vessel.

Disney Cruise Lines docked Fantasy for its first class related dry docking. Works included an extensive hull treatment and anode replacement program, the erection and maintenance of a 10,000 cu. m. of complex scaffold stage

to support major water park and slide refurbishments.

Looking Ahead to 2018

2018 Highlights will be: a project for CCL similar to the aforementioned Elation project, where a vessel will undergo a “revitalization” within a 30-day period. GBS turn-key solutions will include the fabrication and installation of new steel structures, including: a cabin block structure which will incorporate additional cabins, new structures which will become balconies for mid-ship and aft cabins on several deck levels, the fabrication and installation of a ducktail and sponsons, steel fabrications as base components for interior work which will enhance general public spaces. GBS will fabricate the major support structures for the new waterpark. Standard overhauls to piping and mechanical systems are planned, along with complete hull treatment, thruster and stabilizer overhauls and ABB Azipod overhaul. On another CCL vessel, “bridge wing suites” will be added, these have proven to be a success with CCL customers on other ships in the fleet. RCCL will have two “revitalization projects within 2018, major projects will run concurrently with the GBS turnkey projects of fabricating and installing aluminum deck blocks for the incorporation of suites. On these projects GBS will also fabricate the major support structures for the new waterparks. A success from the first “signature of excellence” program, HAL will add “Lanai Cabins”, on several of their vessels, this giving their customers the opportunity of direct access from the cabin to the promenade deck.



Images: Vigor

Hendry Marine: New Drydock

Hendry Marine Industries, Inc. (HMI) (along with its affiliated companies Gulf Marine Repair Corporation, Universal Environmental Solutions, LLC, and Anchor Sandblasting and Coatings, LLC) offers a broad range of maritime services in Port Tampa Bay, including commercial and government ship repair, steel fabrication, gas-freeing, tank cleaning, slop services, lead and asbestos abatement, brokered waste, and blasting and coating.

The Hendry family entered the maritime business in 1926 when Captain F.M. Hendry started a construction aggregate business and then later a dredging business. Captain Hendry passed the business on to his son, Aaron W. Hendry, and under Aaron's leadership, the company progressed from construction aggregate and dredging to ship repair and maintenance. In 1988, Aaron acquired Gulf Tampa Drydock and changed the name to Gulf Marine Repair. In 2012, Aaron had the foresight to start Universal Environmental Solutions, LLC, a company offering gas-freeing and cargo conversion services, so customers could gas-free or convert cargo at the same location as their repair work. UES continues to provide not only those services, but also slop removal, lead and asbestos abatement, and brokered waste services. In 2017, the HMI family of companies grew again by acquiring Anchor Sandblasting and Coatings, LLC, to provide in-house blasting and coating. Now, HMI is the only one-stop shop for ship repair and maintenance on the Gulf Coast. "We are focused on growing our current business lines while keeping an eye toward future opportunities for expansion and diversification. Our goal is to continue to foster a relationship-based commercial strategy, allowing us to build upon and maximize the substantial, long-term industry relationships and

the solid reputation of our team from the craftsmen to the executives." While the current market conditions in commercial shipping are tight, HMI focuses its core competencies around commercial *and* government ship repair, and subsequently HMI reports that it has grown its workforce by 50% in 2017. It is in fact HMI's diversity that it counts as a primary strength in markets strong and soft, as its ability to serve customers in one location is what HMI considers to be a primary competitive advantage.

Investment

HMI and Gulf Marine Repair purchased a new drydock which was set to arrive at the Tampa shipyard in late December 2017. "The entire team at HMI and Gulf Marine worked hard on this transaction," said Rick Watts, President of Gulf Marine. "The future for HMI and Gulf Marine is bright, and this drydock will allow us to service the next generation of tugs, government vessels, and many other types of vessels. We're excited about providing our customers with additional capacity, and this new drydock is the perfect complement to our existing assets."

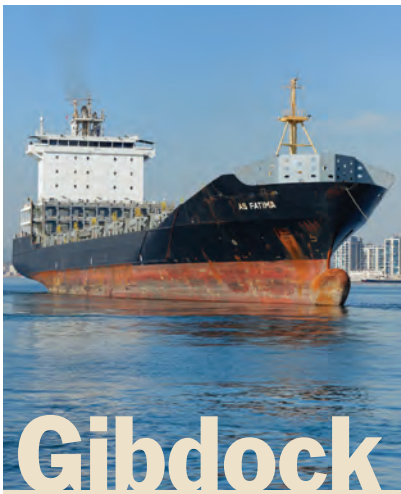
"While the industry as a whole is suffering, we are confident in our ability to continue to meet and exceed our customer's expectations, so much so that we have acquired a fourth drydock that we are going to give to our employees as a Christmas present," said Jim Long, CEO and President of Hendry Marine Industries, Inc. "This dock will expand our capabilities and value, allowing us to service the new deep-draft tugs and larger U.S. Coast Guard cutters. The company will continue to look for ways to expand our business through improvements and more diverse service offerings."



New Drydock Principal Dimensions

Length, o.a.:	94.8 m / 311.02 feet
Breadth:	24.2 m / 79.4 feet
Pontoon Depth:	3.500 m / 11.48 feet
Maximum Draft:	11.700 m / 38.39 feet
Max Draft over	
Pontoon Deck:	8.200 m / 26.9 feet

Images: Hendry Marine



Gibdock

Images: Gibdock

Containership Trio Cap 2017 on an Upturn

The year 2017 ended on a strong note for Gibraltar-based Gibdock which attracted three German containerships to its facilities for ship repair work, including:

- the 2,785 TEU Rita, owned by Peter Döhle
- the 1,300 TEU AS Farima from Ahrenkiel Steamship, and
- the 3,091 TEU Louis S owned by Schepers Rudolf Reederei.

Rita, measuring 206m long, was docked for 14 days in October for a drydocking schedule that included 11,000 sq. m. of hull treatment, with blasting over an area of 5000 sq. m.; repairs to the sea chests, tailshaft and liferaft cradles; and the removal of the vessel's propellers and bow thrusters for overhauling.

AS Fatima, 166m long, arrived in Gibraltar in late October and was primarily docked for work to address a stern tube issue. This required the yard to dismantle and remove the tailshaft and transport it to the workshop, where the propeller blades and blade carriers, as well as the propeller hub itself, were completely overhauled. During the ship's 21-day stay Gibdock also conducted a complete overhaul of the vessel's main engines.

Schepers' 220m long Louis S was drydocked in the yard's dock No. 1 for about a week. The container vessel also came in with a stern tube issue requiring the propeller unit to be dismantled, which required Gibdock to manufacture the tooling for the dismantling work. Gibdock facilities include three drydocks: 154m x 29m, 184m x 29m and 272 x 38m. These are equipped with a total of 10 dock cranes with lift capacities up to 45 tonnes.

BDD: Continual Investment

Bayonne Drydock & Repair Corp. (BDD) performed two major ship repair drydocking and overhaul contracts in 2017. The USNS Charlton was completed and the USNS Soderman is in its final stages. Although BDD performed a vast array of commercial work, these two contracts were in occupancy of BDD's large graving dock for the entire year.

Overall, the company reports that there are many positive growth signs in the ship repair sector, particularly when it comes to federal government spending for navy ships.

To keep in step, BDD continues to in-

vest to ensure that its people and facilities are committed to providing the best service to commercial and government customers. In 2017 and going into 2018, BDD invested in several major facility improvements.

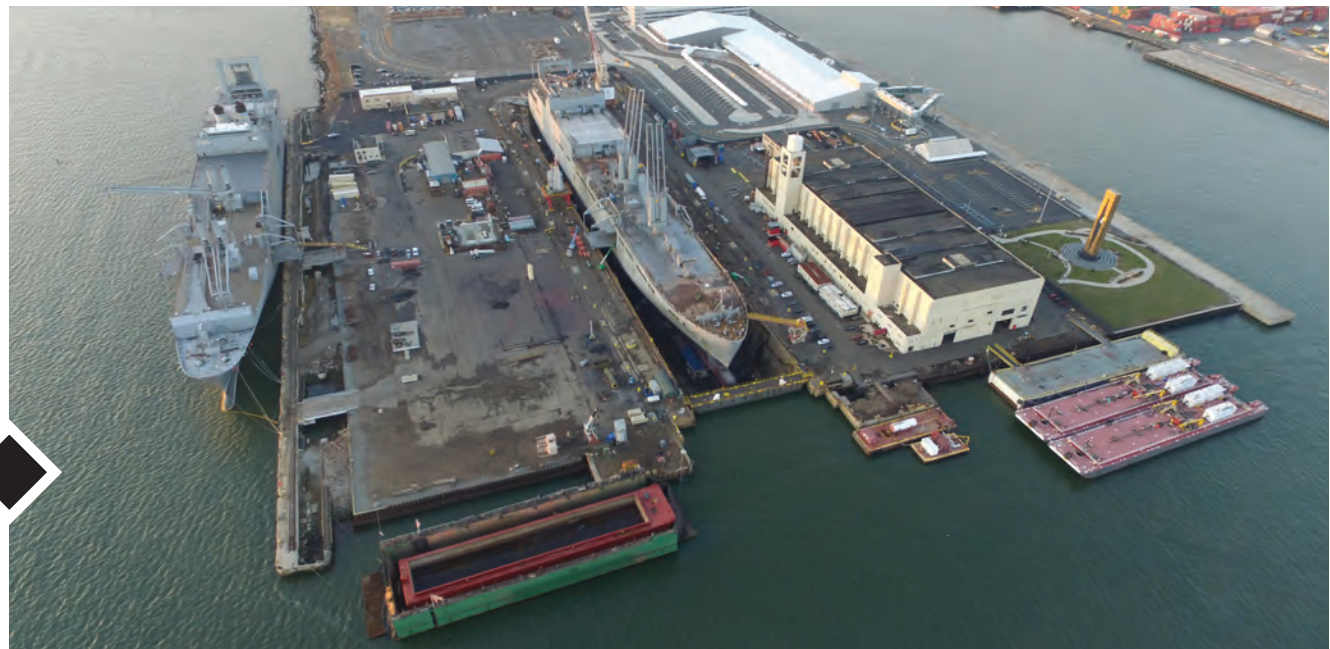
- In addition to purchasing a variety of new equipment, BDD also purchased a 150-ton Rough Terrain Crane.
- BDD purchased a Floating Drydock to keep current with customer demands. The floating dock has an overall length of 268 ft. and width of 90 ft. and the capability of docking vessels and barges up to 3,500 LT.

- BDD is in the process of upgrading

all the warehouse lighting to LED and anticipates updating its Substation to meet new FEMA Flood Guidelines.

While BDD's investment in facility upgrades has obvious benefit to the ship owners it service, it is also seen as a means to continually grow the business and employment base for the region.

"What you become starts with what you envision yourself to be. Having dedicated energetic employees, a strong facility, professionalism and reliability are the fillers that take you from one level up to the next. That's how we will continue to grow," said Mike Cranston, President, Bayonne Drydock & Repair.



Images: Bayonne Drydock & Repair

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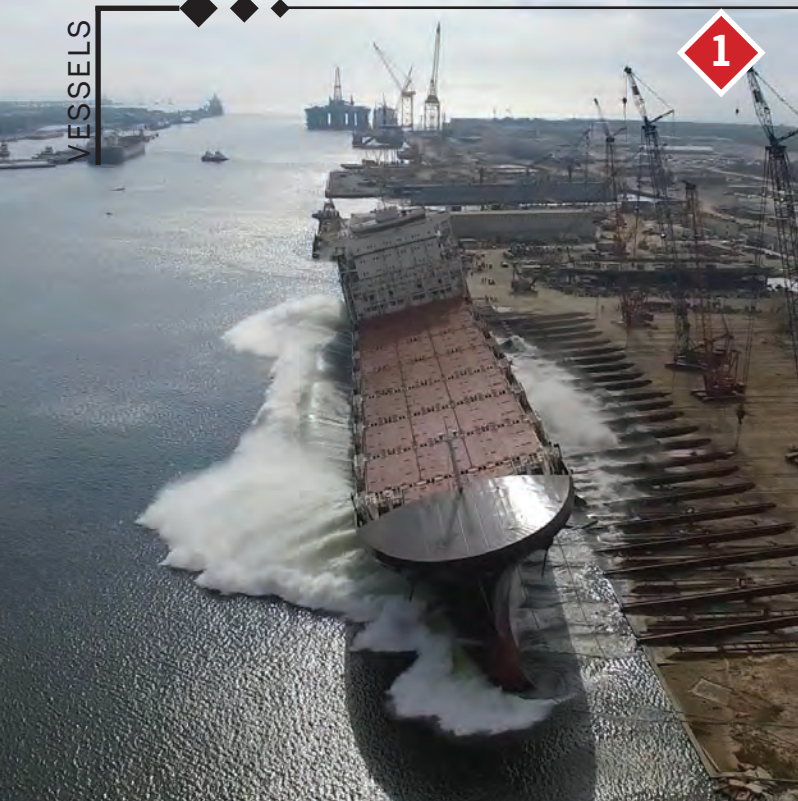


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1

1: LNG-fueled ConRo Taino

VT Halter Marine launched the second of Crowley Maritime Corp.'s new Commitment Class ships, Taíno, one of the world's first combination container/roll-on-roll off (ConRo) vessels powered by liquefied natural gas (LNG). Taíno will sister ship, El Coquí, in early 2018. The ships are designed to transport up to 2,400 TEUs and a mix of nearly 400 cars and larger vehicles in the enclosed, ventilated and weather-tight Ro/Ro decks.

2: World's First Barge-based FSRU

Exmar took delivery of the world's first barge-based floating LNG storage and regasification unit (FSRU), built at Wilson Shipyard in Nantong, China and features regasification capacity of up to 600 million standard cu. ft./day with storage capacity of 26,000 cu./m. of LNG.

3: HAL's Nieuw Statendam Launched

Nieuw Statendam, a new cruise ship under construction for Holland America Line, a brand under Carnival Corporation & plc, was launched at Fincantieri's shipyard in Marghera, Venice.

Final outfitting can now begin, ending in autumn 2018 with the ship's delivery to the owner.

The new vessel, the 16th ship built by Fincantieri for Holland America Line and the second Pinnacle class ship after Koningsdam, delivered in 2016 from the same shipyard, will be about 99,500 gross tons, almost 300m long, with accommodation for up to 2,660 passengers on board in more than 1,300 cabins.

4 Davie Delivers Asterix

Commissioning and sea-trials have been completed for Canada's first Resolve-

Class Naval Support Ship, Asterix, the first new naval support ship to enter service with the Royal Canadian Navy in more than five decades. Asterix departed Québec City on December 23, 2017 en-route to Canadian Forces Base Halifax where she will enter service with the Royal Canadian Navy.

5: Seaspan Launches OFSV1

Seaspan Shipyards launched the first large vessel to be designed and built under the Government of Canada's National Shipbuilding Strategy (NSS) – OFSV1, the first of three Offshore Fisheries Science Vessels (OFSV), a 63m CCG fisheries research vessel. OFSV1 is the first of three and measures 63.4 x 16m with a 6.15m draft. Its diesel electric propulsion system delivers a 12.5 knot maximum speed.

6: Vittoria Launches Tug for Algeria

Vittoria Shipyard returns to the offshore tug market with the launch of the new vessel C869, built for the harbor authority in Skikda, Algeria. Vittoria specializes in designing and building military, paramilitary and commercial vessels – launched the vessel onto the Canal Bianco at its Adria facility. Ordered by the Algerian Ministry of Transport in December 2016 for \$8.2m, the new vessel measures 26 x 10m with a 3.8-m draft, and it is designed to have more than 30-tonns bollard pull capacity. It is equipped with a pair of azimuth ASD thrusters driven by two medium speed diesel engines producing a total of over 3,300 hp.

7: World's Largest Crane Vessel

Holding OOS International Group B.V.

Crowley



2



9

Damen



8

Incat Crowther



Wilson

Fincantieri



Davie Shipbuilding



Seaspan Shipyards



Victoria Shipyard

is working with China Merchants Industry Holdings (CMIH) to design and build what will be the world's largest semi-submersible crane vessel (SSCV), OOS Zeelandia. The dynamically positioned ICE Class 1B liquefied natural gas (LNG) SSCV will be suitable for platform removal and installation in deep water, equipped with two 12,000T capacity cranes spaced 112 meters apart. The aft crane will be fitted with a 360 degrees rotating DP work bridge where DPOs and crane drivers are located next to each other.

8: Sydney Harbor Ferry

Nancy Wake is the new 27-m catamaran passenger ferry delivered to the Australian Public Company Sealink, and has commenced operations on Sydney Harbor. Designed by Incat Crowther and built by Aluminium Marine, it is a 280-passenger

vessel accommodating 198 passengers inside, 82 outside. Nancy Wake is the fourth vessel of this design. The ferry is fitted with a pair of Yanmar 6AYM-WGT main engines, each producing 670kW. The vessel is designed to operate efficiently and comfortably at 25 knots at a modest MCR.

9: Damen to Convert Dredger

Damen Shiprepair & Conversion won a contract to convert a dredger to dual-fuel capability combining LNG and MGO – a first of its kind project in Europe. The contract was awarded by Rouen-based GIE Dragages-Ports with regard to its 117m, 8500 cu. m. trailing suction hopper dredger Samuel de Champlain, and the works will take place next year at Damen Shiprepair Dunkerque. The conversion is part of an EU-supported initiative to promote LNG propulsion in short-sea vessels.



OOS International

Caterpillar Marine's MEO & the big 'Virtual Engine'

Late last year Caterpillar introduced the Multi-Engine Optimizer, or MEO. According to T.E. "Dra" Wiersema, Product Manager, Caterpillar Marine, 85 to 90% of the value of MEO is in fuel savings. But the story of MEO is so much more. As the maritime industry increasingly moves towards data analytics to control everything from fuel management to overhaul scheduling to route planning, there has been the requisite avalanche of new products and systems purporting to deliver incredible returns. If the performance of MEO matches the enthusiasm of T.E. "Dra" Wiersema, Product Manager, Caterpillar Marine, power management in the maritime sector is about to change dramatically.

Meet MEO

The Multi-Engine Optimizer from Caterpillar is, essentially, what its name suggests: an efficient means to manage power onboard a vessel. "We load this box with the performance maps of the engines, from the fuel performance to the NOx performance and including the torque maps," said Wiersema. "Then we have a control algorithm that allows up to select engines; it not only selects engines, but also load points based on load demands that we get from the vessel."

So, for example, if the vessel sends a signal for a 4 MW load, MEO evaluates the engines available and selects the best combination. But the power of the systems doesn't stop there. "It doesn't just pick engines, it picks engines and assigns loads so that every engine is operated on an independent load point, which is unique and not the norm for this industry."

While Wiersema is MEO's biggest advocate, he also acknowledges that MEO is not right for every vessel. "There is a possibility that MEO can save you nothing.

That's not normal, but it's possible." The process to evaluate the potential value of MEO starts at the very beginning, sitting with the naval architect and the owner for a realistic view of the vessel and its operating profile. "There are applications where there is a high variable load where a naval architect cannot design the perfect engine package to always operate in the sweet spot," said Wiersema. "That's where MEO excels."

One of the first pilot programs for MEO was a 32-week test with an overall average fuel savings of 7.3%, said Wiersema. "But there were some weeks where we saved 0.5%; other weeks where we save 12%."

To help designers and owners best evaluate the value of MEO, Caterpillar offers a Sizing Tool where all parameters are entered to determine the best package of engines.

The Big Virtual Engine

"MEO is digital, with feet," said Wiersema, noting the flexibility the system allows. "I no longer care about individual engine maps. What matters is the vessel's load profile, and putting together the best combination of engines that will put out the lowest possible fuel consumption." And the higher the power, the bigger the potential savings.

MEO essentially helps to maximize power flexibility, mixing medium speed, high speed, constant speed, variable speed, large power, small power and even battery power.

Wiersema said Caterpillar Marine is speaking to some cruise ship customers, "and you are talking 60 to 70 MW of power. Do you know what 1% of fuel savings is on 70 MW of power in dollars? It's huge."

— Greg Trauthwein



Image: Eric Haun

T.E. "Dra" Wiersema (right), Product Manager, Caterpillar Marine, spoke to Maritime Reporter TV in New Orleans regarding Caterpillar new **Multi-Engine Optimizer (MEO)**.

Watch the full the interview at:

<https://www.marinelink.com/videos/video/the-big-virtual-engine-100173>



Image: Caterpillar Marine

Cummins-powered Daisy Mae

Triple-Screw Tug for the Hudson River

“The Daisy Mae is the closest you can get to Z-drive maneuverability, without the cost of Z-drive,” maintains her builder Joseph Rodriguez of Rodriguez Ship Building Inc. in Bayou LaBatre, Alabama.

Rodriguez has designed and built a lot of tugs over the years and doesn't make this claim lightly. Further more he backs it up with his description of the beamy 82 by 32-foot tug that his yard delivered to Coeymans Marine Towing. This is one of the Carver group companies based at the Port of Coeymans 110 miles up the Columbia River from New York. The triple-engined boat is powered by a port and starboard tier 3 compliant Cummins QSK38 engines each delivering 1,300 HP at 1800 RPM and a center-line, tier 3 compliant Cummins QSK19 for an additional 750 HP at 1800 PRM. The two outside engines turn Kahlenberg stainless steel four-blade Kaplan style 75.25 by 80-inch propellers through Twin Disc gears, while the centerline engine is fitted with a 65.25 by 72-inch propeller with a similar configuration.

Shaft brakes have been installed all three safts to allow rapid shifting fore and aft. All the propellers are fitted with Kort nozzles to enhance their thrust by as much as 32% for a bollard pull of 47.5 tons.

With a maximum draft of only ten feet, the Daisy Mae will work comfortably along the Hudson River. With her model bow, she has better sea keeping abilities than a conventional riverboat. At the same time, she has riverboat maneuverability with tow flanking rudders on both the two outside props. The combination of powerful port and starboard engines with Kort nozzles on a beamy hull, together with the shaft brakes, foil-shaped steering rudders, and towboat



Cummins/Alan Haig-Brown

style flanking rudders will give the operator of the new tug a lot of options for maneuvering in the river currents or tight harbors when towing, pushing or on the hip of barges.

For pushing, the tug is equipped with a second, elevated aluminum pilothouse with a 41-foot above the water-line eye level. While for towing, a Markey towing winch, with 2000 feet of 1.5-inch wire, is mounted on the aft deck.

A pair of Patterson 40-ton deck winches is mounted aft for making up to push. Although built in the south, she is built for the north with heavy ice strengthened frames and plating forward. As an ABS

load line vessel she has been stability tested and she is Sub-chapter M compliant including all required fire suppression systems.

Accommodation is provided for a crew of five: captain, mate, engineer, and two deckhands. Tankage includes 33,000 US gallons of fuel, 8,000 gallons of water, 500 gallons of lube oil, 1,000 gallons of waste oil, and 1,000 gallons for zero discharge provisions.

An extensive set of wheelhouse electronics includes two Halo 4-pulse compression radars, 16-inch touch-screen chart display, satellite compass, AIS, autopilot, depth sounder, and weather

station all manufactured by SIMRAD. There are also three radiophones, a sat phone, and a bridge monitoring system. Electrical power is provided by two Cummins QSB7-DM powered 60 kW generator sets.

Speaking of the new 3,350 HP Daisy Mae, which was delivered in October of 2017, the owner's representative said, “Rodriguez Ship Building. has turned out a quality vessel in a short time frame. His employees show pride in their work in every aspect of this build and it has exceeded our expectations from a ship builder and has added a new vessel for our fleet.”

Schottel Pump Jet for RV

The 28-year-old Aranda is the first Finnish vessel to be modernized with a diesel-electric hybrid propulsion system. The 59.2 x 13.8 m ice-going research vessel is to be fitted with a 3 MW generator. While the conventional shafting is being retained, an electrically powered Schottel Pump Jet (SPJ) of type SPJ 132 RD will be installed as a new auxiliary propulsion unit. It features an input power of 400 kW, is installed flush with the bottom of the

research vessel and provides maximum thrust over the full 360° range, with no resistance, even in shallow water.

Being built at the Finnish shipyard Rauma Marine Constructions, the Aranda is owned by the Finnish Environmental Institute and is intended for year-round research and surveying missions. Besides the propulsion assistance provided by the auxiliary drive, the SPJ is also used for dynamic positioning with an accuracy of

half a meter.

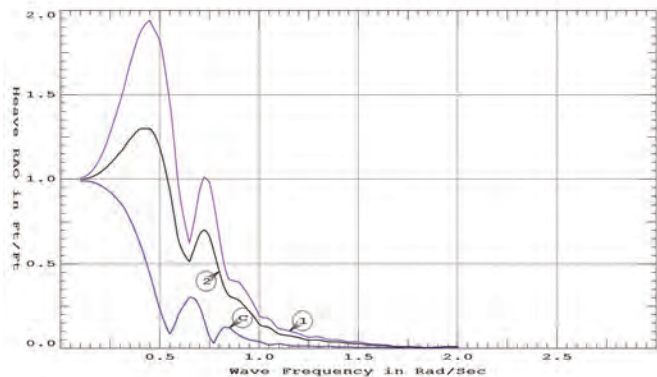
The resilient mounting means that the steel and cast-iron structure of the Pump Jet is completely isolated from the vessel's hull, thus eliminating high-frequency excitations. In addition to extremely quiet operation, this property is a prerequisite for undisturbed seismic measurements, which will be one of the many tasks of the research vessel.

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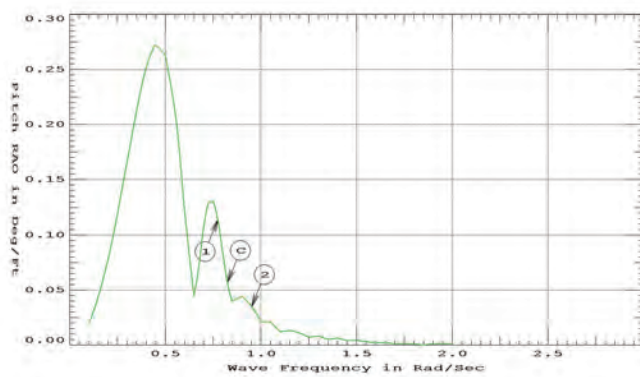


Schottel

GHS Adds “Seakeeping”



KRISO Containership CG and Critical Point Heave RAOs in head seas and zero speed as taken from the SeaKeeping report.



KRISO Containership CG and Critical Point Pitch RAOs in head seas and zero speed as taken from the SeaKeeping report.

SEAKEEPING CRITICAL POINTS

#	Description	L	T	V
(CG)	Center of Mass	0.0f	0.0	47.0
(1)	Bow	415.7f	0.0	77.1
(2)	Stbd Focsle Dk	275.0f	51.9s	77.1

GHS

General HydroStatics is no longer just about hydrostatics, and will soon offer capabilities in the world of hydrodynamics with the introduction of a long awaited addition to the GHS product family: **an optional seakeeping module.**

Adding a seakeeping module means run files may now include seakeeping capabilities by adding a couple new commands and existing geometry files (.GF) can be used for the seakeeping analysis with little or no modification. Integration with GHS also reduces required user input, getting answers faster while increasing user control.

GHS already offers users a complete package when it comes to stability and longitudinal strength. In addition, GHS offers advanced capabilities for complex loading conditions, crane operations, and salvage operations. The onboard configuration of GHS, or General HydroStatics Load Monitor, “GLM” offers users the functionality to configure highly-capable onboard loading computers based on the proven GHS calculation engine. The new GHS SeaKeeping “SK” module builds upon this existing foundation to give users even more functionality, all while staying within the GHS framework.

Before GHS SeaKeeping, when GHS users needed to perform a motions analysis for their designs, it was neces-

sary to use the built-in GHS conversion tools to prepare their geometry for third-party software tools. The loading condition would then need to be manually re-created in the third-party software using output from GHS. In many cases, theoretical limitations in other software programs meant a direct re-creation of the loading condition was impossible, as hydrostatic information could not be directly accessed or used, so further simplifications had to be made.

By contrast, much of the information that other seakeeping codes require as input is accessed in a direct manner “behind-the-scenes” by the native GHS SeaKeeping module. This means SeaKeeping will run on the specific loading condition, and all added weights, tank loads, and their respective locations are included in the formulation. By keeping the seakeeping analysis within GHS, the number of input parameters is dramatically reduced, geometry conversion issues are virtually eliminated, the overall complexity of an analysis is reduced, and accuracy is improved. All of these factors translate into reductions in the time users will spend running quality seakeeping calculations, offering users unmatched ease of use.

The release version of the GHS SeaKeeping module is based upon a linear, 6-DOF, rigid-body, frequency-domain, strip-theory method with variable heading and forward speed terms. Although

other methods exist, each with their respective merits, strip-theory was chosen because it is well-established, well-tested, and generally well-understood. The method is also more robust than other available methods, is well suited to the section-based GHS geometry format, and is computationally efficient. The 2D hydrodynamic problem is solved using a cutting-edge, in-house boundary element method algorithm, which avoids the geometric pitfalls of conformal mapping while improving upon the computational limitations of classical panel methods. While the method offers excellent capability for a wide range of applications, it is important for users to understand and be aware of the theoretical foundation behind the analysis.

Users will be able to compute such information as absolute and relative displacements, velocities, accelerations, and RAOs at the vessel center of gravity or at any other designated point. Crane booms, control stations, and other motion-critical locations on the vessel may be designated using GHS critical points in exactly the same way one would specify critical points for a stability analysis. The user simply has to indicate which points should be included in the seakeeping calculations. SeaKeeping will then compute the motions at these points and automatically create a report, including RAO plots, which clearly show the 6-DOF motion response. For each point,



About the Author

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The SeaKeeping report summarizes all critical points for easy reference.

statistical response data including response variance, average and significant response amplitudes, average periods, and extreme maxima are also provided.

GHS SeaKeeping is designed to allow users to compute motions in regular or irregular long-crested waves via an extension to the existing WAVE command. A seaway may be specified using the built-in wave spectra forms, which include Pierson-Moskowitz, Bretschneider (General, Narrow-band, and ITTC 1984), general JONSWAP, and ITTC 1978 JONSWAP. Users may otherwise opt to use an external data file when site-specific information is available. A custom, parameterized sampling algorithm was designed to give reliable and accurate discrete representations of wave spectra. A summary table and plot of the continuous and sampled spectrum are automatically included in the seakeeping report for review.

For data-centric users, GHS SeaKeeping offers optional output data files that include such information as the hydrodynamic and hydrostatic coefficients, and inertial, diffraction, and total forcing amplitudes and phase angles. Users can easily access this information for verification, validation, or post-processing as needed.

The addition of SeaKeeping to the GHS product family ushers in a new option for powerful, integrated, and user-friendly seakeeping calculations.

MOL, Rolls-Royce



Intelligent Awareness

Rolls-Royce, MOL Collaborate

The maritime industry increasingly moves towards autonomy, and Rolls-Royce has been a major driver of the initiative globally. Rolls-Royce recently announced a deal with Japanese multi-modal transport company Mitsui O.S.K. Lines (MOL), to collaborate in the development of its intelligent awareness system.

Specifically the initiative will be trialed onboard the 165-m passenger ferry Sunflower, owned and operated by Mitsui O.S.K. Lines' subsidiary company, which makes the 222-nm run between

Kobe and Oita via the Akashi Kaikyo, Bisan Seto and Kurushima Straits.

An intelligent awareness systems will be deployed with the aim of making the vessel safer, easier and more efficient to operate by providing crew with an enhanced understanding of their vessel's surroundings.

This will be achieved by fusing data from a range of sensors with information from existing ship systems; such as Automatic Identification System (AIS) and radar. Data from other sources, including global databases, will also have

a role.

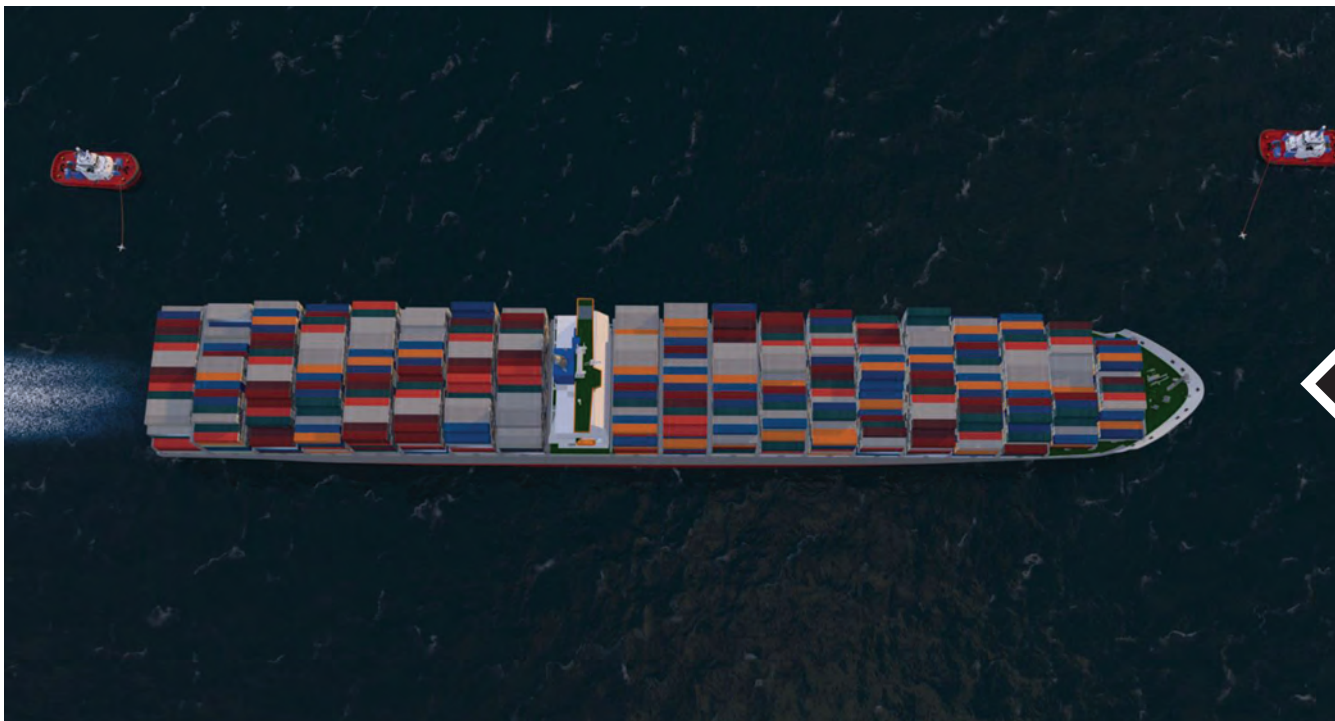
The intelligent awareness system will benefit from Rolls-Royce's extensive experience in the Tekes funded project Advanced Autonomous Waterborne Applications Initiative (AAWA), which has been running since June 2015. The company has been conducting a series of tests of the sensor arrays in a range of operating and climatic conditions on board Finferries' 65 metre double ended ferry Stella, which operates between Korpo and Houtskär in the Archipelago Sea on the southwest coast of Finland.

KOTUG: Send in the Drones

KOTUG applied for a patent to use drone technology in its tug operations, an invention which uses a drone to connect the towline to an assisted vessel. KOTUG claims to be the first tugboat

company that uses the technology to deliver a messenger line to a predetermined location with object recognition software. Instead of picking up the heaving line of the assisted ship, the messen-

ger line of the tug will be brought to the assisted ship in a more controlled manner, in theory allowing the tug to safely sail beside the assisted ship instead of in front of the assisted ship.



KOTUG

Chasing the X-Prize with Autonomy

Kongsberg supported GEBCO-NF Alumni Team to conduct Technology Readiness Test of unique AUV-USV concept Supported by Kongsberg, the GEBCO-NF Alumni Team, one of 19 semi-finalist teams competing in the \$7m Shell Ocean Discovery XPRIZE competition, completed Technology Readiness Tests of its Unmanned Surface Vessel (USV)/Autonomous Underwater Vessel (AUV) concept and associated combination of communications hardware and software to process and transmit data remotely. The test event was held on the fjord outside Kongsberg's factory in Horten, Norway. The GEBCO-NF Alumni Team's concept uses a SEA-KIT unmanned surface vessel, USV Maxlimer, built by Hushcraft in the U.K. USV Maxlimer performed as planned during the Technology Readiness Tests event, where the team demonstrated the USV's unique ability to launch and



Kongsberg

recover a Kongsberg Hugin AUV, and track it accurately on the surface during subsea survey operations.

The autonomous navigation and AUV tracking capabilities of the USV are made possible courtesy of the integration of the Kongsberg & Hushcraft custom developed automation and software configuration in conjunction with Kongsberg's K-MATE common autonomous control engine. K-MATE will also be used by several unmanned and autonomous vessels delivered by Kongsberg Maritime, including the fully electric container feeder; YARA Birkeland. The autonomy controller has been developed in a collaboration between Kongsberg Maritime and FFI, the Norwegian Defense Research. The GEBCO-NF Alumni Team is led by alumni of The Nippon Foundation/General Bathymetric Chart of the Oceans (GEBCO) Postgraduate Certificate in Ocean Bathymetry Training Program. GEBCO is the only organization with a mandate to map the entirety of the world's ocean floor. The partnership with The Nippon Foundation provided more than \$3 million for the team's concept to be developed.



Bahri

Aldubaikhi



OCIMF

Ross



Deutz

Dr. Strecker



Crowley

Gilliam



Crowley

Cosgrove



Crowley

Sperling

Aldubaikhi Named Bahri's CEO

Bahri appointed **Abdullah Aldubaikhi** as its new CEO. His appointment comes as the company gears for a new phase of expansion. He joins Bahri from Saudi Agricultural and Livestock Investment Company (SALIC), where he served as CEO for six years. Bahri presently owns 88 vessels, including 41 VLCCs, 36 chemical/product tankers, six multipurpose vessels and five dry bulk carriers, with an additional five VLCCs on order.

Ross Named OCIMF Chairman

Chevron Shipping Company president **Mark Ross** has been appointed as chairman of the Oil Companies International Marine Forum (OCIMF). Ross succeeds Shell's Dr. Grahaeme Henderson.

Deutz Names Dr. Strecker CFO

Dr. Andreas Strecker, 56, was appointed as a member of the Board of Management of DEUTZ AG, effective March 1, 2018. He succeeds former CFO Dr. Margarete Haase, 64, whose contract ends on April 30, 2018. Dr. Strecker previously worked in managerial positions in the Bus and Controlling units of the Daimler Group, most notably for many years as the President and CEO of Daimler Buses North America.

Crowley Names Management Team

Crowley Maritime Corp. appointed four industry veterans to oversee the consolidated lines of business under the recently formed Crowley Shipping group. The appointments include:

- **Tucker Gilliam**, vice president, petroleum services, who will have responsibility for a fleet of 37 owned or managed tankers and articulated tug-barges for bulk petroleum and chemical transportation throughout the U.S. Gulf, East Coast, West Coast, and Alaska, as well as international ports.
- **Cole Cosgrove**, vice president, ship management, will lead Crowley's commercial ship management and technical services for diverse and specialized fleets across the globe, including Crowley Accord's international ship management services. He will also oversee the new Commitment Class ConRos serving the U.S. mainland-Puerto Rico trade.
- **Johan Sperling**, vice president, marine services, will lead ship assist and

tanker escort services as well as oversee the ocean-class tug and flat-deck barge fleets, which provide specialized cargo transportation.

- **Paul Manzi**, vice president, Crowley Alaska Tankers, will lead the new business associated with the pending purchase of three petroleum tankers from SeaRiver Maritime.

Crowley is currently transitioning its non-liner and logistics business units into three main business units – Crowley Shipping, Crowley Fuels and Crowley Solutions.

Jacobs Receives 2017 Connie Award

XPO Logistics CEO **Bradley Jacobs** received the Containerization and Intermodal Institute's (CII) 2017 Connie Award.

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Metruck

Jacobs founded XPO Logistics in 2011 and has led the company to become a top 10 global provider of supply chain solutions and one of North America's largest intermodal providers, generating approximately \$15 billion of revenue. The company operates in 31 countries, with 1,435 locations and more than 90,000 employees.

Bowles Named Director DLBA

Naval architecture and marine engineering firm Gibbs & Cox, Inc. has appointed **Jeffrey B. Bowles** as Director of its Chesapeake, Va. division, Donald L. Blount & Associates (DLBA).

ASC Shipbuilding CEO Steps Down
ASC Shipbuilding CEO **Mark La-**

marre stepped down after three years at the helm of the Australian naval warship builder. ASC shipbuilding GM **Jim Cuthill** stepped in as acting CEO.

Andrade New CFO at Teekay Tankers

Stewart Andrade has been appointed Chief Financial Officer of Teekay Tankers, succeeding **Vince Lok** who will remain Teekay Corporation's Executive Vice President and Chief Financial Officer.

Goss, Martus Honored

Crowley Maritime Corporation's **Zoe Goss**, director, marine recruiting and development, and **Ray Martus**, vice president, vessel construction management, have been honored with 2016 Thomas

Crowley Awards, the company's highest honor for its employees. **Goss**, a commander in the U.S. Navy Reserve, was lauded for her achievements ensuring the company's mariners have the training and skills they need to be high performers. **Martus** was recognized for his leadership of the ongoing construction of Crowley's two Commitment Class, combination container/roll on-roll off (ConRo) ships that will be among the first in the world powered by liquefied natural gas (LNG). **Martus** oversees a team of experts guiding the entire construction process, including serving at the shipyard to effectively build the vessels for the U.S. mainland-Puerto Rico trade. He also was credited with managing a team that not only oversees the build-out of

Crowley ships, but also those of third-party companies who are having vessels constructed or repaired in shipyards.

Metruck to Lead Port of Seattle

The Port of Seattle Commission announced the appointment of retired U.S. Coast Guard Rear Admiral **Stephen P. Metruck** as its new Executive Director, effective February 1, 2018.

AME Opens New Hydraulics Unit

Advanced Mechanical Enterprises (AME) has added hydraulic service and repair to its broad range of predictive, preventative and corrective maintenance solutions. This will be led by industry veteran, **Jeremy Short** and will offer hydraulic services on capstans, ramps and

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Vane Bros. Orders Four New Tugs
Chesapeake Shipbuilding Corp. signed an agreement to design and build four new push tugs for Vane Brothers. Design and construction on the Subchapter M compliant tugs will begin immediately in Chesapeake Shipbuilding's hull fabrication buildings in Salisbury, Md., with

the series' lead vessel expected to be delivered in the beginning of 2019.

FBS Delivers Wawa's First ATB

Wawa Inc. has taken delivery of its first owned vessel, a newly built articulated tug-barge unit (ATB) constructed by Fincantieri Bay Shipbuilding. The

barge, named 1964, and its 8,000 hp tug, Millville, were christened at the Sturgeon Bay, Wisc. shipyard. Wawa, which runs a chain of gas stations/convenience stores on the U.S. East Coast and presently sells about two percent of the gasoline sold in the nation, will use its new ATB to supply its growing network of retail locations in Florida.

MacGregor Acquires Rapp Marine

MacGregor, part of Cargotec, has signed an agreement to acquire Rapp Marine Group (RMG) in order to strengthen its offering for the fishery and research vessel segment. The enterprise value of the acquisition was approximately \$19 million.

Wärtsilä Acquires Trident B.V.

Wärtsilä acquired Netherland based Trident B.V., a specialist in underwater ship maintenance, inspection and repair services. The acquisition is expected to close in January 2018. The enterprise value of the transaction is \$20.8 million and an additional \$4.2 million earn-out, based on the business performance in the coming years. The turnover of Trident is approximately \$10.7 million.

MacGregor Splits Division

MacGregor, part of Cargotec, will reorganize its offshore and merchant shipping operations. Under the plan, MacGregor's Smart Ocean Technology division will be divided into two new divisions: Cargo Handling and Advanced Offshore Solutions.

Concordia, Damen Partner

Concordia Group and Damen Shipyards Group signed a joint venture agreement to cooperate in the construction and trade of inland waterway vessels. The joint venture will operate under the name Concordia Damen Shipbuilding. Concordia has been active in the Dutch inland waterways business since 2001 and also internationally over the past decade. Concordia's corporate identity will remain within the new joint venture.

Metal Shark Bags Contracts

Metal Shark is building a 45-ft. Defiant Pilot Boat for the Virgin Islands Port Authority at its Jeanerette, La. production facility. At its shipyard in nearby Franklin, La., Metal Shark is building a 64-foot Defiant Pilot Boat for the Brazos Pilots Association of Freeport, Texas. Both vessels will be delivered in 2018. Metal Shark said its Defiant-class pilot boats can be completely custom configured, from the type and location of platforms and rails, to various propulsion types and fendering systems.

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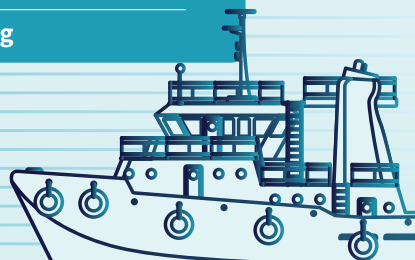
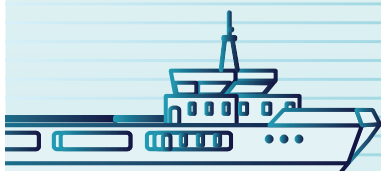


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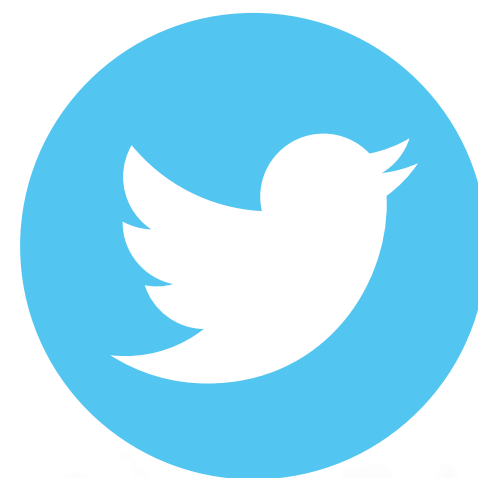


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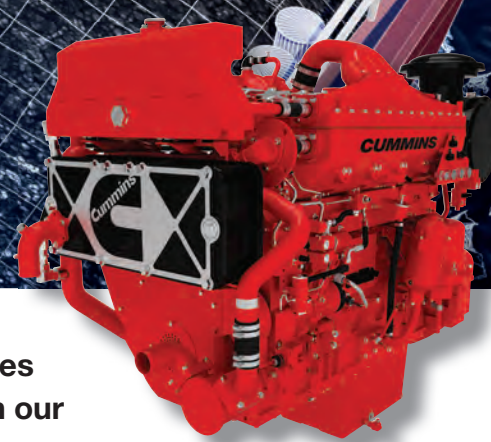
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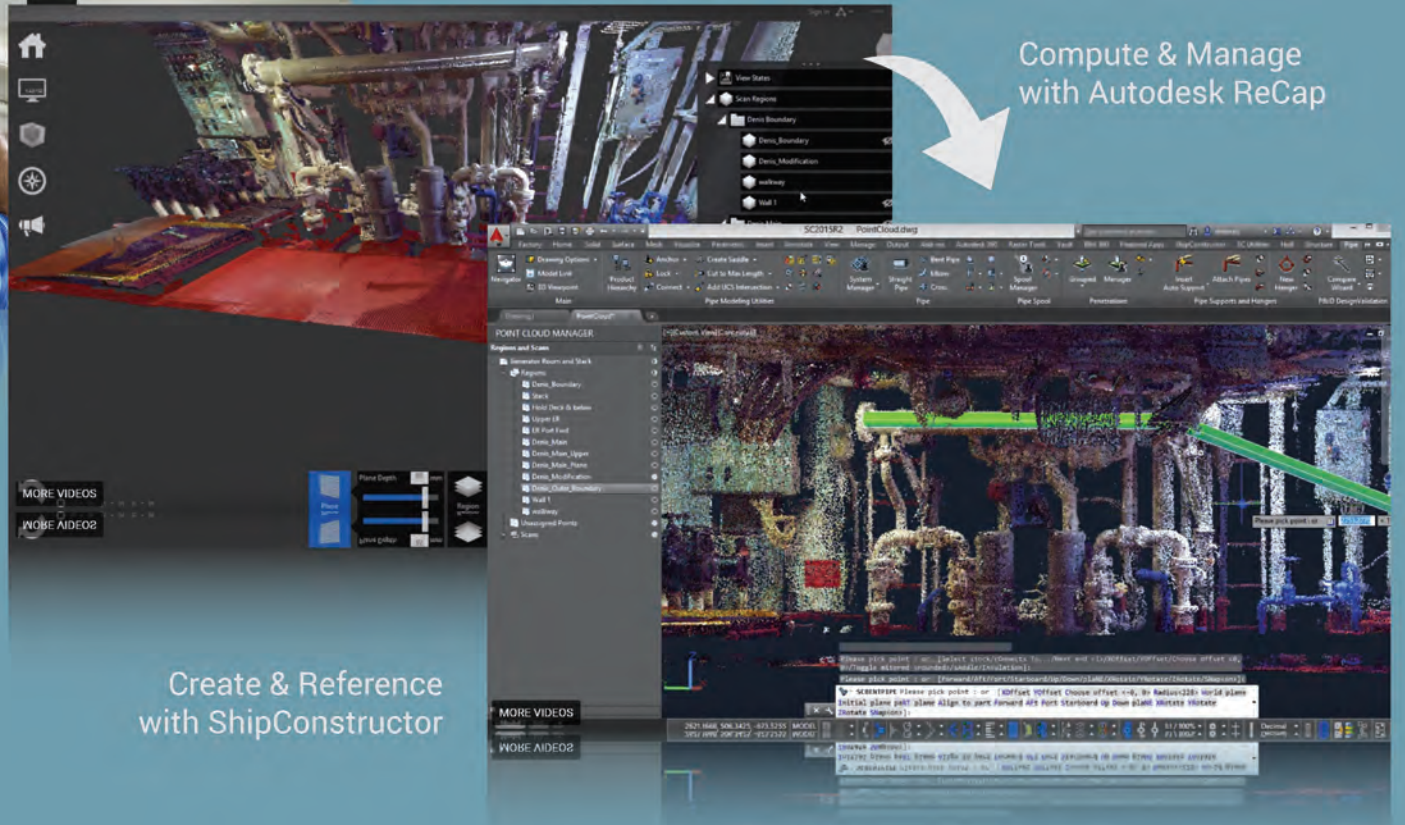


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