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November 2015

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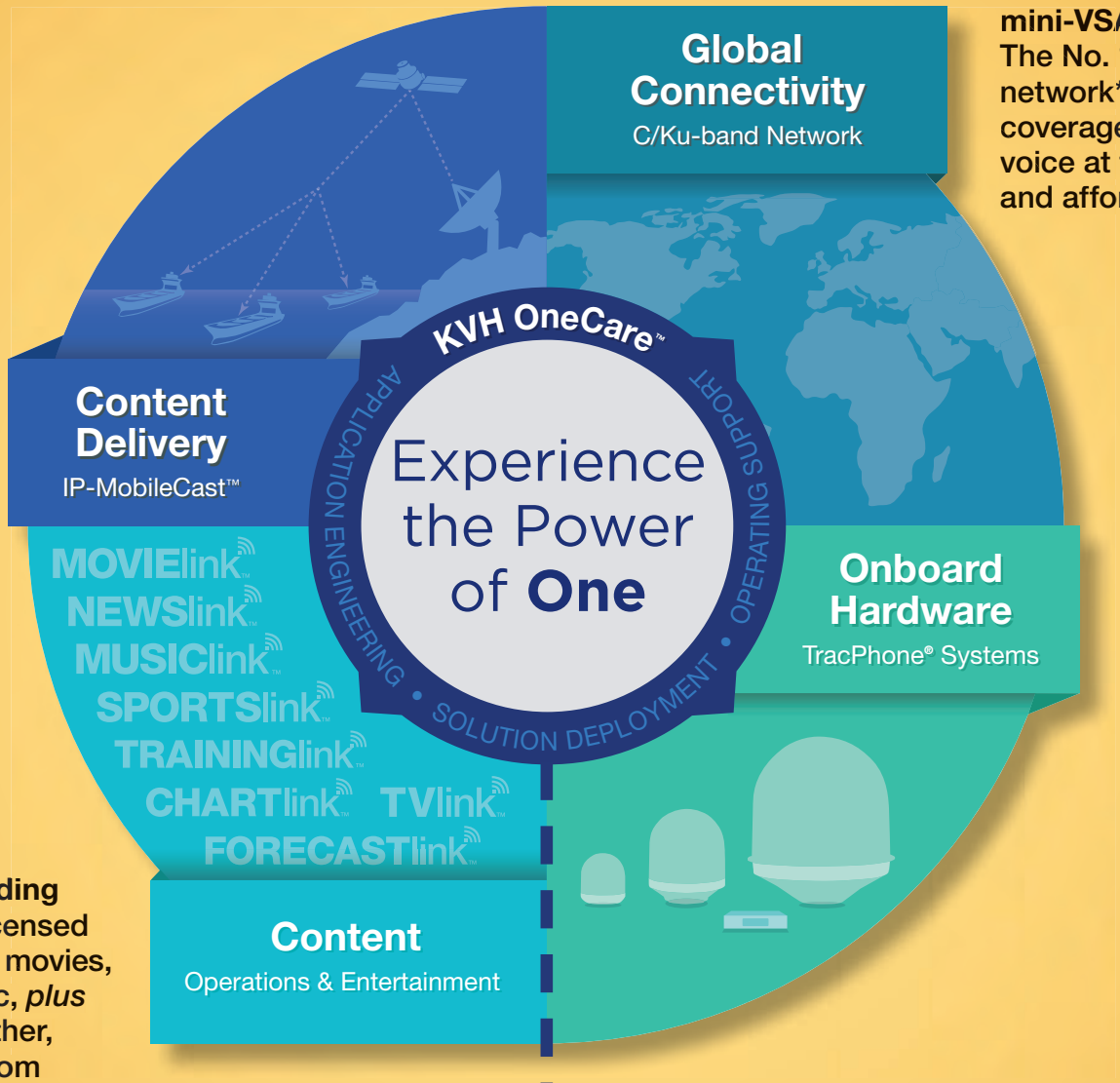

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Photo: Damen Shipyards

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Photo copyright NGO Shipbreaking Platform 2012

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By Tom Mulligan

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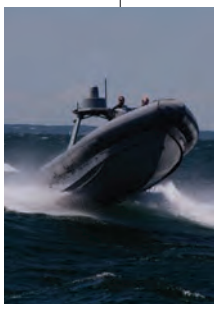

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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

Coming to the end of 2015 is bittersweet. The sweet is the edition you hold in your hands, our largest of the year, focused on the strong and growing workboat sector, a bright spot in a year that has been most closely associated with a depressed energy sector which has obvious ripple effects throughout much of our industry.

While the energy market is down [and there are not many rays of hope on the immediate horizon], trust that the energy industry is not out forever. The long-term prospects remain strong, premised on the universally accepted belief that world energy consumption will continue to grow in the coming generation.

The fate and direction of the high-value floating production system market is one that is particularly worth watching in the coming years, as these multi-billion dollar systems represent not only a huge market opportunity for suppliers of maritime goods and services, but are a true bellwether of the future as they represent one of the most costly means to recover energy from below the sea. **Jim McCaul** of IMA is a renowned analyst in this sector, having closely monitored the global Floating Production market for more than two decades courtesy of his Floating Product System report. He recently issued a new 186-page analysis for the sector, providing qualified guidance through 2020. Read his insightful synopsis of the market starting on page 14.

The bitter is the recent loss of the 790-ft. TOTE ship El Faro and all 33 souls onboard. Having sat in this seat for more than two decades I have seen more than my fair share of tragic maritime losses, but the story of El Faro will surely be one for the ages, particularly in the North American maritime market. It would be irresponsible at this point to draw conclusions, though many have already tried. At press time the wreckage of the ship had been identified sitting in water more than 15,000 feet deep, with efforts underway to find and recover bodies as well as the Voyage Data Recorder. While I certainly was not privy to this specific voyage, the ship's history or the decision making chain previous to the ship being lost during Hurricane Joaquin, you can be sure that no stone will be left unturned in the examination of technical issues specific to the ship and risk management protocol specific to the ship's management. Regardless of the outcome, it once again points to the potential perils faced by the hard working men and women of this industry every day, worldwide. Further, it again proves the point that despite the overall exemplary safety and service record of commercial ship and boats in, the relatively rare tragedy always garners more headlines and attention than the much more common everyday successes.

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Mike Petters

President & CEO, HII

Last month Mike Petters, president and CEO of Huntington Ingalls Industries (NYSE:HII), was honored by the Coast Guard Foundation at the 35th Annual Salute to the United States Coast Guard, held in New York City. Maritime Reporter & Engineering News recently caught up with Petters – the man who leads America's largest military shipbuilding company and a provider of manufacturing, engineering and management services to the commercial and non-commercial oil, gas and energy markets – to discuss not only the honor, but the status and future direction of the business of building ships for the most powerful Navy on the planet.

By Greg Trauthwein

You recently were the spotlight of a Coast Guard Foundation Award in New York City. Can you share with our readers your connection to CGF, and provide perspective on how your participation has impacted you personally and professionally?

The recognition was on behalf of corporate support for the foundation over the last three decades. Personally, I think that, even in my own life, even just a little bit of help along the way makes a huge difference. So I think that if people are going to sign up to serve our country, we should sign up to support them. It is a great investment in our national future.

HII is obviously in the business of building Navy ships. Having spent nearly three decades in this business, how is it most the same, and most different, from when you first started.

Navy shipbuilding will always be on the frontier of technological complexity; I think that was true 30 years ago, I think it's true today, and I think it will be true 30 years from now. The pace of technological change has accelerated dramatically. Thirty years ago we could take technology and combine that with quantity and industrial base considerations to produce a navy that could be where it needed to be, when it needed to be there, to deal with the threats that were at hand. The change in complexity, the change in technology has made it harder, in that the systems and 'things' that go onto ship today are more complex; but the threats that they deal with are even more complex. The buzzword around this is asymmetric problems; it is kind of cheap to create a threat; it is pretty expensive to deal with the quantity of potential threats.

When you think of the technology required to deal with the number of potential threats, it creates tremendous complexity in our platforms, and the expense causes us to reduce the number of our platforms.

Dealing with the quantity of asymmetric threats is expensive. That becomes a

Navy shipbuilding will always be on the frontier of technological complexity;
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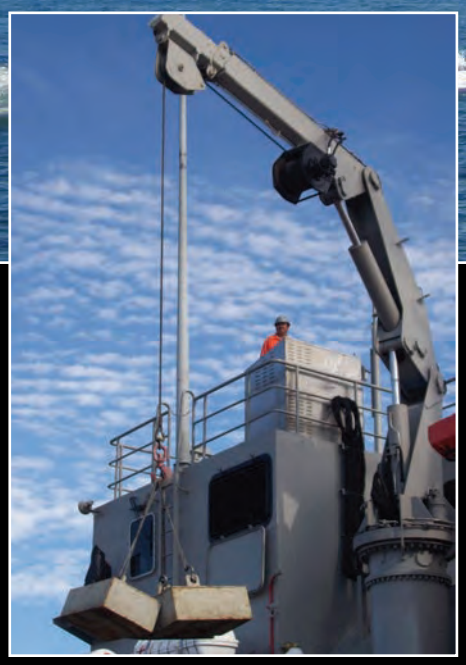

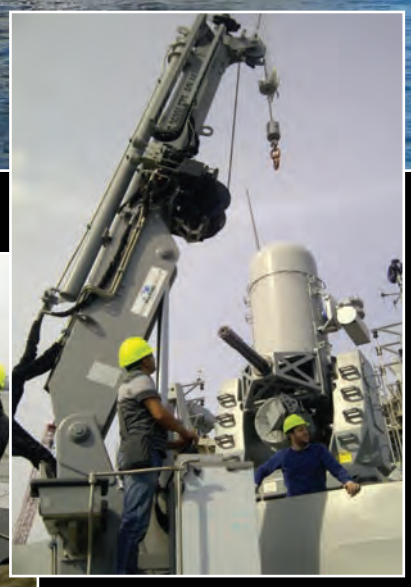

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I'm looking out my window at the **Gerald R. Ford,** which will be making history for the next 50 years. It will be a very important part of how the world evolves over the next 50 years, and frankly, that's pretty exciting.

Mike Petters, pictured with Chris Miner VP, program management at Newport News Shipbuilding

real challenge, because in shipbuilding, the more repetitive we can be, the more we can move toward series production, the more we can make the next ship look like the last one, the better we can invest and the better our customers like it. .

You lead an industrial organization in a country that many would argue has lost its industrial prowess. In your mind, what is the key to HII's success?

Every successful business starts with your people. We have nearly 40,000 employees around the world, and our primary assumption is that every day that they come to work, they want to do a good job. The challenge is to enable that. Whether it's with tools and equipment, or its with training, or sequencing or planning … it's all about making sure your people have their best chance to do their best work. If you're able to that, you will be successful; if you're not able to do that, you're not going to last very long.

Navy business, like many others, are cyclical. What is the secret to staying efficient as demands rise, fall and change?

There are two parts. The first is customer intimacy; you've got to have a good sense of the challenges you customer has, and know the options your customer has to deal with those challenges. You are always learning. I was in the Navy and I've been in shipbuilding for 28 years, and I learn something new every day. I think it is critical that you continue to refresh your perspective on your customer and their challenges. The second part is asking: do you really know where technology is taking the processes that you use? How well do you understand that; how well can you lead that, so that you can create those technologies and processes that ultimately our customer will need to deal with their challenges. You've got to do both: you've got to be really close to your customer and understand what is driving them, and you've got to understand your craft, today and tomorrow.

If you had to identify the one technology that has most enabled efficiencies in your business, what would that one technology be?

Our ability to process data has become both our greatest tool and our biggest challenge. Decades ago, if we wanted to have a system on a ship to fight a fire, we would have a pump and a hose and a sailor. Today, we still have the pump, but instead of a hose we'll have sprinklers. Instead of the sailor we have 2,000 electrical signals coming in from around the ship to a processor to let a computer know whether or not to turn on the fire suppression system. That's an opportunity to improve the performance of the ship and help our sailors focus on the higher end part of being in the Navy. But it's also a challenge of building and integrating that type of system. The management of information cuts both ways.

What do you find most gratifying about your job?

We are blessed to support this great country. One of our shipbuilders once said … 'we build our ships so that when our sailors go overseas that they're never going to be in a fair fight.' When people see our platforms coming over the horizon, they see America at its very best. It's great to have a very small part in sustaining that for four decades to come. I'm looking out my window at the Gerald R. Ford, which will be making history for the next 50 years. It will be a very important part of how the world evolves over the next 50 years, and frankly, that's pretty exciting.

Conversely, what do you find most frustrating?

We just talked about a ship that will be making history for the next 50 years, but as a society I think we are falling into the trap of not thinking very long term. For me, it's challenging to deal with institutions that can't see past next week, next month, next quarter or next year when we are thinking about five decades from now. The hardest part for me is impressing on folks that real leadership in our country requires people to take a longer view.

Every business has its challenges. What are yours?

We are investing heavily in our shipbuilding enterprise to set the stage for the next 25 years. I call it a generational investment in shipbuilding, to transform both our nuclear and non-nuclear shipbuilding enterprises. At Ingalls we're investing in facilities and process flow to reorient that yard toward the products we see that the Navy is going to need over the next 30 years. At Newport News, we are investing as we come through the building of Ford. One of the challenges of shipbuilding is that we build our prototype as our first production unit, so the Ford is the lead ship and the prototype. We have learned a lot on that program and now we can invest in areas of our yard that will drive efficiencies when building the remaining ships of the Ford class.

Floating Production Systems

Downturn in the Deepwater Sector: A Bump in the Road or Long-Term Slowing of Growth?

By Jim McCaul, IMA/World Energy Reports

IMA/World Energy Reports has just completed a comprehensiveassessment of the five year outlook for the deepwater sector. The new report – the 19th annual floater market forecast prepared by IMA since 1996 -- provides our forecast of orders for floating production systems between 2016 and 2020. Here's an overview of the findings and conclusions in the report.

Bottom Line

We see the downturn in market conditions and implosion of Petrobras as a bump in the road. While the outlook is clearly dimmer than last year, there is a large backlog of planned projects requiring floating production systems – and the long term fundamentals to support investment commitment in these projects remain very solid. But the next 12 to 24 months will test the resilience of field operators and contractors in the deepwater supply chain.

The Current Situation

After four decades of rapid growth, the deepwater sector has suddenly stumbled. Very few orders were placed in 2015 for floating production systems. Only 2 FPSOs have been ordered since January of this year– compared to 12+ orders annually over the past decade. The downturn in orders reflects the general unravelling in industry conditions. Virtually every company in the supply chain feels threatened by business softness. Capital expenditures are being sliced and deepwater project starts deferred. Personnel reductions are being announced on a daily basis, rig contracts are being cancelled or renegotiated, assets are being written down.

What happened?

Behind the downturn is an imbalance in oil supply and demand brought on by the emergence of shale/tight oil and inability of major producers to coordi-

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nate a ramp-down of global output.A huge oversupply of oil is in the market. The result has been a plummeting of oil prices over the past year --reducing cash flow and prompting oil companies to severely cut back on capital expenditures to conserve cash.

Add to this the implosion within Petrobras. The major player in the deepwater sector has been largely taken off the field by a corruption scandal. More than a third of expected FPSO orders over the next five years were to be generated by Petrobras. But the company's financial problems have caused a massive cut back in planned project starts. In 2014 Petrobras was planning to acquire13 additionalFPSOs for project starts between 2018/20. Now it is planning to acquire 5 FPSOs – and questions remain about the ability to finance even this reduced number of FPSOs.

Is a Rebound Likely?

Absolutely. Clearly there will be a rebound in the deepwater sector. It will be driven by increasing global oil demand and need to find new sources of oil to replace depleting sources. Global oil demand has been growing at an average rate of 1.4% annually over the past 20 years.With the exception of two years during the global financial meltdown, oil demand has increased year over year during this period.

Looking forward, industry analysts differ on the rate of future oil demand growth, but not on whether growth will continue. For example, the IEA sees world oil demand in 2040 growing to 104 mb/d, an increase of 10 mb/d over current consumption. The EIA predicts global oil/liquid fuel consumption will grow to 119 mb/d by 2040, a 30% increaseover the present. OPEC expects oil demand to grow to 111 mb/d in 2040, up 18% from global oil consumption in 2015.

Among the oil majors, ExxonMobil expects an average growth of 1.2% in oil demand through 2025, followed by a 0.5% growth between 2025 and 2040. BP calls for world oil demand to grow at an average rate of 0.8% annually through 2035. Ultimately new oil sources will be needed to accommodate this demand growth – as well as replace supply losses as depleting oil fields come off line. Deepwater is among those new sources.

The Rebound Scenarios

Three plausible forecast scenarios are profiled in the report that capture a realistic range of underlying market conditions likely to prevail over the next five years.

Low Scenario

Sluggish global economic growth, decelerating energy demand, strong competition from shale oil, oil prices in the $50 to $60 range through 2020, local content policies pressure deepwater cost growth, Petrobras problems continue into 2017/beyond.

High Scenario

Strong economic growth, accelerating energy demand, oil prices in the $70 to $80 range through 2020, constraints limit shale development, easing local content policies reduce cost pressures in deepwater projects, Petrobras regains investment grade in H1 2016.

Most Likely Scenario

Modest but sustained economic rebound, 1.5% energy demand growth, oil prices in the $60 to $70 range through 2020, shale oil grows in North America – but not elsewhere, deepwater cost growth decelerates, Petrobras credit junk rated through 2017.

In all scenarios the expected long term price of oil – on which major investment decisions are based – falls within the EIA projected future crude price range of $70 to $170/barrel in the late-2020s, $80 to $200+ in the late 2030s.

What Will Drive the Rebound?

We are tracking more than 240 offshore oil and gas projects in the planning stage that likely require a floating production system for development.Some of these projects will require multiple systems. If all projects proceed to development, up to 275 new production floaters will be required over the next 10 to 15 years. A large backlog of eligible projects is significant – but only part of the picture in forecasting future production floater orders. Ultimately an investment decision is needed to transform these deepwater project opportunities into contracts for floating production facilities. In our forecast report we examine eleven underlying business drivers that will influence the timing and direction of future deepwater project investment decisions. Here's how we see these eleven drivers at the moment.

In the positive category are

- Oil and gas demand keeps growing
- Supply disruption potential keeps the focus on finding new sources of supply
- Long term oil/gas prices will rise, driven by demand/supply fundamentals

In the negative category are

- Near term oil and gas prices have fallen to levels that discourage investment
- Major energy companies have been cutting back on capital expenditures
- More supply has suddenly come into the oil and gas market
- Shale/tight oil and gas projects are competing for investment funds
- Local content constraints in the supply chain are creating delays and overruns
- Petrobras, the major customer, is having serious financial problems
- Cost of capital for deepwater projects will rise over the next several years

In the unknown category are

- Black swan events can (and have) disrupt the sector

Interaction of these drivers over the next few years will determine the number and timing of future production floater orders.

Forecast for Orders

In the most likely scenario, over the next five years we expect orders for 64 oil/gas production units (FPSOs, Semis, Spars and TLPs), 29 LNG processing units (FLNGs, FSRUs) and 25 storage/offloading units (FSOs). Capex associated with the building and conversion contracts will be in the vicinity of $106 billion. A breakdown of the forecast by size unit, region, year order placed, new or modified hull, etc. is provided in the new report.

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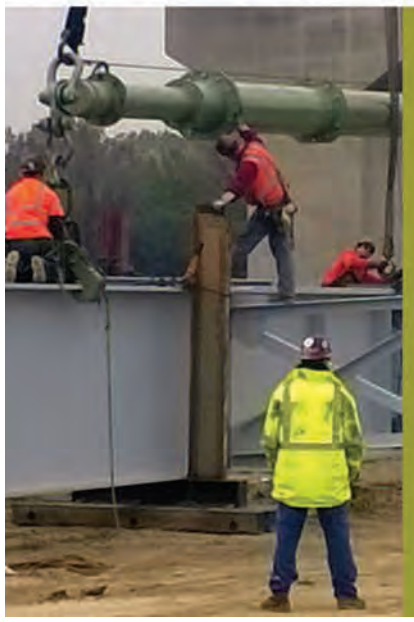

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Out of the Eye ... & Staying There

Joseph Keefe is the lead commentator of MaritimeProfessional.com.

I have never been in a hurricane. That's a fact. Actually, my wife likes to say that whenever there is any kind of natural disaster, I'm typically nowhere to be found. And, when I think about it, I realize that she is right. Whether by accident or by design, that's exactly how it has played out during the 30+ years that we have been together. Whenever this touchy subject does come up – typically once a quarter – she usually points to one particular event as proof of concept.

In August of 1983, long before Katrina left her indelible mark on the U.S. Gulf Coast and the city of New Orleans in particular, there was Alicia. On August 18 of that year, the storm – the only major event of that hurricane season – plowed ashore into Galveston and Houston, causing billions of dollars in damage, flooding and along the way, took the lives of more than 20 unfortunate souls. At the time, I called Houston home. I was also shipping out for a U.S.-based oil and refining company. My wife – then my girlfriend – rode out Alicia hunkered down in her south Houston apartment. Me? I was at sea in the middle of a 60-day rotation, sailing as Second Mate on a coastwise chemical tanker.

The Gathering Storm

As the storm approached the coast (weeks later, my girlfriend told me all about it in no uncertain terms), she had gone out and bought some beer, bread and butter (the three crucial "B's" of any competent hurricane preparation), the last three 'C' cell batteries left in the Bayou City, loaded up her only flashlight, and dutifully sterilized the bathtub and filled it with tap water, in anticipation of the inevitable loss of power, gas and water which was sure to follow. This "wasn't her first rodeo," she deadpanned. And, just as Dr. Neil Frank had promised from the National Weather Center, Alicia roared ashore with a vengeance.

For the first part of the storm, my girlfriend did, I suppose, what everyone else was doing at that point: she cracked a brew and watched the storm unfold outside her living room window. And then, just as suddenly as it had come, it was gone. Or so she thought. She marveled at the clear sky suddenly overhead before realizing she was probably directly in the eye of the storm. She was. Although weaker now, the storm picked up again and she watched the storm further – that is, until the plate glass window in the living room began to visibly flex and "bow" under the changing and rapidly accelerating pressures.

At this point, she wisely and quickly retreated to the safe room of her bathroom to sit next to the bathtub full of water, listening to the wind scream into the face of the building. The rest is history. She has since forgiven me for not being there in her time of need. I also had a hurricane story to tell; albeit one which had much less of a story line.

Safely at Sea

I had signed onto my regular vessel, a single skin, 600-ft. chemical carrier, on July 21. Typically, we would load in Beaumont, Texas, and then proceed around the Florida Keys to discharge dribs and drabs of product, gasolines, chemicals, lubes and other nasty cargoes at as many as six discharge ports on a given voyage. All the way back in ballast, we would clean all tanks. Typically a two-week round trip, you would endure four voyages in your usual work cycle. In mid-August of that year, we were headed back in ballast for the U.S. Gulf Coast.

Modern communications in 1983 did not include cellular telephones, or for that matter, SATCOM. Sure, we had a weather facsimile on board which would, at unpredictable intervals, spit out a damp, blurry, magenta inked weather map. Otherwise, ship-to-shore communications consisted of telex messages delivered by Sparky and/or a garbled conversation (think: fingernails on the blackboard) with station WOO out of Mobile, Alabama. In any event, and having stopped once on the way south, we were generally aware of what was about to happen in the Western Gulf, but beyond that, we didn't know much. With last lines cast off, away we went. Meanwhile, Alicia was approaching the U.S. Gulf Coast.

The way I remember it, and on the following day, I had the noon to four watch on the bridge, where, with my nose pressed up against the porthole glass, I could watch the Chief Mate breaking a sweat with the pumpman as they cleaned, stripped and gas-freed one tank after another. It was a beautiful day and I was bored to tears. After a while, however, the Captain thumped his way up the stairs to the bridge. I quickly lurched myself out of his chair and ducked out onto the port wing before he could chew me out. A minute later, the helmsman stuck his head outside and said, "The Old Man wants to see you."

I popped back in and he barked at me, "We're slowing down." I looked at him dumbly for a minute and replied brilliantly, "What?" At this point, he shook his head, sighed and rang up the Engine Room himself. For the next 12 hours or so, we ran on reduced RPMs and the total trip – according to my navigation records (and yes, I kept them and still have them) – took about nine hours more than it should have. Eventually, we chugged into Beaumont, which was spared, I think, the brunt of the storm. Two more round trips and I headed home to pick up the pieces. When I got to Houston, I discovered that we had lost an enormous pecan tree in the front yard, one which had miraculously missed the house when it came crashing down.

Sea Stories

Having sailed for just a little less than six years, I don't have too many exciting sea stories to tell. And, that's just fine. The worst weather that I can ever remember was a little storm that we encountered on that same chemical tanker, on another voyage, headed south and coming around Hatteras in ballast. The waves and swells were pretty big (in my humble opinion), the wind was blowing pretty good, and on a couple of occasions during my watch, we buried the bow when we caught a wave at the wrong moment.

It was all a bit scary, waiting for the bow to come back up and then watching that green water cascade off the focs'le and forward decks. I also admit to being a bit 'green' hanging onto to the engine order telegraph for dear life. The vessel was a 41-year-old, jumboized tanker, long-in-the-tooth and she looked it. Complete with an old-style midship forward house, I can assure you that the vessel would creak, 'bend' and flex in certain conditions. For example, if you loaded it slightly wrong – too much weight on either end or too much in the middle, some of the doors in the officer's passageway didn't close correctly until the condition had been remedied.

Nevertheless, the Old Man didn't seem at all bothered by the storm, sitting impassively; chain smoking in his chair and watching it unfold. This, despite the blue haze of cigarette smoke wafting all around me, gave me some comfort. We lurched our way down the coast, and I know that two consecutive half-hour Loran fixes showed us actually going backwards. All of it, child's play for the

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Author Joseph Keefe with his parents in 1980 upon graduation from the Massachusetts Maritime Academy, just three years before his near run-in with Hurricane Alicia aboard a 600 ft. chemical carrier in the Gulf of Mexico.

career mariner, I am quite sure.

Circling back on Alicia and our slightly delayed ballast voyage to Beaumont during the month of August 1983, I was glad to have missed all the excitement in the Houston area. That said; the Master of that vessel wasn't in the habit of discussing his decisions or voyage orders with me. To this day, I honestly don't know what went into any voyage planning in mid-August of 1983. Perhaps the office folks were pulling the strings, or maybe this guy – an experienced mariner – decided what to do all on his own. I'll never know. What I do know is that we weren't anywhere near that storm, and someone made sure we didn't get any closer. Good enough.

Defining Risk: Then, and Now

In 1983, STCW was merely an abstract concept that people maybe talked about but certainly, it hadn't (yet) impacted shipboard operations. In those days, you sat for and passed your license exam, renewed your Radar endorsement, took the blinking light test and you were good to go. I certainly don't remember 'voyage planning' and certainly, the idea of Bridge Resource Management (BRM) had never once entered my train of thought; at sea or ashore. But, in 1983, the risks were largely the same as we might still encounter in 2015.

At sea in August of 1983, risk management – if there was such a lofty thing at that time within our modest two-ship fleet – should have factored in the reality that our scruffy coastal tanker was 41 years old. Again, I have no idea if that was the case. My primary job function(s) consisted of navigational bridge watches, correcting charts and stripping tanks during cargo transfers. I guess they didn't think I needed to know anything else.

Risk management in today's maritime nomenclature includes so many variables. Sophisticated weather routing, voyage planning, top-notch ship-to-shore communications, the endless training mandated by STCW, the U.S. Coast Guard, and on and on. Today's mariners face, in many companies, regular simulation "competency assessments." Those in line for promotion to that coveted Master's position are handed an airplane ticket and told to travel to a reputable maritime training school, where a team of consultants will assess their "competency."

For all the advancements in technology, the tenfold increase in training requirements and regulatory oversight, the same risks that presented in 1983 still exist today. And, the same accidents continue to happen. Thirty two years from now, I'm pretty sure those risks will look a lot like the ones we see today. Are we any safer? The recently retired President of the Massachusetts Maritime Academy, ADM Rick Gurnon, told me not too long ago, "There is no hard evidence that all the STCW training now required has resulted in any measurable increases in safety." He could well be right.

Risk Management is all about informed decisions. Today, these decisions take the shape of many things, impacted by myriad variables. It might involve deciding how and when to best transit across pirate-infested waters or perhaps, plotting the safest possible course of a deep draft, 40+ year old vessel in close proximity of a gathering storm. Dozens of other decisions, just like those described above, are no less important. I myself prefer to stay out of the eye of any storm – real, imagined or metaphorical. And, that's just what I intend to do.

– MarPro

Joseph Keefe is the lead commentator of MaritimeProfessional.com. Additionally, he is Editor of both Maritime Professional and MarineNews print magazines. He can be reached at jkeefe@maritimeprofessional.com or at Keefe@marinelink.com. MaritimeProfessional.com is the largest business networking site devoted to the marine industry. Each day thousands of industry professionals around the world log on to network, connect, and communicate.

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The Latest on Ballast Water

Mismanagement

BY DENNIS BRYANT

On October 5, 2015, the United States Court of Appeals for the Second Circuit issued a 65-page decision holding that, for the most part, the 2013 Vessel General Permit (VGP) promulgated by the Environmental Protection Agency (EPA), was arbitrary, capricious and not in accordance with the law. The court declined, though, to vacate the VGP, but allowed it to remain in effect until the EPA issues a new VGP.

The 2013 VGP had adopted, almost completely, the standards established in the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention). What had looked like a settled and deliberate process for encouraging final adoption of the BWM Convention has suddenly been derailed. Nations and other stakeholders that had calculated that the coming into force of the Convention would largely provide for a uniform international regime may now have to go back to the drawing boards. The major incentive for nations that have been planning to ratify the BWM Convention has been eliminated, as it is unlikely that the ultimate U.S. regime will be consistent with that Convention.

The EPA was sued by various environmental advocacy groups, led by the Natural Resources Defense Council (NRDC). Petitioners used three basic lines of attack in their challenge. First, they argued that the technical standards (officially known as "technology-based effluent limits" or TBELs) in the VGP were deficient. Second, they argued that the quality standards (officially known as "Water Quality-Based Effluent Limits" or WQBELs) in the VGP were deficient. Finally, they argued that the monitoring and reporting requirements in the VGP were contrary to the law. With one narrow exception, the court ruled in favor of petitioners.

TBELs

TBELs set effluent limitations on a point source (such as a vessel discharging ballast water) based on how effectively technology can reduce the pollutant being discharged. All parties to the litigation agreed that untreated ballast water is a pollutant as defined by the Federal Water Pollution Control Act (FWPCA). In enacting the FWPCA, and particularly that portion known as the National Pollutant Discharge Elimination System (NPDES), Congress designed the TBELs standard to be 'technology forcing', meaning it should force agencies and permit applicants to adopt technologies that achieve the greatest reductions in pollution. For nonconventional pollutants, such as ballast water potentially containing invasive species, the EPA is required to set effluent limits based on the best available technology

economically achievable or BAT.

The court found that the EPA process for establishing the 2013 VGP was deficient in several regards. Evidence showed that the EPA defaulted to the standards established in the BWM Convention, rather than conducting a wide-ranging analysis of potential approaches. While the EPA commissioned several studies of the ballast water issue, it inappropriately limited those studies to examination of ship-board technologies, foreclosing any analysis of the costs and benefits of shore-based approaches. The EPA also ignored evidence that several of the available ship-board technologies were able to achieve levels of performance that exceeded, to some extent, the limits established in the BWM Convention.

WQBELs

WQBELs, which supplement TBELs, are intended to prevent degradation of the quality of the water into which a discharge will occur. The limit is based on the amount and kind of pollutants involved and is set without regard to cost or technology availability. The EPA is required by the FWPCA to ensure compliance with its narrative criteria, designated uses, and antidegradation policies.

In the 2013 VGP, the EPA requires all vessels to control discharges "as necessary to meet applicable water quality standards in the receiving water body or another water body impacted by the discharges." The court found that this standard is insufficient to give a shipowner guidance as to what is expected or to allow any permitting authority to determine whether a violation has occurred. The WQBELs do not state how they will ensure compliance. The court dismissed EPA's contention that determining a more specific standard is difficult, holding that scientific uncertainty does not allow the agency to avoid its responsibility for regulating discharges. Further, the EPA failed to implement best management practices (BMPs) as an alternative.

Monitoring and reporting

The FWPCA requires that NPDES permits include conditions that require permittees both to monitor compliance with the TBELs and WQBELs and to report the results of that monitoring. The 2013 VGP requires vessels to monitor the functionality of their BWM systems, if installed, and the concentrations of two "indicator" bacteria. The court found the functionality monitoring requirement to be insufficient because it fails to determine whether unpermitted pollutants are being discharged, noting that the EPA acknowledges that BWM systems meeting BWM Convention standards allow discharge of a certain level of contaminated ballast water. Thus, EPA's reliance on functionality monitoring is misplaced. The VGP requires vessels to report intended ballast water discharges. The court found that vessels should be required to report actual ballast water discharges instead.

It must be noted that, for the most part, the court did not rule that the 2013 VGP standards implemented by the EPA were wrong. Instead, it ruled that the articulated rationale of the EPA in its adoption of those standards was deficient. In some cases, such as possible use of shore-based ballast water treatment, the EPA failed to consider a potentially viable option. In other cases, such as the apparent availability of shipboard ballast water treatment systems that exceeded the BWM Convention standards, the EPA failed to explain why it did not mandate use of such systems. Thus, at least in theory, the EPA could ultimately reissue the 2013 VGP provisions with a more thorough examination and explanation. This is unlikely to occur. The EPA must now reopen its VGP process and more thoroughly examine the various options regarding ballast water management and the costs and benefits of each option. In particular, it must study shoreside treatment options, as well as the capabilities of the numerous BWM systems on the market or under development.

Opportunities for Manufacturers

This presents opportunities for manufacturers. Those who have capabilities regarding shoreside treatment of ballast water may want to bring their systems to the attention of the EPA. Likewise, those who have or can develop shipboard systems that exceed IMO standards may have an opportunity to garner some attention from the next EPA study. As pointed out in the court decision, the EPA permitting process is intended to be 'technology forcing'. At the same time, the IMO should consider reexamining its consideration of BWM systems, rather than resting on its work to date. Ultimately, this reopened VGP process may provide opportunities for serious competition in the area of ballast water management. If so, the challenges emanating from this decision may be ultimately beneficial, although currently unsettling.

The Author

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Ballast Water Management in the field

Put to the Test

BY LAWRENCE YOUNAN

Variable Fluorescence for the Validation of Ballast Water Sampling Techniques Aboard the RV Meteor

Turner Designs, along with scientists from around the world participated in a research cruise aboard the RV Meteor, a vessel owned by the Federal Republic of Germany through the Ministry of Research and Technology (BMFT) and funded by the German Research Foundation (DFG). The goal of this cruise was focused on ballast water sampling techniques and protocols. Various instruments were used to test collected ballast water enabling researchers to determine efficiency for the various sampling techniques employed. The preferred technique would then be used for sampling ballast water from ships for the purpose of collecting an appropriate sample when checking if ships' ballast waters comply with ballast discharge standards.

Cruise Details

The RV Meteor is a German research vessel stationed in Hamburg, Germany. Financial and logistical contributions from the German Federal Maritime and Hydrographic Agency (BSH) in partnership with the federal Department of Fisheries and Oceans Canada (DFO) enabled this 11 day research cruise which began off of the coast of Africa in Mindelo, located on the Cape Verde Islands, and ended in Hamburg, Germany. This cruise occurred in June of 2015, the Atlantic Ocean's most oligotrophic time of the year. Headed by Manfred Rolke from BSH, many top scientists, instrument vendors, and ballast water treatment companies from various parts of the world were aboard to help this effort. Different water types were encountered as shown from the cruise track in figure 1 to the right. Samples were analyzed from oligotrophic (saline) waters to highly turbid river (fresh) waters allowing for a robust data set.

Methods

Water samples analyzed were either untreated surface samples, UV treated surface samples, or ballast tank samples that were held for a specific period of time. The collected samples were fractionated according to size class of organisms and fractionates were individually analyzed using fluorometric, microscopic, ATP, FDA, and molecular labeling techniques. Turner Designs' Ballast-Check 2 was used to estimate phytoplankton abundance as cells/ml as well as assess the activity of those cells using fluorometric techniques. There were 3 sampling events per day, 2 splits per sampling event, and 3 fractionates per split over 11 days for a total of just under 200 samples collected during this cruise. The Ballast-Check 2 analyzed roughly 600 samples as everything was done in triplicate.

Figure 1: Cruise track from M116/2 research cruise aboard RV Meteor beginning in Mindelo on June 4, 2015 and ending in Hamburg on June 15, 2015.

Ballast-Check 2

The Ballast-Check 2 is a small, lightweight, highly durable handheld fluorometer. It is dustproof, waterproof, battery powered, has internal data logging, and is specifically designed for rapid indicative tests of whether ballast water is in compliance with current discharge standards for phytoplankton in the 10-50 micron size class. This determination is based on two important measurements made by the Ballast-Check 2 for characterizing algal constituents in ballast water: ABUNDANCE and ACTIVITY of algae. Factory set, the Ballast-Check 2 is configured for use right out of the box, with simple one-button measurements that yield accurate estimates in less than 1 minute.

The Ballast-Check 2 has been used in many laboratory and field trials for testing the success rate of a variety of treatments used to treat ballast water. Treatments such as chlorination and UV exposure are used to reduce the abundance of organisms in ballast water to make the water safe for discharge thereby reducing the risk of introducing exotic/invasive species. Verification techniques such as microscopy, flow-cytometry, and wet chemistry are used to determine whether treatments are effective, but these techniques require expensive, laborious equipment and trained personnel who can not only operate but also analyze and make decisions based on detailed results. The Ballast-Check 2 provides quick indicative results for gross exceedance of discharge standards as a first step toward determining whether ballast water is safe to discharge or instead requires further testing for final determination.

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Measuring Abundance and Activity

Throughout the cruise, the Ballast-Check 2 measured two parameters for each sample analyzed: Abundance and Activity. These parameters are used to indicate the amount of algae (Abundance = cells/ml) in the sample and how active the algae are with respect to photosynthetic efficiency. The total measuring time is short, < 1 minute, and the final determination of the "okay" or "not okay" to discharge is given by a RISK reporting. High risk indicates that there is a high abundance of algae in the sample and they are active, so if they are released into the environment there is a high chance of survival and proliferation. Low risk means algae in the sample are low in abundance or they aren't able to survive and proliferate due to a diminished photosynthetic capacity. Although RISK wasn't a parameter of interest for this scientific cruise, because numerical values were preferred for statistical comparisons, RISK was logged for each sample analyzed and the RISK determination accurately distinguished among samples that were and were not in compliance with discharge standards for all samples analyzed.

Abundance Results

A highly accurate determination of cells per milliliter in a sample is made using microscopic counts, but this work is extremely taxing, tedious, and requires specialized training to identify organisms of interest. The Ballast-Check 2 uses fluorescence responses to essentially estimate a count of the same organisms of interest as would be counted on a microscope. Figure 2 below shows microscope counts plotted against estimated Ballast-Check 2 counts for most of the samples analyzed on the RV Meteor. The counts from the Ballast-Check 2 and microscope show a good correlation (r2 = 0.82), considering the variability that exists with both counting methods.

Activity Results

Measuring a cell's physiology is one way to determine whether that cell is alive or active. Fluorescence techniques take advantage of the fact that phytoplankton cells use some of the absorbed light energy for physiological pathways (photosynthesis) and measure active fluorescence, which looks at the ratio Fv/Fm to estimate how active phytoplankton are; Fv being variable fluorescence and Fm maximum fluorescence. Active phytoplankton will fluoresce less, as most of the light absorbed is used for photosynthesis, resulting in a higher Fv/Fm and vice versa. The Ballast-Check 2 uses a slightly different algorithm for estimating phytoplankton activity, but the calculation used is based on the active fluorescence method described above. A high end active fluorometer (Walz Water PAM), considered by many to be one of the most sensitive and accurate benchtop active fluorometers on the market, was used by Dr. Marcel Veldhuis from MEA-nl to analyze samples aboard the RV Meteor. Dr. Veldhuis is the senior scientist aboard the MEA Innovator, a test barge used for ballast water trials and testing. After comparing Ballast-Check 2's Activity measure with the Walz PAM measure of photosynthetic efficiency (yield), he quoted: "The Ballast-Check 2 is very promising as a tool for monitoring and compliance control, and easy to operate while providing reproducible data."

Figure 3 below shows a good correlation between the Ballast-Check 2 and the Walz for a majority of the samples analyzed (r2 = 0.71), indicating the Ballast-Check 2 can accurately distinguish between active and non-active phytoplankton cells.

Summary

The Ballast-Check 2, optimally configured for reporting Abundance and Activity of algae in ballast water per ballast water discharge standards, aided the efforts of this research by generating a robust data set to be used for comparing various ballast water sampling techniques. On a side note, Ballast-Check 2 results were compared with higher analytical techniques for characterization of algae in ballast water. With positive feedback and results from this research cruise, we conclude that the Ballast-Check 2 is a simple, easy to use instrument that provides all the information required to accurately determine whether ballast water grossly exceeds discharge standards. This low cost, rugged instrument is a great tool for quick indicative testing and compares well with other more expensive high end instrumentation.

Turner Designs is very grateful to BSH and DFO for this opportunity to participate in their research cruise. We were fortunate to have been involved with this endeavor and have the chance to provide data from our analyses to help with this effort, while also having access to such a robust data set for comparison studies between our instrumentation and other analytical equipment.

The Author

Lawrence Younan, Turner Designs' Applications Scientist since 2006, has an academic background from Moss Landing Marine Laboratories focused on phytoplankton ecology and scientific instrumentation.

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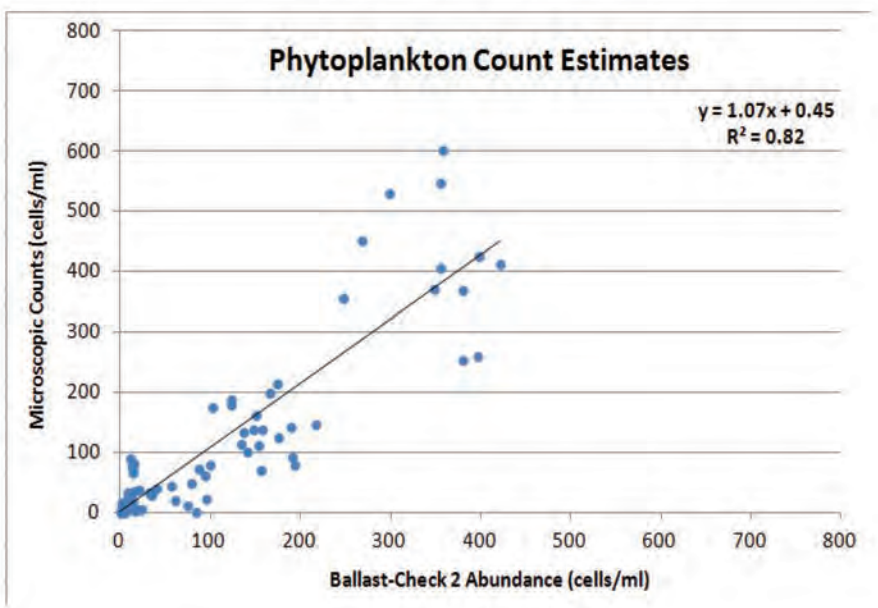

Figure 2: Epi-fluorescence microscopy was used to count algal cells in the 10-50 micron size class. Cell counts were made by researchers S. Bailey, J. Bradie, and J. Vandenbyllardt from the federal department of Fisheries and Oceans Canada (unpublished data). Samples with abundances < 5 cells/ml have been omitted from the data set in this figure.

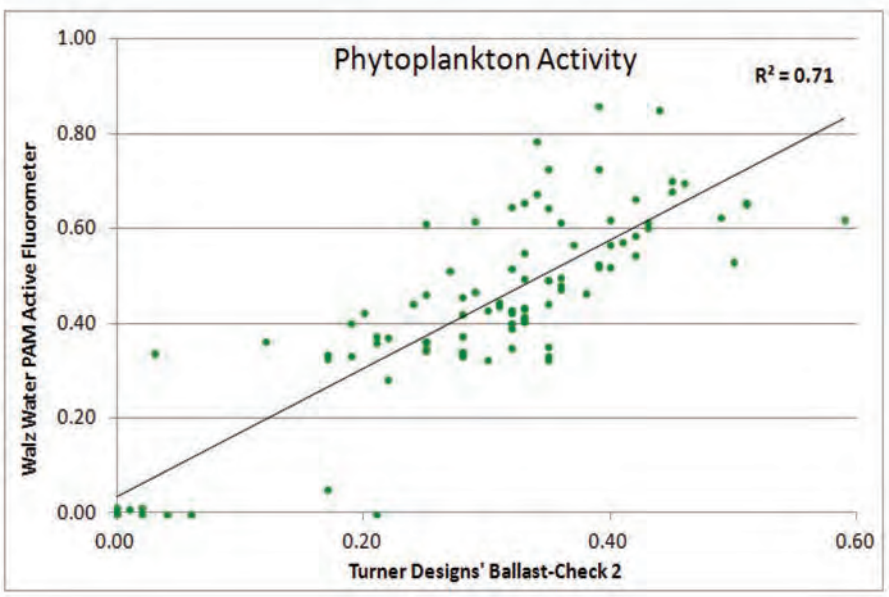

Figure 3: The Ballast-Check 2's Activity parameter correlated with Walz Water PAM fluorometer's Yield estimate. Samples with abundances < 5 cells/ml have been omitted from the data set in this figure.

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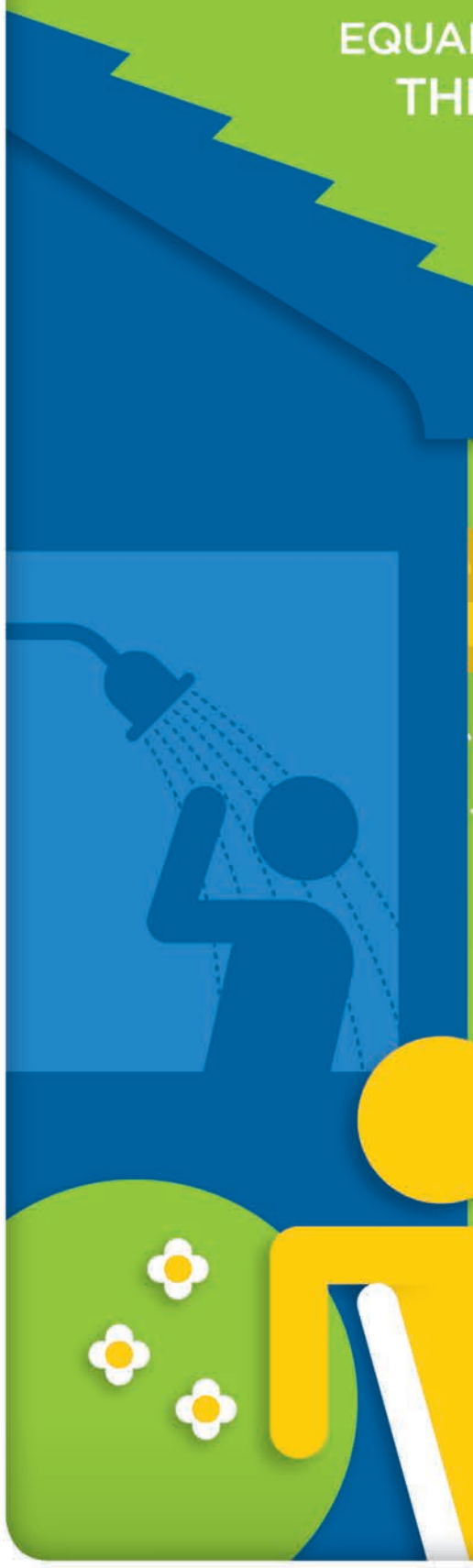

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When conducting investigations

Consider "Privleges"

Whether voluntarily or as required by the International Safety Management Code, the American Waterways Operators' (AWO) Responsible Carrier Program, or some other rule or regulation, investigations of accidents and near-miss situations are routinely conducted by companies in the maritime industry. This is due to the widespread recognition that careful examination of the root causes of such incidents can help to prevent future occurrences. Faulty procedures, defective equipment, and inadequate training can all be identified in the investigation exercise. Conducting investigations is now a critical part of the job for vessel officers, shoreside safety managers, and company executives.

No capable attorney would advise their client to refrain from conducting accident or near-miss incident investigations. For one thing, strict adherence to the requirements of the investigation section of the company's operations manual, the ISM code, or the RCP may be important in defending future litigation to prove that "due care" was exercised. It may also be important in maintaining qualifications to perform customer work or in adhering to covenants and conditions of insurance policies or charter parties. And the worst mistake that can be made is to fail to secure and preserve evidence or, worse, to fail to prevent the destruction or alteration of evidence relevant to the occurrence of an accident. So called "spoliation" of evidence can lead to dramatic results in litigation, including being stripped of defenses or having a jury instructed to disregard all of your other evidence as being untrustworthy.

Any lawyer who does maritime tort work, such as personal injury, property damage, collision, or oil spill cases, is nevertheless dismayed when presented with a client's file that contains damaging admissions of fault in an investigation report. "If only you'd have called me when the accident happened," he or she says to the client, "I could have conducted an investigation that would have been protected from disclosure to other parties as 'attorney work-product.'" Some readers may not realize that the protection against having to disclose reports and material created during an investigation conducted in anticipation of litigation was first recognized in a maritime case. Samuel Fortenbaugh, of Philadelphia's gone but not forgotten Clark Ladner, Fortenbaugh and Young, was nearly tossed into jail for contempt of court for having refused to obey a federal judge's order to turn over his notes of statements he took from the crew of his client's tugboat. Fortunately, that judge was overturned on appeal, leading the U.S. Supreme Court, in the case of Hickman v. Taylor, to give its blessing to Mr. Fortenbaugh's theory. As a result, the Federal Rules of Civil Procedure were amended to incorporate the attorney work-product doctrine in the discovery rules applicable to all federal cases. The general rule is that materials and information gathered by a company's representative, including its attorney, consultant, or agent, if gathered in anticipation of litigation, are not discoverable by the opposition. Even if a compelling need is shown for the discovery of those materials, such as the complete unavailability of certain information by other means, the mental impressions, conclusions, opinions, or legal theories of the attorney or other representative must be protected.

Most sophisticated companies in the maritime industry and elsewhere recognize that getting an attorney on the scene to preserve and protect evidence and information is important when an accident is likely to lead to a lawsuit. That is because the well-known but often misunderstood attorney-client privilege might serve as an additional obstacle to the ultimate discovery of harmful statements or evidence.

The attorney-client privilege is different from the above-described work-product doctrine in one or two important ways. First, except in limited circumstances such as the furtherance of fraud or criminal conspiracy, the privilege is absolute. Whether or not litigation was anticipated or whether or not the other side has some type of need for the information, statements made by clients to attorneys in the context of seeking legal advice are confidential and cannot be compelled to be revealed. However, this does not mean that by merely telling your lawyer about a fact, you can keep the fact from being discovered by other means. Moreover, if the person talking to the lawyer is not actually the lawyer's

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client, the attorney-client privilege does not pertain either. For example, a statement made to a lawyer by a third-party participant in an accident or a witness, even if that witness is a company client's employee, may not be protected by the privilege.

If an accident investigation was conducted by a vessel officer or company employee without a reasonable anticipation of litigation, such as in a "near-miss" situation, and the investigation report contains damaging admissions, that report might be discoverable in a subsequent similar accident that did result in harm and lead to a lawsuit. Is there any way in which those damaging admissions can be protected from being discoverable or used by the other side to make its case? The answer is probably "no," but I would enthusiastically recommend attempting to invoke the so-called "self-critical evaluation privilege" to try to protect the documents and materials from being discovered. This form of privilege, recognized in a few states under certain circumstances, is designed to solve the precise societal problem of how to encourage a company to conduct an objective and thorough investigation, thus possibly preventing future accidents, when the risk of creating harmful evidence against them would be a discouragement. The privilege was initially created to protect the hospital peer review system in which physicians consider the conduct or decisions of fellow physicians in order to make improvements to the quality of health care. The privilege has not been widely recognized, unfortunately. Many times, the reason given for failing to recognize the privilege is that an element of government compulsion of the investigation is not present. But not all jurisdictions require that the reports be made under government compulsion in order to be protected.

The federal courts have been reluctant to recognize the self-critical analysis privilege as a creature of the federal law itself. A federal court will, however, enforce a privilege recognized by a state. Most maritime cases are litigated in federal court, of course, and something called the "general maritime law" is deemed to be applicable to those cases at least as to matters of substance, unless modified by federal statutes passed by Congress. To the author's knowledge, there is no well-established principle of general maritime law that recognizes the self-critical analysis privilege. Therefore, one's best bet is to argue for the application of the privilege if it is recognized in the state in which the federal district court is sitting. Federal district judges are comfortable with applying the versions of the attorney-client privilege defined by the law of the state in which they sit, and such should be no different with respect to the state definition of the self-critical examination privilege. Therefore, when the case is brought in the state court of a state that recognizes the privilege, such as New Jersey, it should not be difficult to convince the court of the applicability of the privilege so long as the elements of the test are satisfied.

In those states that require government compulsion as part of the test, that aspect of self-critical evaluation privilege may well be present in a maritime case, particularly when one considers that adoption of the ISM code is mandatory by federal statute with respect to certain types of vessels. But where government compulsion does not exist, an argument for recognition of the privilege should be made anyway. After all, the privilege exists in order to encourage good behavior by companies. Why should government compulsion be a part of that equation? Companies should be encouraged to voluntarily act responsibly.

Finally, even though the general maritime law or the law of a particular state does not yet recognize the privilege, an attempt to create a change in the law should be made. After all, both the general maritime law and state law on privilege are forms of so called "common law," which should evolve and grow to suit the needs of the society. And unless the issue is raised, a court will never be forced to make a decision. Some courageous judges may recognize the important policy goals behind the privilege and change the law because it is the right thing to do, despite the fact that other judges in his/her jurisdiction have not done so before. And unless you raise the point, you do not have an issue on appeal and the law will never be changed.

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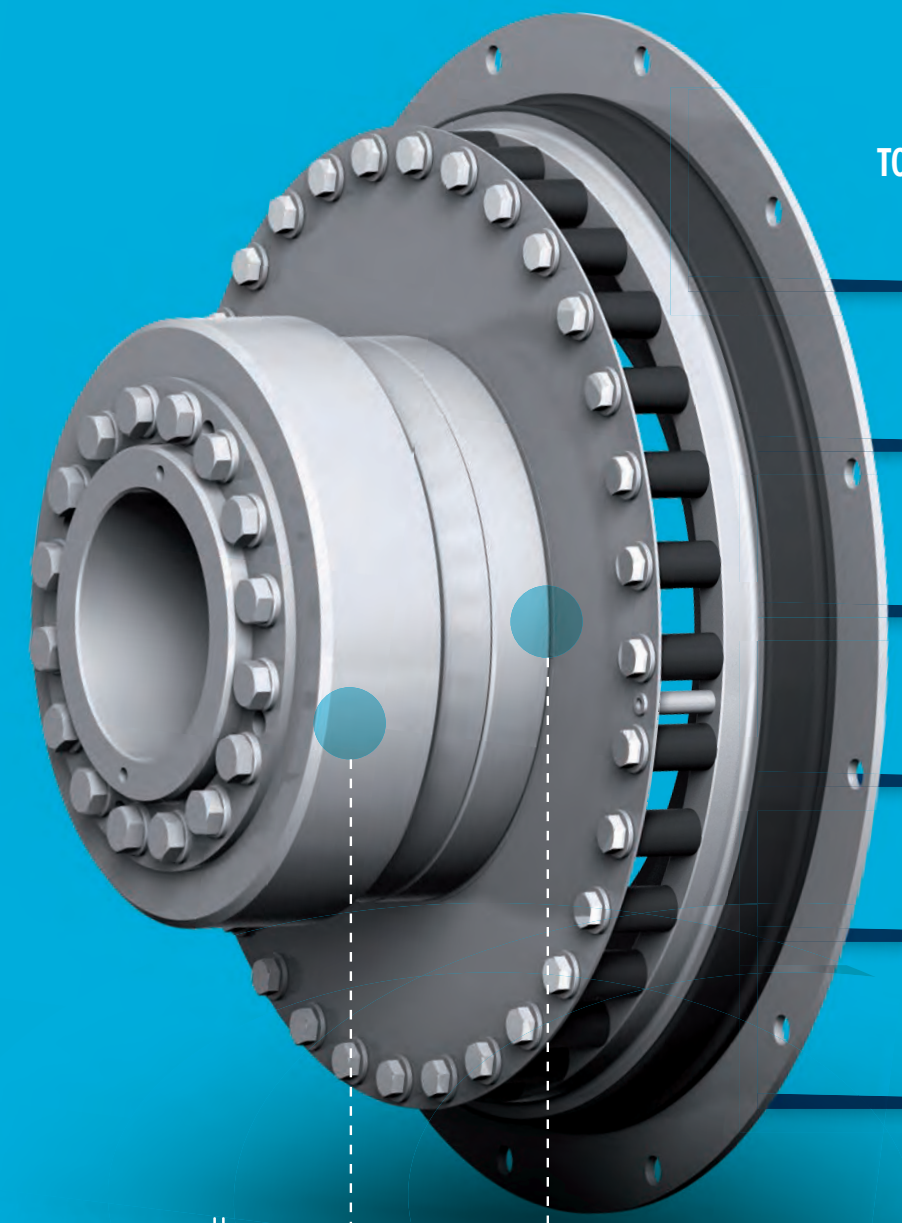

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When using CFD Simulations, an analysis of

Anti-Roll Tanks (ARTS)

BY MAARTEN KERKVLIET

In 2014, the behavior of anti-roll tanks was studied at MARIN by using ReFRESCO CFD simulations to fully understand the working principles.

In 2014, the behavior of anti-roll tanks (ARTs) was studied at MARIN by using ReFRESCO CFD simulations to fully understand the working principles.

The roll motion of ships operating in a seaway often limits operations. These limits could be due to the maximum acceleration, green water, capsize risk or just comfort, for example. Therefore, additional roll damping is often desired to improve the operability of ships. Several devices can be used to decrease roll motion, such as bilge keels, active stabilizer fins and U-shaped or free-surface anti-roll tanks.

At MARIN, the U-shaped ART was examined in detail. The amplitude and phase of the roll opposing moment, resulting from the water that moves transversally in the ART, strongly depends on the inside geometry of the tank. A well-designed ART facilitates a substantial reduction in roll motion at the ship's resonance frequency and a small increase in the response at off-resonant frequencies. Certainly, the design of an ART is not straightforward, as a badly designed ART can make the roll motion even worse during operations.

Using ReFRESCO, simulations were performed to analyze and visualize the forces and moments acting on different areas of the ART. A numerical sensitivity and validation study was performed to obtain a good trade-off between accuracy and computational costs. The results of the simulations will be used to build an ART database for optimization purposes. Additionally, if the required roll damping of the system is known at an earlier stage, ReFRESCO can be used as a simulation driven design tool.

The ReFRESCO results of the U-shaped ART have been compared with available CFD and experimental results from literature, as well as with MARIN's own experiments, using the MARIN Anti-Roll Tank Facility. The results of the simulated and measured data concur very well (Fig.1). Interestingly, some scale effects in roll damping response have been observed, especially when the flow is restricted by obstacles in the tank (Fig.2). Further research on ARTs will be continued this year. For example, the mentioned scale effects and the free-surface ART will be studied to obtain an accurate and complete description of their design and response.

Fig. 1 **Roll damping results of full-scale and model-scale CFD compared with model-scale experiments.**

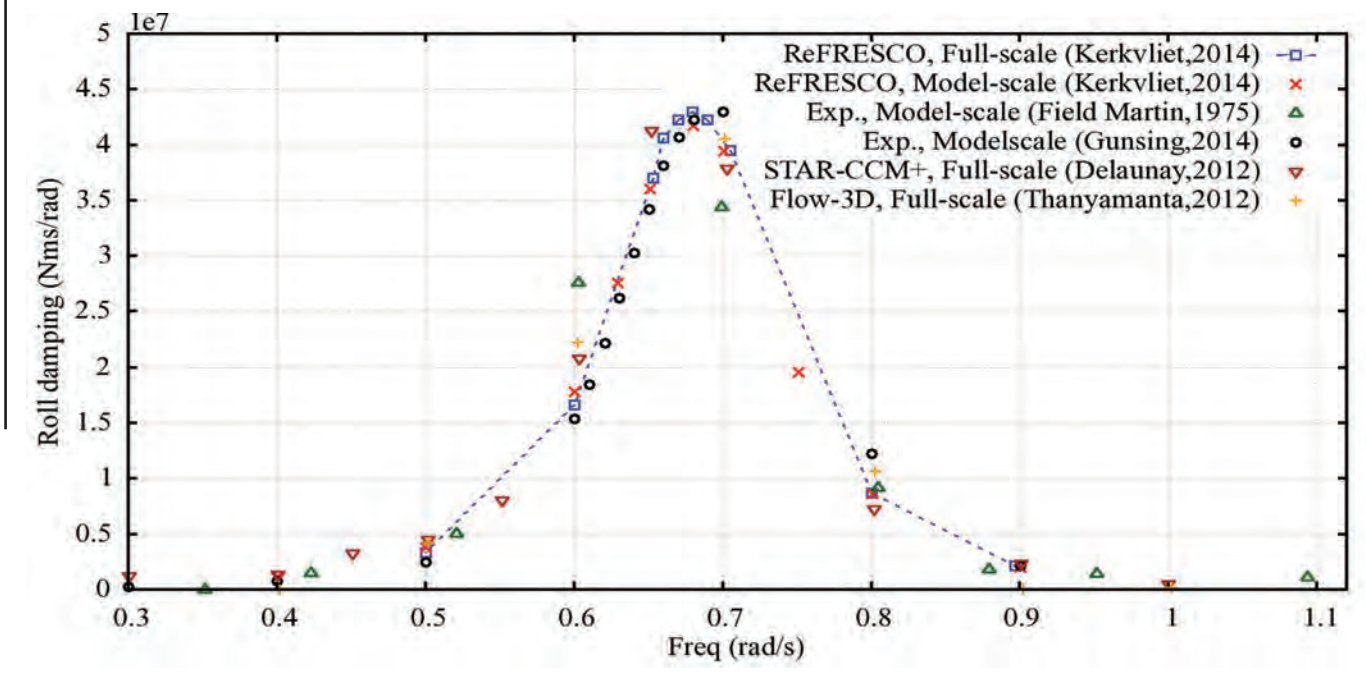
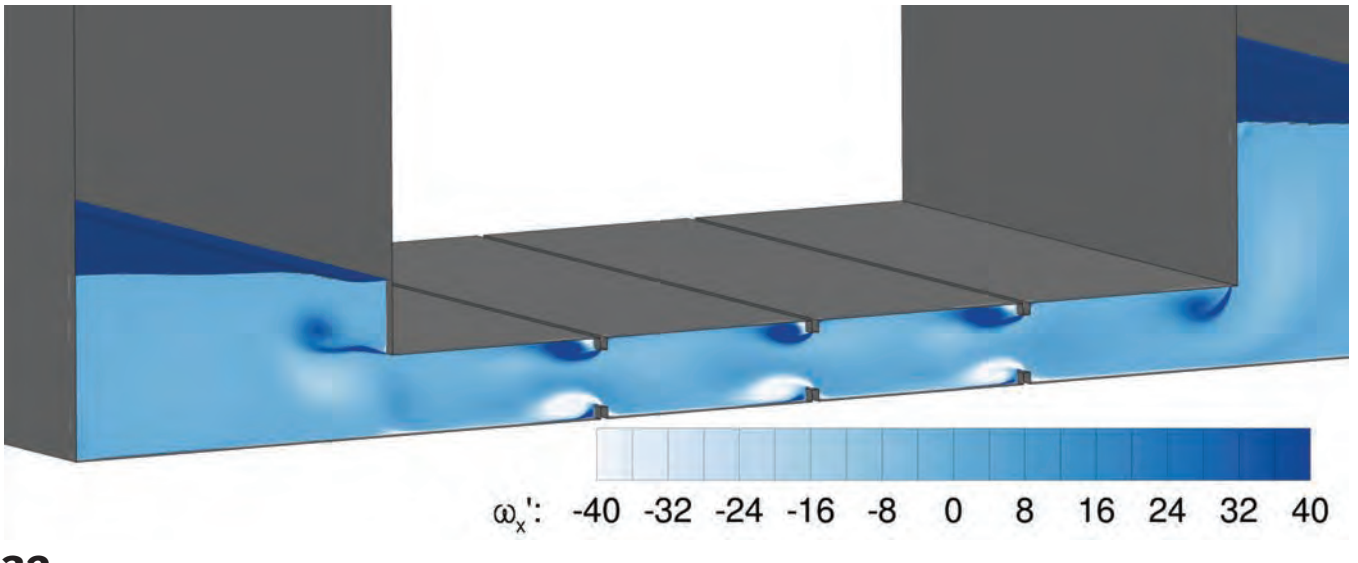


Fig. 1 **U-shaped ART Vortices are shed from the baffles inside the duct.**



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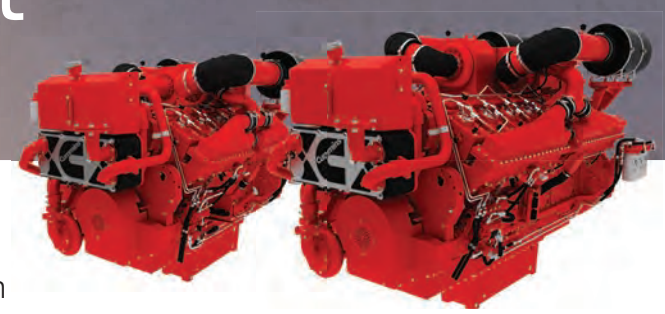

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Opportunities for growth as the economy in

China Evolves

BY WOLFGANG HARMS

The global breakbulk and heavy-lift markets have had to navigate choppy waters in recent years. Not necessarily due to a shortage of freight, but as a consequence of unsustainably low freight rates. The global economic recovery since 2009 has been slow, and competition for the multipurpose sector has intensified due to bulkers, container lines and RoRo's making forays into the breakbulk and heavylift market, as they look to diversify their business and make up for the lack of demand in their respective core markets. It is a concerning trend that could serve to devalue quality within the sector, as well as impacting health and safety.

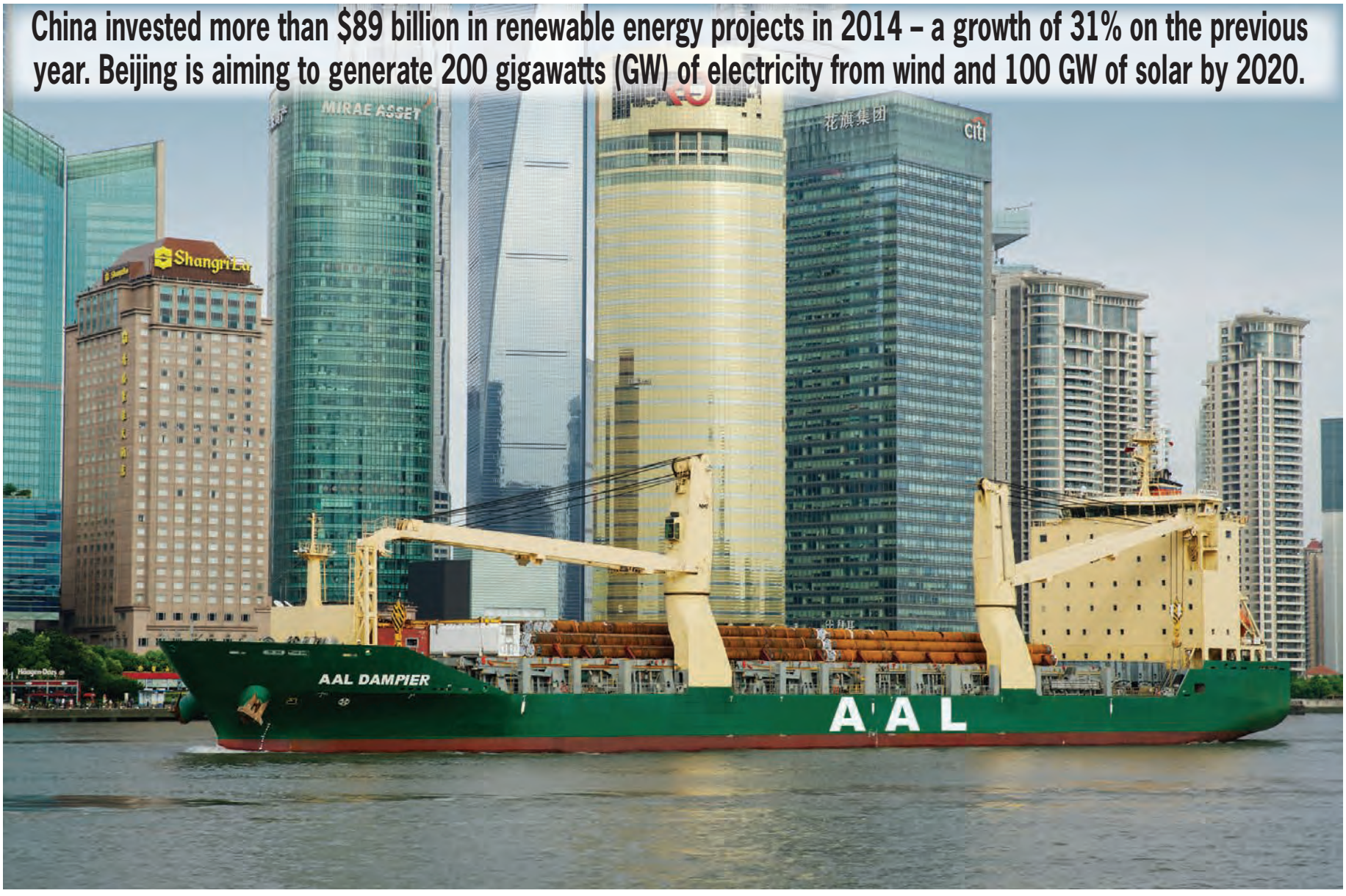
Yet, despite these challenges there is genuine positivity and opportunity within the multipurpose sector. In particular, for the progressive operators that espouse flexibility, dynamism and efficiency, they have been able to respond to the market's changing demands, as well as growth in specific regions, and the changing nature of the cargo those vessels are required to carry.

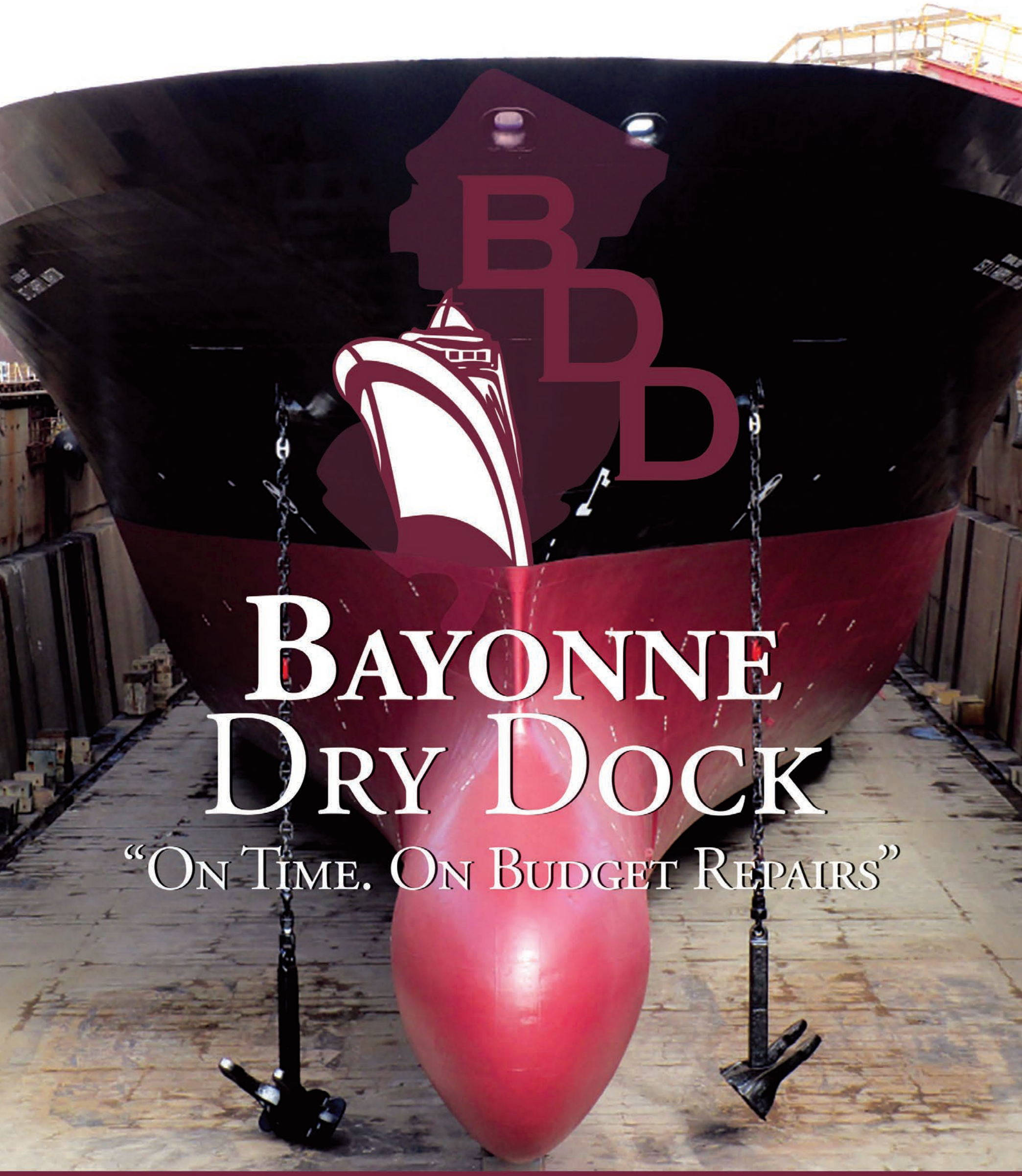
Thanks to the increasing number of renewable energy infrastructure projects, as many developing Asian economies begin to pivot away from fossil fuels, Asia has played a key role in being the global driver in recent years for these breakbulk and project cargo shipments, in conjunction with the significant growth in renewable projects that we are also seeing in Europe and beyond.

However, it is China – as the most conspicuous industrial trader – that provides an insightful look in terms of what is changing in the multi-purpose segment, and the challenges, and opportunities that lie ahead. Concerns about China's deceleration are justified to some extent. It responded to the global financial crisis in 2008 with extensive policy stimulus, which has left many banks, businesses and local governments substantially leveraged. Steps are being taken to prevent a hard landing, with the People's Bank of China reducing policy rates and the reserve requirement ratio since November. Additionally Nomura believe that the government will soon officially lower its growth target for 2016 to assist with the ongoing process of economic restructuring, and that this is likely to be supported by increased fiscal assistance to boost infrastructure spending.

A key part of this will be the One Belt, One Road national development strategy. Since it was unveiled in 2013, China has been mobilizing its political, economic, and diplomatic resources to further integrate itself into the world economy through trade, investment, infrastructure, connectivity, and other de-

China invested more than $89 billion in renewable energy projects in 2014 – a growth of 31% on the previous year. Beijing is aiming to generate 200 gigawatts (GW) of electricity from wind and 100 GW of solar by 2020.





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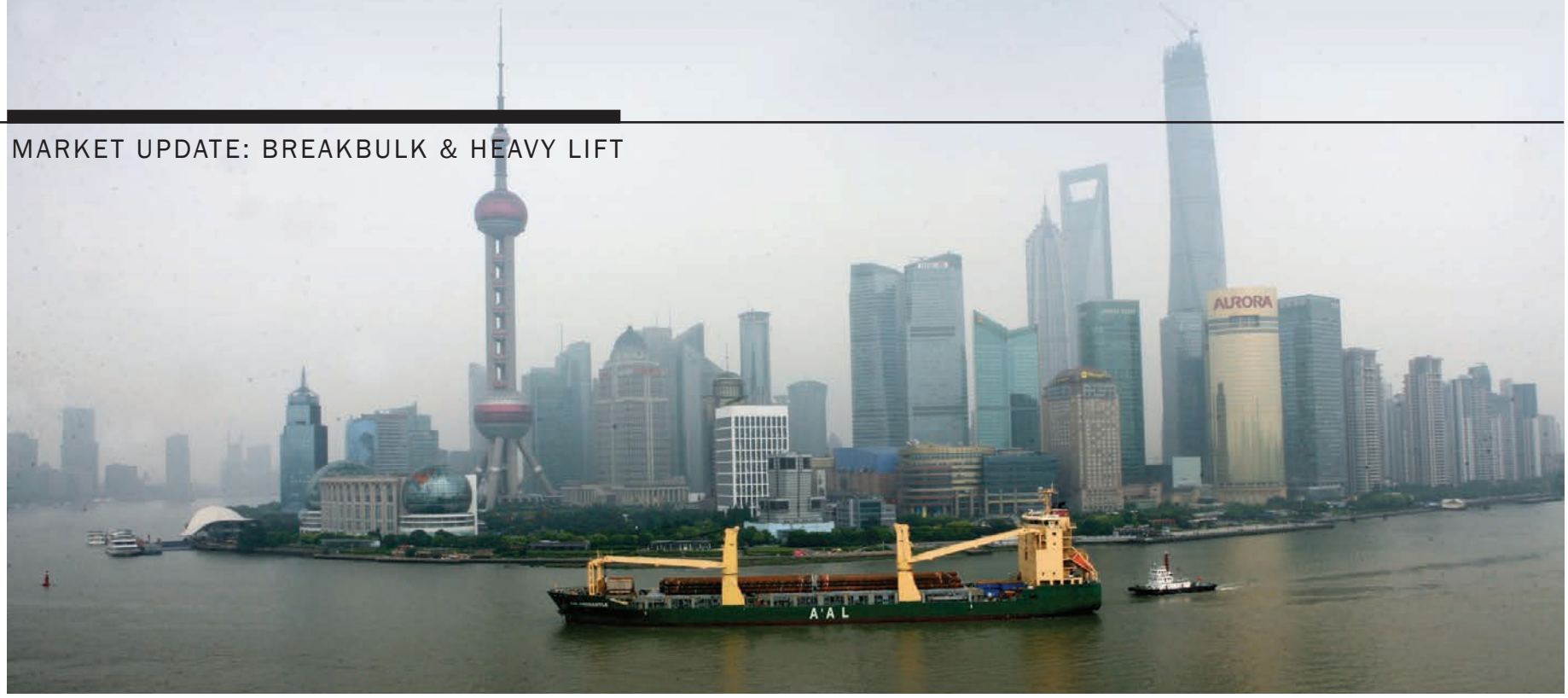

velopment projects. For China's trade partners, the attempt to shore up China's economy may trigger growth and stimulate demand for their goods. However, this will have to be offset against the cost increases that will result from a less favourable exchange rate.

Finding New Markets

Finding new markets for Chinese-made goods is a priority for economic planners, as increasing exports would help ease the burden of industrial overcapacity. The government has sought to open new trading destinations for Chinese companies through a host of government-led initiatives. Africa is one of the foremost targets for China's ambitions, as a region where exponential growth is still possible, and whose economic outperformance during the global recession showed the enormous promise of its emerging markets. Indeed China hopes to achieve $400 billion in trade volumes with Africa and raise its direct investment in the continent to $100 billion by 2020. Since the typical Chinese firm operating in Africa is a large state-owned enterprise, they tend to have a major competitive edge: subsidized government credit, which enables them to out-compete other bidders for African procurement contracts. To achieve these ambitions will require substantial heavy cargo movement, and given the expedited timelines favored by the Chinese government, specialist knowledge and expertise in implementing efficient transportation solutions.

China is therefore a crucial market for AAL, and one from which we expect to continue to realise significant growth. In line with these ambitions, all of our liner services collect cargo from China, and a significant amount of our tramp & projects divisions' voyages take on cargo from Chinese ports. To provide our customers with the most responsive service we have an AAL management office in Shanghai and a number of representative offices in the main ports.

The Energy Sector

The energy sector is also a regular source of business for multipurpose carriers and uncertainties in global energy markets can certainly impact the demand for project cargo, services; for example, the world's big energy groups have shelved $200bn of spending on new projects in recent months according to consultants Wood Mackenzie. However given that global businesses have a cumulative $4.4tn of cash on their balance sheets, and with S&P forecasting capital expenditure to rise 8% in 2015, we're anticipating a sizeable uptick.

This is primarily due to the impressive growth of their renewables market. According to the U.S. government's Energy Information Administration, China invested more than $89 billion in renewable energy projects in 2014 – a growth of 31% on the previous year. Beijing is aiming to generate 200 gigawatts (GW) of electricity from wind and 100 GW of solar by 2020, as part of their drive to have 15% of total energy consumption from non-fossil fuels by 2020.

For AAL, as a specialist breakbulk, heavy lift and project cargo operator, these are patterns that we've been anticipating for some time, and we believe that renewables will constitute a substantial part of our project cargo in the coming years. We continue to deliver significant movements in this sector, not just in China, but worldwide. One reason for this is that the technological expertise required has diversified, reducing wind power's capital costs. This has resulted in the development of larger machines capable of increased power yield – which require higher hubs, longer blades and greater nameplate capacity.

In turn, the demand for high quality, specialist breakbulk cargo and heavy lift solutions for the components and machinery has become increasingly critical. Moving a 75-m long wind turbine is no small feat, and requires scrupulous planning and wide-ranging expertise. That, of course, is where we come in. These transportation challenges are nothing new to AAL, and with the youngest fleet of new generation and technologically advanced multipurpose heavy lift vessels we're fully prepared for the growing demands of the renewables sector.

Increasing Competition

One of the biggest consequences for the multi-purpose sector of the slowdown in global trade since 2009 has been the increase in competition from the container and bulker sectors, which has inevitably affected margins, as well as the generic quality and potential health and safety within the industry, as these operators do not have the specialist equipment or expertise that is required to transport complex cargoes.

With regards to freight rates, in reality they are market driven and there is not a lot you can do about it. It is also highly likely that when container freight rates and demand improve, container lines will become much more reluctant to carry this complex and more time-consuming cargo, which could cause rates to rise dramatically.

At AAL, we understand that there is a certain amount of cyclicality in the markets and for that reason we focus on what we can control: our operating costs, driving efficiencies, delivering dependable services, and integrating our customers' needs with our own. For us this is where the key difference lies: bulkers and container liners cannot provide the expertise, the technical capabilities, and attention to detail required to safely and consistently shift complex cargoes from A-to-B.

We have also seen some operators compromising on the cargo safety and cargo care standards that customers have every right to expect due to low freight rates. At AAL, we are proud of our reputation for the highest standards of cargo care, because we know that investments in safety pay dividends for our customers. They understand that supply chain integrity depends upon the reliability of each stage for the safe and reliable movement of their cargoes. In our market, short-term profits often result in long-term costs.

The significant advantage enjoyed by multipurpose operators is that we're not dependent on one sector or market, but have the in-depth knowledge and experience to operate in a variety of specialist fields. This expertise and heritage has enabled AAL to realize considerable growth over the past few years. Despite the downturn of the markets, we have doubled our revenues and expanded our fleet, trade routes and services to cement our position as a truly global carrier.

There will always be some turbulence in global trade, and much like the changing domestic and international demands placed on China have required it to adapt to a changing business environment, AAL is taking this development as an excellent opportunity to respond and grow.

The Author

Wolfgang Harms, AAL's chief representative for greater China and deputy managing director.

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Big IT

How fast, how far will IT drive maritime?

BY STEVE DRIVER

The IT industry doesn't like to stand still. Upgrades, updates, new versions and enhanced functionality are released on a regular basis. New services are enabled, bottlenecks eliminated, more joined up operations enabled. The underlying platform remains the same but, over time, its capabilities evolve and stretch to meet changing expectations.

But then, every so often, something far more dramatic comes along. We are experiencing one of these more dramatic periods at the moment. The latest technology trends – the impact of mobile, the power of Big Data, the possibilities of the Internet of Things (IoT), the demands of interoperability – aren't about tweaking, enhancing existing systems and solutions, or adopting incremental upgrades. Instead they are creating whole new meaning from business activity and transforming our understanding of what can be achieved.

The opportunities for forward-thinking companies are immense, and the maritime sector is no exception. Systems that help manage physical assets for example are prone to exactly the same transformative trends as the latest start-ups coming out of Silicon Valley. Old certainties are being questioned and enticing new possibilities are being considered. When looking to review or upgrade systems, maritime operators should also consider solutions that will deliver the new technology.

Specialization or Cross Fertilization

One of the biggest questions being asked is how far industry specialization offers value. In the maritime industry, every system must be class approved. That's clearly not negotiable. But after that, the benefits of a system that is focused solely on maritime but does not draw on other industrial sectors and influences is less clear.

The bare minimum for an asset management system must be that it gives organizations control over physical assets by collecting and sharing information on reliability, maintenance, inventory, resources and personnel, and by disseminating and enforcing best operational practice over the lifetime of the asset. Inevitably, in a maritime environment, the difficulties of ship-to-shore and ship-to-ship connectivity are extensive, and so some form of a robust data replication capability is needed. The availability of data is increasingly relevant as more and more devices that can be remotely monitored are attached to the network and produce ever-more data for analysis.

But the need for data availability is shared by a number of industries: offshore drilling in the oil and gas business, remote exploration by mining companies and even long-haul fleet managers need advanced systems that help them manage plant, production, infrastructure, facilities, transportation and communications in far-from-easy circumstances.

Data often needs to be examined by off-site managers or geographically spread teams in as close to real time as possible, without the 'always on' connectivity that less mobile industries enjoy. In this sense, there is huge advantage in using software that shares best technology practice: the need for replication mastered by shipping operators can apply to offshore drilling platforms; the role of technology in managing health, safety and environment by drilling operators can offer significant benefit to maritime businesses facing ever-closer scrutiny in these areas.

These highly regulated industries also tend to share the rugged environmental conditions that characterize the maritime industry. The demands of an offshore drilling platform are at least comparable if not identical to those in commercial shipping. Again, best practice on managing maintenance schedules, for example, can be shared to mutual advantage. Selecting systems developed with knowledge gained from serving a variety of industrial sectors enables maritime fleet operators to benefit from this shared expertise. Seen in this light, the focus on software that comes solely from within a single sector appears limiting.

We are already seeing this type of expertise sharing across a number of commercial sectors outside heavy industry. Apple is bringing its particular expertise to retail transactions and payments business, for example. Intel is getting involved in watchmaking. Amazon is using its retail platform to become a significant player in cloud provision. Similar levels of cross-fertilization and knowledge share can help develop best practice among the maritime and other industrial sectors who have similar problems to solve.

It's also worth noting that software suppliers who are embedded in many industrial sectors, and who have significant investment programmes in those sectors, can deliver greater benefit to maritime operators. It's the same principal as the automobile industry, where cars built in small numbers with limited markets often lack the latest features and can be less reliable than more popular models backed by significant investment from manufacturers. In the same way, software developers that draw on wide-ranging expertise and user feedback produce robust, reliable solutions that meet actual need.

The latest technology trends – the impact of mobile, the power of Big Data, the possibilities of the Internet of Things (IoT), the demands of interoperability – aren't about tweaking, enhancing existing systems and solutions, or adopting incremental upgrades. Instead they are creating whole new meaning from business activity and transforming our understanding of what can be achieved.

Integration and Interoperability

Asset management software that shares expertise from many sectors extends the pool of 'best of breed' technologies from which industries can draw. But it's not the only form of sharing that is available. Another of the big trends now dominating the IT sector is the use of APIs to link together separate systems to create a more seamless whole. Vendors are also making specialist modules readily available to their core product to create a more flexible and scalable solution.

For example, as a standalone system, an asset management solution provides an important, even necessary function. When it shares information with and responds to data from supply chain systems, finance applications, enterprise resource planning (ERP) then that functionality is significantly enhanced. It means the time and resources required to provide an end-to-end asset manage-

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ment, maintenance and monitoring function are much reduced. It also ensures that the business can better understand the full impact of any change in routing, for example, or the true opportunity cost of taking a vessel out of operation.

Equally, technologies that support health, safety and environment monitoring, or risk and liability management, for example, can be added on to an asset management system, as can management of change (MoC) and incident management (IM) modules. Maritime operators using systems with all these capabilities included have already seen a reduction in the total cost of technology ownership, as well as efficiency improvements to their operations.

Bigger and Bigger Data

The third big trend that has almost come to dominate the IT industry is that of big data – and again it has positive implications for forward-looking maritime operators who can discover, release, process and analyse vast amounts of data from their operations. This data can be transformed into invaluable information and insight into even the most obscure areas of activity. With greater business intelligence available, remaining traces of guesswork or assumptions are being eliminated from the decision-making process.

Now that the data genie is out of the bottle, all kinds of possibilities are opening up. One of the more interesting for the maritime industry is the move from planned to predictive and proactive maintenance.

A typical maintenance schedule might involve a regular and predetermined plan to strip down an asset, overhauling it and putting it back into service. For a diesel generator engine running for 6,000 hours a year, the manufacturer's manual will typically recommend an overhaul at 16,000 hours. The frequency is based on observation over time, convenience and necessary risk aversion. But with the right analytics capabilities in place, the maintenance schedule can be finely tuned to match the actual demands of the individual engine. It could, for example, run for an additional 4,000 hours before a maintenance overhaul. This just-in-time maintenance capability results in a much more efficient use of spares, time and resources. Multiplied over an entire fleet it can produce a significant cost saving.

The Internet of Things

These are all significant and transformative technology trends. But the biggest disruptor of all is the Internet of Things – which itself is set to increase the volume of data available by order of magnitude.

In the industrial sector, the possibilities opened up by attached intelligent sensors to 'things' – devices, plant or equipment that until now have not been computerized or part of a data network – connecting them together, extracting previously unavailable information and analyzing it, often without human intervention, is the future of computing. Analysts at IDC predict that approximately 212 billion connected "things" will be installed worldwide by the end of 2020.

What this means for the maritime industry is that ships could be become self-contained floating networks, transformed by analytics, machine learning, and self-healing capabilities. In the future, engineers won't need to proactively monitor data to find out whether maintenance is need after 3,000 or 4,000 hours. The ship will tell them. The kind of insight provided by these newly intelligent vessels not only creates huge efficiencies in the operation of each ship, but can help optimise the way that almost every aspect of the business is run.

Again, shared experience comes into play for those software companies embracing the IoT. Tha t experience and the pace of new software will help the maritime industry simplify the collection, analysis and insight of its operational data.

Data Assurance and Deployment

With significant benefits to be gained from the ability to collect and analyze a variety of data, the means of deployment also comes under the spotlight. There's little to be gained from analyzing asset telemetry data for trends if the data-set is incomplete because different parts of the organization are on different versions of the software.

Systems based on web technology overcome this problem and give fleet operators a greater ability to respond quickly and easily to the increasing pace of technological change and software releases. Instead of deploying a series of system upgrades to individual operating locations, web-based technology enables these operators to install a new version to all sites from a single, central location – which makes it easier to ensure the benefits of the new technology are being seamlessly adopted.

The Blueprint for the Future

It is hard to overstate the nature of the changes taking place in IT capabilities right now, or the effect they will have on businesses that choose to engage with them. We've already seen the need for mobile capabilities, diverse availability models that include software as a service (SaaS), and greater use of private and public clouds, but the step-change ahead is of a much greater magnitude.

However, the possibility of a more streamlined and less hazardous operation and the potential to create a more efficient and cost-effective business will only be realized if the asset management system and other core platforms have these forward-looking capabilities built in. Any upgrade of technology has to be made with an eye on a very different IT future.

It's no longer about nice-to-have features or simply greater performance and throughput. The opportunity is there to completely rethink what asset management platforms could be capable of, assess what different vendors can offer over the long term, and envision a truly IT-enabled maritime business.

At this point in the IT cycle, an upgrade is no longer just an upgrade. It is the start of a complete business transformation.

The Author

Steve Driver is Managing Director of SRO Solutions Ltd. As a qualified marine engineer, Steve has spent most of his career in the marine & offshore sector, helping organizations develop and implement their use of various IT systems. He set up SRO Solutions, a Gold accredited IBM Maximo business partner, in 2005.

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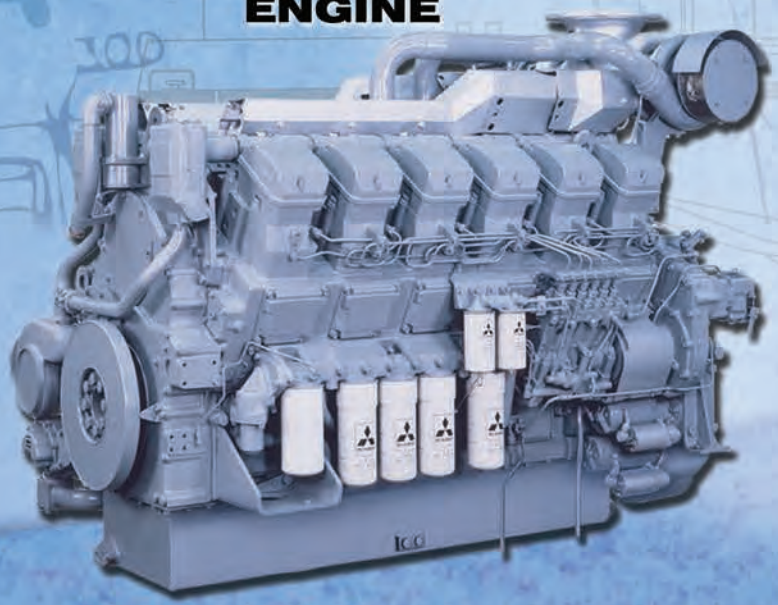

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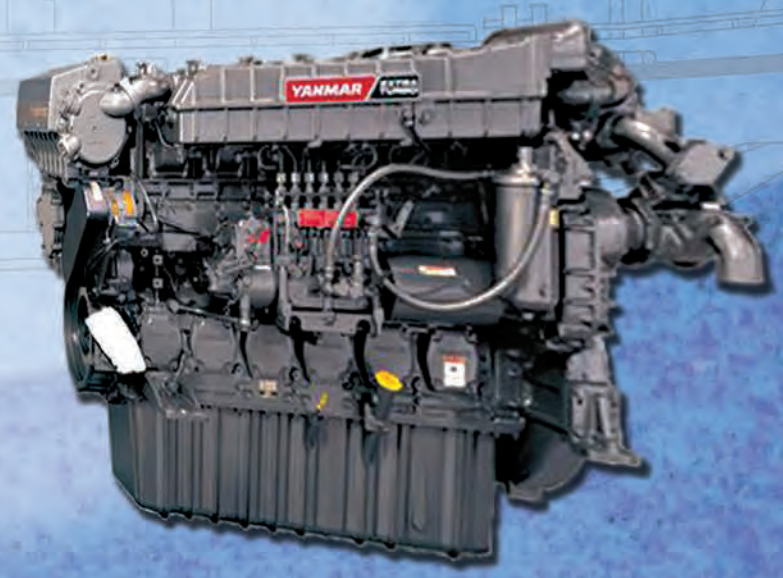

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FPSO Skarv with Pointlink antennas.

Photo: BP

The Digital Oilfield

Microwave Communication Offshore Brazil

By Claudio Paschoa

With most offshore wells in Brazil located between 30 and 300 km from the coast, communication with offshore assets has not always been straightforward or reliable. Some operators and service providers still use traditional maritime VSAT services for coverage offshore Brazil, yet the introduction of Microwave radio has led to a much better level of quality and reliability in high-bandwidth voice and data communications. ***Claudio Paschoa****, Maritime Reporter's correspondent in Brazil had an interesting conversation with Arild Fotland, head of Ceragon's Oil and Gas Division, about the advantages of Microwave radio communications for offshore operations in Brazil.*

Fotland joined Ceragon in 1978 and has been stationed all over the world. Since 2010 he has been dealing with introducing Ceragon's communication systems in Brazil and Argentina. Ceragon has been supplying communication equipment to the offshore industry in the Norwegian continental shelf since the 1976, having delivered more than 200 microwave links in the North Sea. Ceragon is also the sole provider of stabilized antenna systems for microwave radio (4 to 18GHz), with safety certifications to deliver reliable, high-capacity offshore links, which can withstand fading, harsh weather conditions and vessel movements. Ceragon has its knowledge center in Bergen, Norway, where it has developed radio transceivers with a special coating to withstand offshore operations and also where it developed its Pointlink (Point to Point) and Point to Multipoint solutions. "Ceragon's microwave solutions deliver dependable high-bandwidth with low latency, enabling so-called integrated operations, Video and Data for crew "infotainment". This is of particular value since to attract quality workers in any given area offshore it is necessary to enable the crew to stay in touch with family/office, as well as offer entertainment during off times, including social media interactivity," said Arild. In Brazil Ceragon has its offices in the cities of São Paulo and Rio de Janeiro, offering sales and after-sales services, along with technicians dedicated to installing and maintaining their range of equipment.

Better Comms Offshore

There has been a noticeable increase in offshore communication systems' reliability offshore Brazil since around 2013, with the introduction of stabilized microwave communications. Microwave radio may well be the most cost-effective and robust solution for connecting offshore and onshore operations. Ceragon has been successfully providing PointLink microwave systems, Evolution radios and gyro-stabilized antennas as an effective and safe, high-capacity communications solution for Integrated Operations (IO) offshore Brazil, especially important on Rigs, Drillships and FPSOs, where IOs are vital and there is a

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potential risk of gas leaks. Ceragon has been closely working with Norwegian operator Statoil since the 1970s and it has continued this partnership in Brazil. “One of our great accomplishments in Brazil has been the installation of a 176 km link from the top of the 2,257 meter Pico da Caledônia mountain near the city of Nova Friburgo in the state of Rio de Janeiro, around 90km inland, linking Statoil’s Peregrino field, located around 85 km offshore in the Campos Basin. It was a real challenge to place the equipment on top of the mountain, where access was very difficult, as it is located within a National Park and required special logistics considerations. It is probably one of the longest links in the world,” said Arild.

Ceragon considers Petrobras an important customer for its aspirations in Brazil, with the national operator being by far the biggest contractor in the Brazilian oil and gas market. “We have delivered many stabilized systems to Petrobras, and our systems are used in many of Petrobras’ major projects, where we have installed stabilized antennas from 0.6 to 1.8 meters in diameter and even a 3m diameter antenna. These are quite big in terms of stabilized solutions of up to 1 Gb. Some of the challenges we have in Brazil are related to the distances involved. In some case we even use fiber optics as a support, by using an already installed fiber point at sea to distribute high-bandwidth signals between remote offshore assets and shore bases,” said Arild. In Brazil, as in other locations in Latin America and around the globe, Ceragon offers turnkey offshore solutions, including field surveys, performance calculations, frequency planning, installation, testing and commissioning, along with after-sales services and Service Level Agreements.

Keeping Track of Moving Assets

Vessel movement is a challenge to any communications system. Rigs, FPSOs, OSVs, Pipelayers and Drillships all require reliable, high-speed data and voice communications, in some cases with all areas of the offshore operation linked continuously to onshore offices, which increasingly have control over critical offshore systems. Reliable communication is also vital for planning and conducting systems shutdown and even vessel evacuation. An FPSO for example may weathervane, or swing on its mooring with wind, wave and tide action, with wind and waves also causing significant pitch, roll, and heave movement. “In order to secure dependable communication links to shore, the antennas of these vessels need to be able to adjust to the ships movements in order to maintain line-of-sight radio contact. Highly accurate GPS systems are also a key component of the communications system. When vessels rotate the stabilized antennas compensate for this movement in order to maintain 0.2 degree of accuracy. Electrical servo motors, specially adapted to safely work in offshore environments, maintain the antennas aligned and stabilized,” says Arild. The antennas and their stabilization systems are pressurized with air inside a dome, making it impossible for any gas leak to penetrate the equipment. This is a vital safety consideration as it allows communication systems to remain operational even in the event of a severe gas leak. All domed Pointlink systems in Brazil are certified for ATEX Zone 1.

Southern Comfort

Arild believes that Brazil and South America in general have a great potential for microwave communication solutions and he sees integrated operations

Arild Fotland, Director of Ceragon Oil and Gas

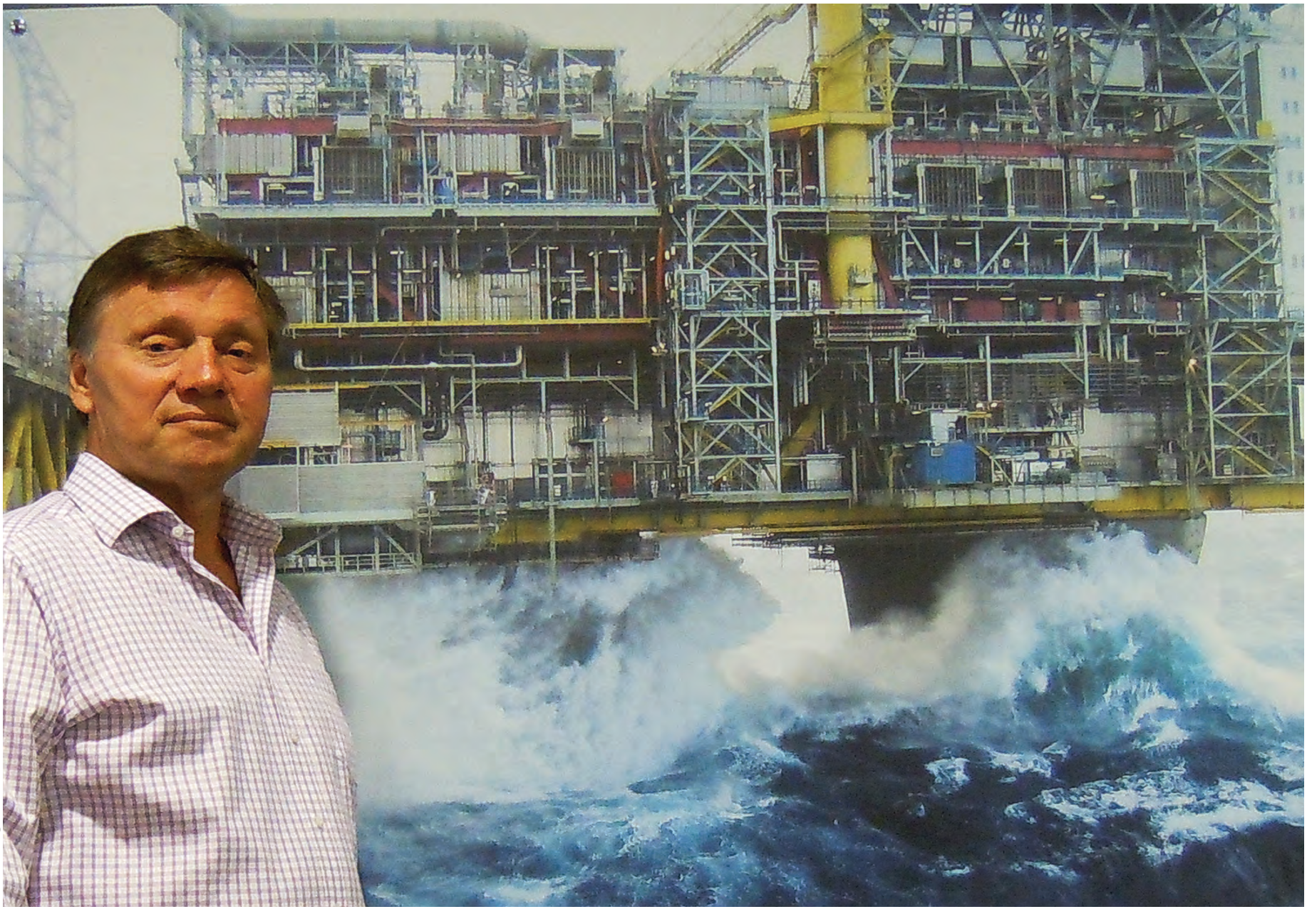

Photo: Ceragon

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as one of the market drivers. A number of sensors, such as downhole sensors, radar surveillance of oil spills, video surveillance on the rig and underwater also need high bandwidth communications in order to be viewed and controlled from shore bases. Vsat for example only offers a latency of 500 milliseconds, whereas Pointlink offers less than 5 milliseconds. PointLink provides higher capacity and lower latency connectivity than satellite solutions, while guaranteeing lower deployment cost than fiber optic cable. Its stabilized antennas deployed on FPSOs and rigs, stay in perfect alignment for connection to land-based facilities or to other moving offshore installations. The greatest advantage to IO operations is that PointLink's reliability and high capacity enable the transition of data from offshore assets to onshore locations while maintaining a "virtual presence" at each of the offshore locations.

Another innovation by Ceragon is the concept of "Point to Multipoint". This is a high-capacity Point to Multipoint (P2MP) solution that delivers up to 200Mbps of aggregated traffic, to support voice, data and high-resolution video applications. The solution offers excellent performance in harsh conditions, and robust near line of sight (nLoS) and non-line of sight (NLoS) performance capabilities. It supports an extensive range of sub 6GHz frequency bands, and is suitable for small cell deployments. It has the capacity to bring "h" band to several locations at once, by dividing sectors between 90 and 120 degrees. Inside these sectors many vessels may interact through the same network, and have communications at the same time, making it a form of offshore cloud. In the Campos and Santos Basins offshore Brazil there are hundreds of vessels and rigs operating at any given time and it is believed that this number will reach thousands by the next decade, which makes Point to Multipoint look to be a vital form of communication for vessels operating within a oil field or even an oil basin. It's important to remember that large oil field such as the Libra pre-salt field in the Santos Basin has an area of over 1,500 square kilometers and when fully developed will be populated by a number of FPSOs and an even larger number of support vessels and even oil tankers, which will load up with oil from some of the FPSOs offshore and will also need reliable communications. Even with Petrobras' ongoing crisis, Arild still remains highly optimistic and remarks that this has not affected their orders. The only setbacks have been the slowing down of the ordering processes while Petrobras sets is priorities, however there have been no cancellations and a number of communication systems are to be delivered to the national operator in October. Arild concludes that "Ceragon is the only microwave company that provides a complete end-to-end in house solution that includes a stabilized antenna, meets the ATEX Zone 1&2 requirements, and provides state of the art microwave radio technology (Modem, RFIC). By offering tight integration between all components, Ceragon delivers the best performance across all parameters – capacity, reliability and range. What's more, Ceragon has extensive expertise in offshore microwave and has established solid relations with leading Oil & Gas companies". With the continuing growth of the Brazilian oil and gas market, onshore and offshore, robust and reliable communications will see a steady increase in demand over the next decade, with IO offshore assets requiring fail-proof communication systems in order to operate smoothly.

Ceragon's Rendition of a Digital Oilfield Communications Scheme.

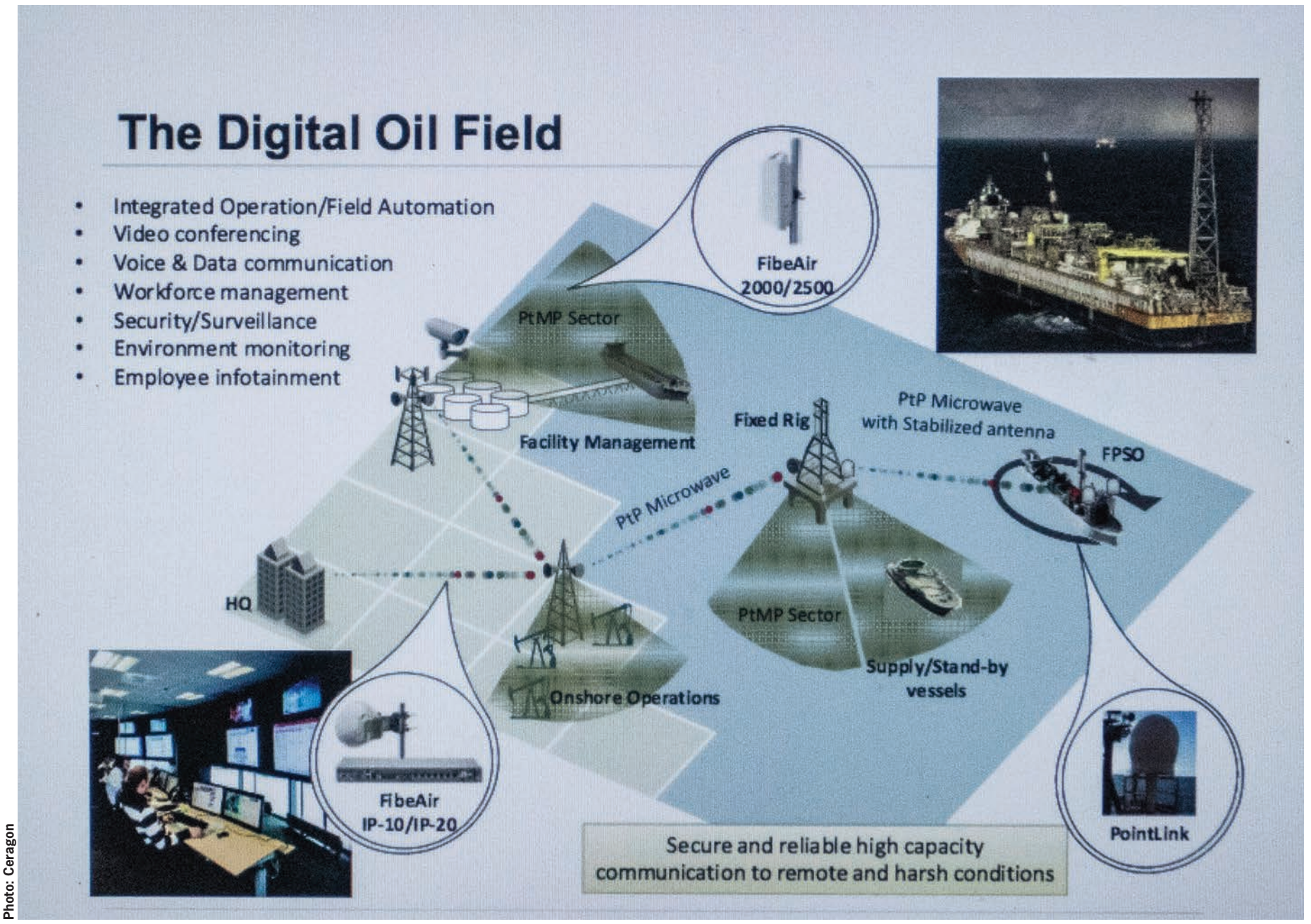

Photo: Ceragon

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Damen's **Norway** Foray

By William Stoichevski

The Damen Shipyard Group's man in Norway likes picking up the phone these days. With offshore markets in the doldrums, a unique phenomenon is occurring: "Norwegians are talking to me," said Damen's Norway sales boss, ***Remco Hottentot.*** *Three years after opening shop in oil town Stavanger, Hottentot is expanding with a new Aalesund branch. From offshore supply and service to wind parks, fisheries and construction workboats, the Damen offices mark the existence in Norway of valuable alternate 'value,' also known as choice.*

Damen Shipyard's head of Norway sales, Remko Hottentot.

We reach Mr. Hottentot during his whirlwind tour of arctic Norway. "Norwegianized" after 26 years here, the expat confirms the oil price plunge has been good for Damen. Clients are cost-conscious, and it suits his purpose. Outside of Norway, it's been a summer of firsts for Damen — tugs for the Baltic Sea and new orders for crew vessels — plus the launch of cable layer Maersk Connector at Damen Shipyards Galati in Romania. The market

is North Sea wind park grids and infield power.

Q. Is cable-laying the North Sea business that has taken off the most?

A. The first (cable-layers) are going to work in the Netherlands, but Germany, Denmark and others are gearing up to service offshore windfarms. But, our clients operate worldwide. They've bought them for the long-term and not for just one project. The cable-layers — the one for Van Ord (Nexus) and for Maersk — are the Damen Offshore Carrier. Have you noticed that vessel? We basically use a smaller version for the windfarm cable-layers. The larger one — the 8.5-ton-one — has brought interest from (new) types of clients. It's outfitted as an offshore cable-layer, but it can be outfitted as an offshore installation vessel or support vessel or a transport vessel. It continues to be a self-propelled platform that you can put more equipment on. Take, for example, the carousels where the cables are laid.

Q. You recently opened an office in Norway, a tough market for outside sales. Why was the timing right for a Damen office here? Which Damen offerings ought to be attractive?

A. For Norway at the moment there's … offshore. But the business we see most is the vessels for aquaculture. We've seen growth now in all sorts of workboats. These vessels are so chewed out in their concepts that they're ideal for this industry, so we've sold a few. They're useful to the sjøentrepreneur — the guys who build quays and bridges. Most are standard vessels that we have in stock. We also have dedicated vessels for the aquaculture industry because we expect the industry will double in the next five years and grow fivefold by 2050. The industry is also expected to move further offshore, and you need different kinds of vessels for that.

Q. Among 22 tugs and pontoons shipped recently from Damen shipyards in Asia for sales in Europe there were two Fast Crew Supplier 2610's for wind park service. How do you see the future market needs of offshore wind, and can these vessels be used for other renewables projects?

A. We have delivered a lot of (FCS) vessels to the Middle East. It isn't a large focus in Norway. You mention offshore wind. With FCSs, we expect to keep going into offshore wind with the FCS 3307 and its small sister the FCS 2008. Why? Because regulations are changing for vessels up to and over 20 meters. We expect the small boats to be replaced, (and) that's why we have the 30m '07'. The FCS models are selling, and we haven't stopped developing the concept. FCSs are suitable for tidal farms or wave energy installations, and for offshore! More and more, the FCS 2610 is seen as a high-speed, crew-friendly support vessel. We see it used for crew supply in the fjords and from Stavanger, where Heerema has a big crane vessel. They're using it as inexpensive people transport.

Q. There's a bottleneck of wind projects in Norway. Would you be ready to offer grid builders a range of vessels should the project count suddenly increase?

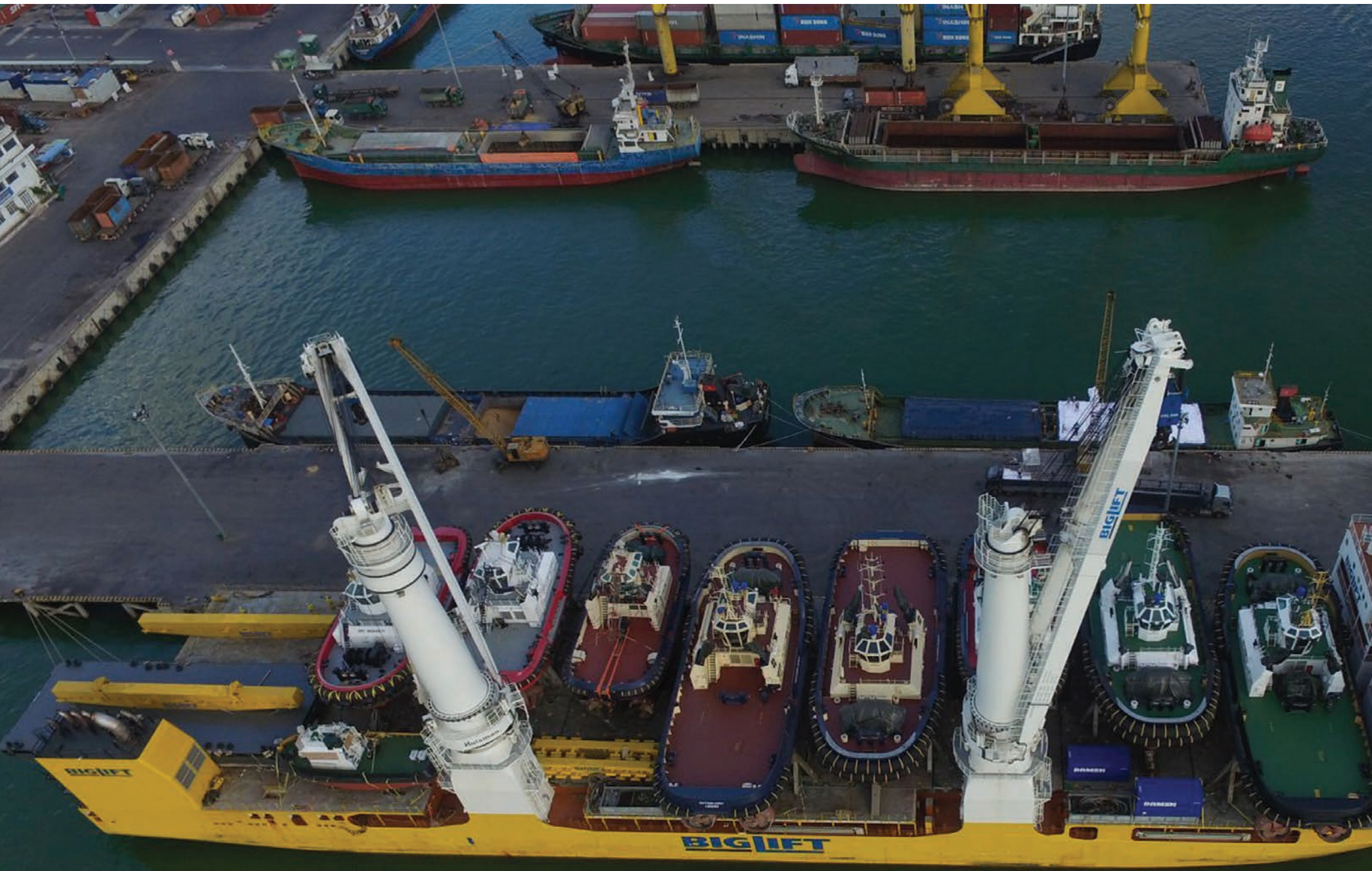
A. Well, we have the walk-to-work vessel. If you want go out to the 25 nautical mile range, then you want to stay out there because you don't have boats going in and out by the day. You need larger vessels. We're very aware of those tenders (for larger vessels) and the projects going on. We're very involved with customers on a new W2W design. With wind farms it's no longer just shallow water. Statoil's HyWind project is in deeper water. The turbines float. That opens another market for Heavy Lift T&I vessels like those we built for Jumbo Offshore.

Q. What obstacles, if any, has your sales organization met entering the Norwegian market?

A. It was three years ago, and I started t here alone in Stavanger, and now we have expanded to four people. It fact we're growing motstrøm: We're going against the current here. As people are being laid off we're adding those lost by others. They are people dedicated to sales of news boats and to repair. When I started here, it was high times offshore, and we had a lot of focus on oil and gas. To break into that market is very difficult. There are a lot of old, existing relationships.

Q. What are your goals this year? Next? How hard is it going to be?

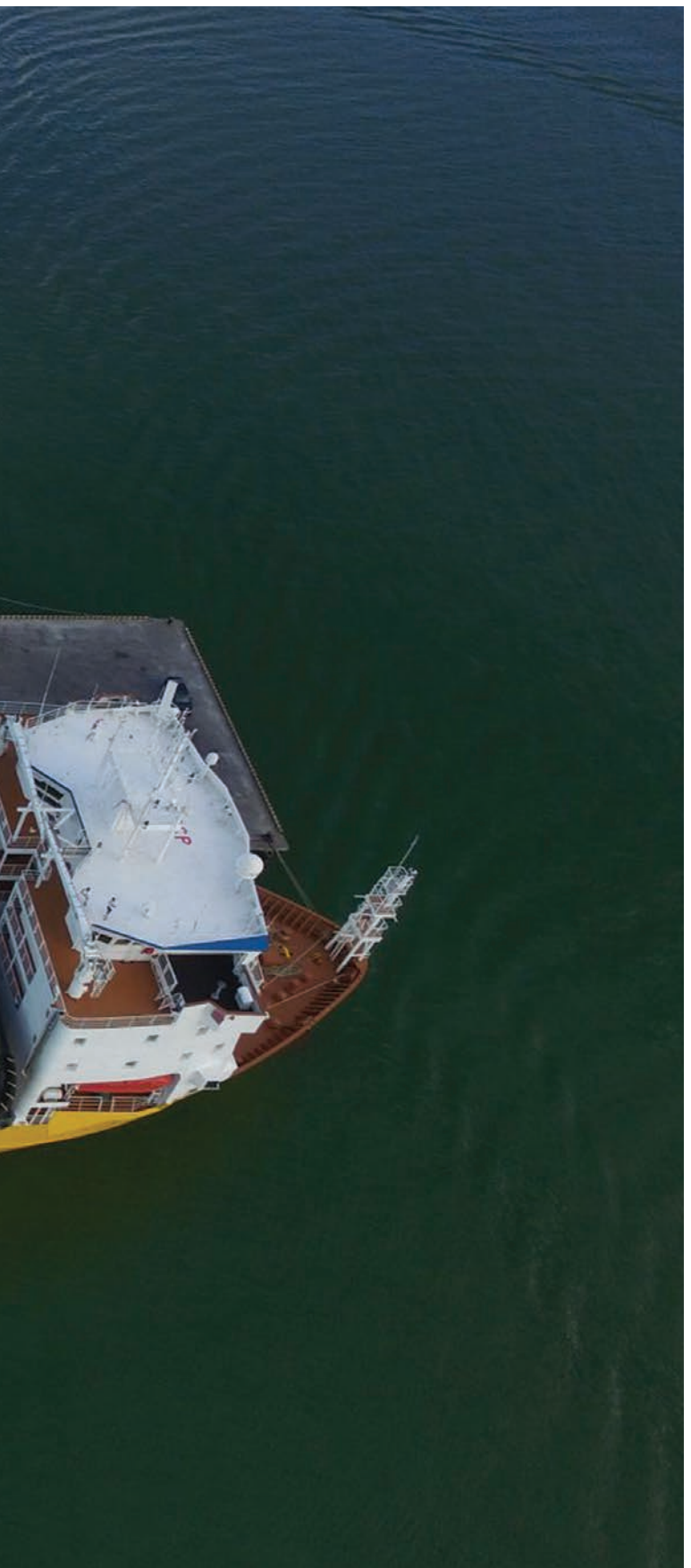
A: We're not so vulnerable as other yards. Maybe 15 percent of our business is oil-and-gas-related, and we have a €2 billion yearly turnover. We expect to deliver 275 ships this year. When times are really good and everyone's building ships, and there's construction, no one will talk to me! Now, the oil price is down, and people have time to talk. Every disadvantage has an advantage!



In Stock: A load of Damen workboats about to leave Singapore for Europe

We're interested in offering financial solutions to start-up companies. In fact, the total package. That makes Damen attractive because they see a booming business where all the smaller boats can be used. We offer them financing and vessels in stock. You come over and you say, "I want that one, like buying a car."

Q. Norway offers countless harbors, jetties, a large refinery, smaller ones and an LNG export terminal. Mining looks set to expand. What Damen offering best addresses this market?



Aquaculture Designs: Damen's STD-UV 3711

Versatile: the Van Oord Nexus is a Damen Offshore Carrier in design

A. We put about 50 ships in stock every year, and that is very attractive to the guys in aquaculture, port operations and construction. It's vessels that have grown out of the dredging industry in The Netherlands into sophisticated workboats. These are shipped cold-stacked. As for where we want to grow. Our focus, obviously, is offshore support with, likely, the simpler vessels that'll locate based on low OPEX.

Q. What will you do when this interview is over?

A. I'm on the road visiting clients. The first thing is to make a list and prioritize, and it's all workboats at the moment. We're taking the main challenges of each industry very seriously, and you can't design a ship without operational input. There's a lot of design, but we take that to our customers, and they can still fill in and decide all the bits and pieces on the deck, like where the cranes and winches have to be. The design is done, and that means we can deliver fast. I can say, "I have a vessel for you. It might not be 100 percent compliant, but it'll be 99 percent." It means you can start making money from Day 1.

FDNY Boat Named for Feehan

New York City Fire Department newest fireboat, William M. Feehan, has been completed by shipbuilder MetalCraft Marine. William M. Feehan was a FDNY firefighter lost in the September 11 World Trade Center attacks. Feehan, who at 71 was the oldest of 343 firefighters to pass away in the line of duty on September 11, 2001. The vessel's nameplate, displayed prominently alongside the cabin, is milled from an I-beam lifted from the rubble of the World Trade Center.

Feehan remains the only FDNY member to have held every rank in the department, from probationary firefighter up to fire commissioner, and was said to have known the location of every fire hydrant in New York – a true "fireman's fireman," according to Salvatore Pastore, a lieutenant with FDNY Marine Company 6 as well a liaison to MetalCraft for the build of the new vessel.

"We'll never forget any of the firefighters we lost that day," Pastore said, "but this lets 'Chief' Feehan's family know that we're remembering him in a special way." The vessel is a slightly scaled-down version of MetalCraft's staple FireStorm 70.

FDNY's new fireboat, William M. Feehan, features a nameplate milled from an I-beam lifted from the rubble of the World Trade Center.

(Photo: MetalCraft Marine)

William M. Feehan Main Particulars

Length	66 ft.
Width	18 ft.
Depth	3 ft.
Hull	Aluminum Monohull
Maximum speed	41 kts
Cruising speed	32 kts
Main engines	(3) C-18 Caterpillar at 1,150 hp each
Water jets	(3) HJ 403 Hamilton jets
Gears	ZF transmission 665
Fire pump engine	C-9 Caterpillar at 510 hp
Pumps	(2) Darley model ZSP 3,000 gpm at 150 psi ..that can dispense foam to one or both pumps
Fuel	twin 500 gal.
Potable water	25 gal.
Fire monitor	(1) Stang fire monitor roof-mounted remote operated with 5,000 gpm at 80 psi

Z-Drives on the Inland Rivers

MR examines the trends toward outfitting inland towboats with Z-Drive technology.

Image above: American Way #9200, Posed @ ACL (Tiger Fleet) Baton Rouge, LA

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Z-Drive technology on the commercial waterways is hardly a novel concept, having firmly established itself as a viable propulsion solution, particularly where fuel economy and maneuverability are key considerations. The inclusion of Z-Drive solutions on inland waterway vessels have generally been less enthusiastic, largely because of draft considerations and the mindset of traditional owners that were satisfied to continue operating long-tenured technology. But the tide appears to be shifting for Z-Drives on inland waterways. While the incorporation of Z-Drive technology is still the exception rather than the norm, it continues to gain favor.

By Greg Trauthwein

Z-Drives on inland waterway vessels has been slow in coming, due to entrenched systems and the conservative nature of owners. Are these attitudes changing? If so, how?

Edward Schwarz, Business Development Manager, ZF Marine Propulsion ystems Miramar, LLC

Inland waterway towboat owners do not build vessels often, so a newbuild project is a major under taking. For many it might have been more than 25 years since the last time they invested in building new vessels. The majority of growth for inland waterway operators has been the acquisition of existing fleets, but as those opportunities dwindle, building new vessels will be the predominant growth activity. When deciding what type of vessels they want to build operators have to ask themselves if they want to build for the future industry demands or build to traditional standards. We all know that industries change and evolve and there will always be a push for markets to improve safety and efficiency. Owners that want to prepare for the success of the next generation look at all the available technologies and then make decisions. This is what is truly driving changes in attitudes.

Roland Schwandt, General Sales Manager, SCHOTTEL

Inland waterways offer a cost efficient and eco-friendly way of goods transportation through the country from and to coastal ports. And I would consider a rising of the inland waterways traffic volume in the years to come very probable. Of course, a higher traffic volume requires investments in traffic and transport safety. High maneuverability and short stopping distances on the vessels side will therefore get even more important. Additionally to high traffic volumes, inland waterways put very special challenges on vessels and towboats which range from high amounts of debris in the water to strong currents and shallow draft. Other demands address the operation profile of the vessels: inland waterway vessels often operate at full load, following a tight schedule, and therefore need a robust thruster with easy maintenance or exchange possibilities. Towboat thrusters will have to answer these needs. Especially adequate for this task are Z-drives, which can be found on the U.S. inland waterways since 2008, while they have been used in other countries already for a much longer time on inland waterways.

Brian Fariello, Wärtsilä

Inland waterways companies are very traditional going back multiple generations, and changing from fixed pitch propellers on shafts to thrusters required a mind-set change. The main concerns were impact damage due to logs, and river bottom in shallow draft. Other concerns included the capital cost of the thruster and how it would be paid back courtesy of benefits in operating expenses, as well as concerns with silt and its effect on propeller shaft seals.

"Owners that want to prepare for the success of the next generation look at all the available technologies and then make decisions. This is what is truly driving changes in attitudes."

Edward Schwarz, Business Development Manager, ZF Marine Propulsion Systems Miramar, LLC

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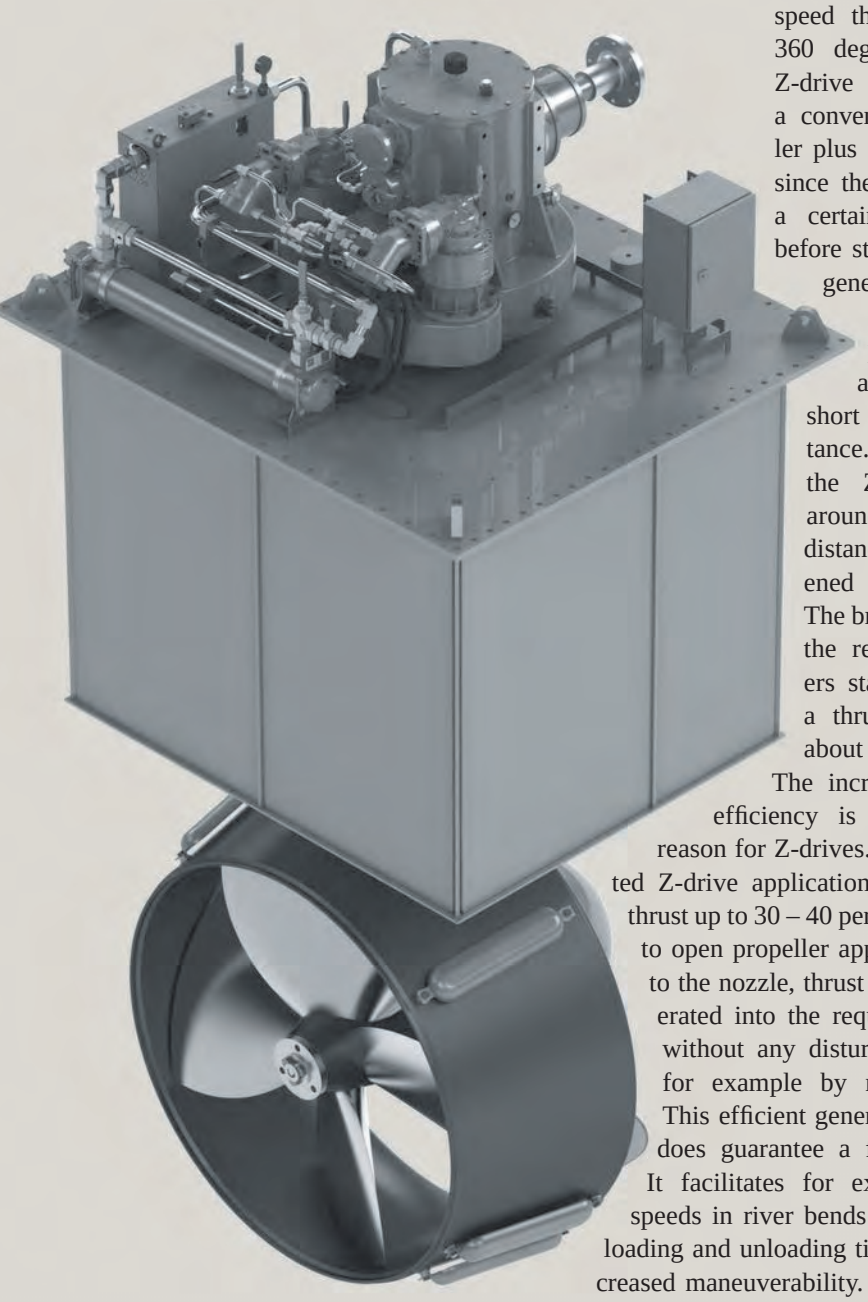

speed the thrust of a 360 degrees steerable Z-drive is higher than a conventional propeller plus rudder system, since the rudder needs a certain water flow before steering force is generated.

Another important safety aspect is a short stopping distance. By turning the Z-drives 180° around, the stopping distances are shortened effectively. The braking effect of the reversed thrusters starts already at a thruster angle of about 70 degrees. The increase of thrust efficiency is an additional reason for Z-drives. Nozzle outfitted Z-drive applications increase the thrust up to 30 – 40 percent compared to open propeller applications. Due to the nozzle, thrust is always generated into the required direction without any disturbances caused for example by rudder blades. This efficient generation of thrust does guarantee a faster journey: It facilitates for example higher speeds in river bends and decreases loading and unloading times due to increased maneuverability. All in all, you can say that the increased maneuverability and thrust efficiency in various operation conditions also results in a decrease of fuel consumption.

Nozzle outfitted applications have another advantage: Some vessel operators are anxious about the shallow draft on some inland waterways, which may lead to opting for a smaller propeller diameter. Unfortunately, this approach decreases the propeller blade area and consequently increases the propeller load which leads to reduced efficiency.

SCHOTTEL prevents this with a special nozzle concept: A flat bottom nozzle is partially integrated into the vessel's hull and therefore increases the space for the propeller, while minimizing the draft of the vessel. Rudderpropellers with this special nozzle reduce the danger of grounding and offer more clearance in shallow areas. The nozzle does also add to the robustness of the thruster as it functions as an extra protection against floating debris.

When an inland towboat operator is considering propulsion configuration options, why are Z-Drives even in the mix?

Schwandt @ SCHOTTEL

The most important factor for our Inland Waterway customers to install a Z-drive is certainly the high maneuverability and therefore increased efficiency and safety. The inland waterway operation profile requires frequent steering corrections or maneuvers, for which Z-drives are predestined: Conventional shaft lines prove to be rather cumbersome in maneuvering situations: The change of water flow direction generates an inhomogeneous flow and pressure in the propeller and rudder area of a conventional propeller system. This causes the engine to speed up to compensate the changing conditions. By contrast, Z-drives capture the optimum flow direction since they are 360 degrees steerable. Even at slow

Fariello @ Wärtsilä

(Owners who adopted the solution found) operational efficiencies, as many operators state that they can install up to 20% less power with steerable thrusters versus traditional FPP props. In addition there is considerable fuel savings, as rudders provide drag when they operate. Perhaps the most compelling argument is improvements in maneuverability, as there is no longer a need for complex rudder systems (steering and flanking rudders no longer needed).

Schwarz @ ZF Marine Propulsion

The major skepticism was the lack of references of Z-drive vessels for the inland applications. Everyone acknowledged the performance benefits but had concern about the robustness of Z-drives in river applications. Now this source of skepticism is being lifted. ZF currently has dozens of push boat vessels operating everyday from Minnesota to Texas and everywhere in between. In 2016 we project that ZF Z-drives will have accumulated over 1 million operating hours, just in U.S. river applications alone.

It was the courage of the early adopters, the pioneering companies that lead the path to industry acceptance. These owners rationally compared the technology, cost, increased safety margin and decided that the benefits exceeded the risks. These companies take the responsibility of moving their client's goods extremely personal and want the best vessels to do it. They are dedicated to raising the bar of safety for the industry.

From where you sit what are some of the peculiarities of the Inland Waterway System as compared to application of Z-Drives in other bodies of water?

Fariello @ Wärtsilä

Downtime for any commercial vessel is critical. However many inland waterway companies are smaller and loss in time or revenue can be very damaging to their bottom line as well as reputation which could affect future contracts if they are viewed as having an unreliable fleet.

Schwarz @ ZF Marine Propulsion

Z-drives are the leading thruster technology for both blue water and harbor tug applications. The inland waterway market is a completely independent market segment, in no small part due to the uniquely harsh environment working vessels face on U.S. rivers. It is the tip of the spear of difficult environments to test thrusters. If your product can perform in North American rivers it will surely work anywhere else in the world. Through a close collaboration between ZF and our customers, we are able to feed information back to our R&D department and our factory to continuously improve our Z-drives to best fit this challenging application.

Schwandt @ SCHOTTEL

SCHOTTEL serves the inland waterway market since its early beginnings next to the river Rhine, which until today is one of the most important inland waterway shipping routes in Europe. Inland waterways are a very versatile market. Here, you find a lot of different fields of application, for example in the passenger vessel or cargo section, and very differing water characteristics as canals, rivers or lake districts. SCHOTTEL offers its customers a variety of different propulsion solutions adapted to the specific situation. Viking River Cruise vessels are for example equipped with twin propeller solutions which facilitate a reduced propeller diameter for the use in shallow water. Additionally, it allows a spacious clearance between the propellers and the hull and reduces pressure pulse to the hull. A smaller propeller diameter requires only minor tunneling of the ship's stern. In contrast to high tunneled ships, these stern lines increase the overall propulsion efficiency significantly. In extremely shallow waters passenger vessels do operate only with SCHOTTEL Pump Jets which are installed flush with the hull. Tanker and cargo ships on European inland waterways are also equipped with SCHOTTEL Rudderpropellers and additional SCHOTTEL Transverse Thruster in the bow to facilitate maneuvering operations, for example when loading and unloading.

So where does this market go from here, in your estimation?

Schwarz @ ZF Marine Propulsion

We conservatively estimate that the adoption rate will continue to rise exponentially in the next few years. When the industry hits a 50% Z-drive adoption rate for new build projects, owners competing with old technology will have a difficult time winning competitive contracts. Just as the industry saw with the harbor tug market, this is when the market will meet critical mass and Z-drives will become the preferred propulsion system

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"The most important factor for our Inland Waterway customers to install a Z-drive is certainly the high maneuverability and therefore increased efficiency and safety."

Roland Schwandt, General Sales Manager, SCHOTTEL

"We expect the U.S., Canadian and South American markets to continue to add Z-drives to their inland waterways fleets and as the technology becomes more accepted the power of these vessels will increase too."

Brian Fariello, Business Sales Manager, Propulsion, Americas, Wärtsilä

SCHOTTEL Rudderpropeller Type SRP 1215 with flat bottom nozzle

for the market.

Schwandt @ SCHOTTEL

Technology, regulatory standards and environmental regulations are subject to continuous change – that is true also in the inland marine industry. These developments will demand the industry to rethink the topic of propulsion and thrust efficiency and might influence the "natural renewal" of the existing inland waterway fleet. It is also very probable that there will be a need for more vessels, with better manoeuvrability, due to a rising demand of goods transportation via inland waters.

Kari Kyyrö, Naval Architect, Steerprop Ltd.

Traffic congestion is a growing problem on most densely populated areas in the world. In addition to road transport, also railways are often suffering from this. For instance EU is aiming at shifting transport from land to waterborne, and inland shipping is a part of that. Inland transport has good growth potential without congestion problems. In addition to goods transport, river cruise vessels are gaining popularity. Azimuthing units offer significant benefits for river operations, where excellent maneuverability is usually a must. The market potential is good, however competition is also growing with makers developing products aimed specifically at the inland market. It will be interesting to watch if the U.S. operators will follow the European way and start building more diesel-electric push boats.

Fariello @ Wärtsilä

We expect the U.S., Canadian and South American markets to continue to add Z-drives to their inland waterways fleets (mainly ATBs and pusher tugs) and as the technology becomes more accepted the power of these vessels will increase too. For the Russian market, the usage of thrusters for inland waterways is more common for container and cargo vessels. Conversion from traditional FPP shaft lines to use of thruster is in a further stage than US inland waterways.

Steerprop Cuts Through

Finland-based Steerprop is an expert in Z-Drive technology for arguably the most demanding situation on the waterfront: Arctic operatons. Kari Kyyrö, Naval Architect, Steerprop Ltd., shares insights on his company's penetration – courtesy of U.S. partner Karl Senner Inc. – into the U.S. inland waterways system.

By Greg Trauthwein

Kari Kyyrö, Naval Architect, Steerprop Ltd.

Steerprop was created in 2000, and according to Kyyrö the company is in a good situation, with a employee base that are highly skilled and motivated. The company is a specialist in providing its propulsion systems for the most rigorous Arctic conditions, and this year a special emphasis is on allocating resources to growing and improving the after-sales service business, said Kyyrö. "We will continue to strengthen our organization and to further improve our strengths: reliable, efficient, environmentally friendly propulsion systems for demanding offshore applications, ice going vessels as well as passenger and cruise ships."

Accord to Kyyrö based on the strict draft limitations on the inland waterways systems, the Steerprop units best suited for this application will be in units at the lower end of its power range spectrum, specification its types SP10, SP14, SP20 and SP25, with open or ducted propellers. "For instance, the biggest "line boats" in the U.S. might have three SP25D units ("D" = ducted) with a total propulsive power of around 4500 kW (6000 hp)," Kyyrö said. "In river use, our smallest units (SP10) start at around 600 kW per unit. The biggest mechanical azimuthing units in the world are built by Steerprop for arctic vessels (six units with 9 MW each). In our CRP ECO range (with Dual-End Contra-Rotating Propellers) we can offer power levels of 20+ MW per unit." When it comes to operating on inland waterways and facing down the challenges found within, Kyyrö said that Steerprop is well versed in handling various types and sizes of impact from debris. "At Steerprop we are very familiar with dimensioning against impact, thanks to one of our biggest strengths: experience in ice classed units. We are used to building our products robust," he said. "In ducted units, we can offer our high efficiency HJ3 nozzle. Compared to a conventional 19A-type nozzle geometry, the HJ3 gives 5% to 6% more thrust in bollard and offers an even more significant efficiency increase at speed, where the conventional nozzle quickly starts to cause drag instead of forward thrust." As anyone in maritime knows "ruggedized" comes with a price, but Kyyrö contends that if owners evaluate not just the initial CapEx, rather the overall lifecycle costs, his company will always be in the conversation.

"With our robust units, we can offer scheduled overhauls instead of 'repairing when it breaks,'" said Kyyrö. "If something does brake down, our spare part and maintenance service functions well. In the U.S., our representative Karl Senner, LLC takes good care of this." In order to minimize breakdowns, Steerprop units are equipped with a condition monitoring system. This can be connected to the Steerprop service center with an online solution.

Caterpillar Adds Azimuth Thrusters to Tug Package

Caterpillar Propulsion earlier this year introduced a 'new' thruster package for the workboat market, initially geared toward the harbor and terminal tug market but eventually to the inland fleet as well. At Norshipping in Oslo Anders Bergh, M.Sc. Sales Manager, Caterpillar Marine, explained that the new Caterpillar thruster in reality already has nearly a decade of experience on the water. "Berg Propulsion, before it was Caterpillar Propulsion, launched an azimuth thruster seven or eight years ago, a very successful launch of a new product," Bergh said

In fact the original azimuth thruster was designed for the demanding offshore/dynamic positioning market, vessels that run at full load a large percentage of the time, meaning it was larger, heavier and more expensive than something one might find on a workboat. "That's not what a tug operator needs," said Bergh. "What we're doing now is bringing an altered version of the azimuth thruster that is suited for tug operators – harbor and terminal tugs that have an operational profile that calls for low load for most of the time, with bursts of activity. That product is designed differently in terms of dimensions and safety margins, because it needs to come down in weight in price."

In targeting the tug market Bergh noted that while Caterpillar engines own a dominant share of market, until now it did not have a thruster product that it could package as a turnkey solution.

The 60 metric ton bollard pull Cat Propulsion Marine Thruster Azimuth (MTA) is the first model in what will become a new family of rotatable units optimized for tug operations, with an initial unit expected to be delivered into a commercial trial by the end of 2015.

The new range has been engineered to optimize performance when working as part of an integrated propulsion train and will be made available through the Cat dealer network. The complete package for tugs will include engines, high speed shafting, controls and clutches. The MTA's consoles will display and control engine and thruster functionality

"We looked at it from the tug operator's point of view and thought of the tug master sitting on the bridge," said Bergh. "The first thing we did was integrate the engine panel with the propulsion panel, helping to save space on the bridge." While the marine package is slimmed down from its offshore brethren, it is still packed with 'the good stuff' according to Bergh, including a condition based monitoring system that can monitor and report the condition of the unit's lubrication, for example.

Caterpillar Propulsion has made simplified installation and easy access for maintenance priorities as part of the new thruster development, without compromising the conservative design principles on which it has built its reputation. The clutch and the mechanical PTO will be contained in a single unit, while the thruster and engine assembly can also be installed as a complete unit.

Ultimately, up to six different sizes will be available to cover a wide range of tugs.

Anders Bergh, M.Sc., Sales Manager, Caterpillar Marine

Tech Note

Thrustmaster *Quick Release:*

Z-Drives with Mechanical Fuses

A highlight of Thrustmaster's efforts to safeguard its Z-Drive thrusters for towboats operating in the inland waterways are the inclusion of a built-in mechanical fuse or quick release coupling. **(Pictured below is torque limiting coupling general assembly drawing and a picture.)** The inclusion of a quick release coupling at the input shaft of the Z-drive gives operators added protection from the inevitable debris that can line the riverbed. The quick release coupling acts as a mechanical fuse whenever the drive line is blocked, for example should the propeller ingest a log, a tire or other river waste that is typical during daily operations. After the obstruction is removed from the propeller, the mechanical fuse can quickly be reset manually. The mechanical fuse, also called a torque limiting coupling, is a component installed on the horizontal input shaft of the Z-drive and connects to the cardan shaft driven off of the engine or electric motor.

The concept behind the quick release coupling is that when the propeller or gear set and/or drive line sees any spike in torque above the set limit for the coupling, the coupling instantaneously breaks free allowing the cardan shaft and engine to spin freely without driving the thruster. The propeller and gear set are instantaneously disconnected from the engine saving the propeller, gear sets, and bearings, from damage or complete failure. Therefore, not only avoiding the damage, but also operational downtime, unnecessary dry-docking, and crippling cost of repairs typically associated with the competitions' thruster run-ins with the inevitable debris.

The quick release coupling is a standard component on Thrustmaster's line of Z drives.

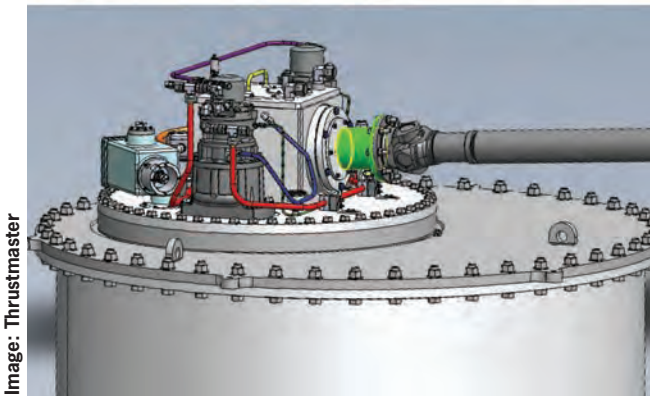


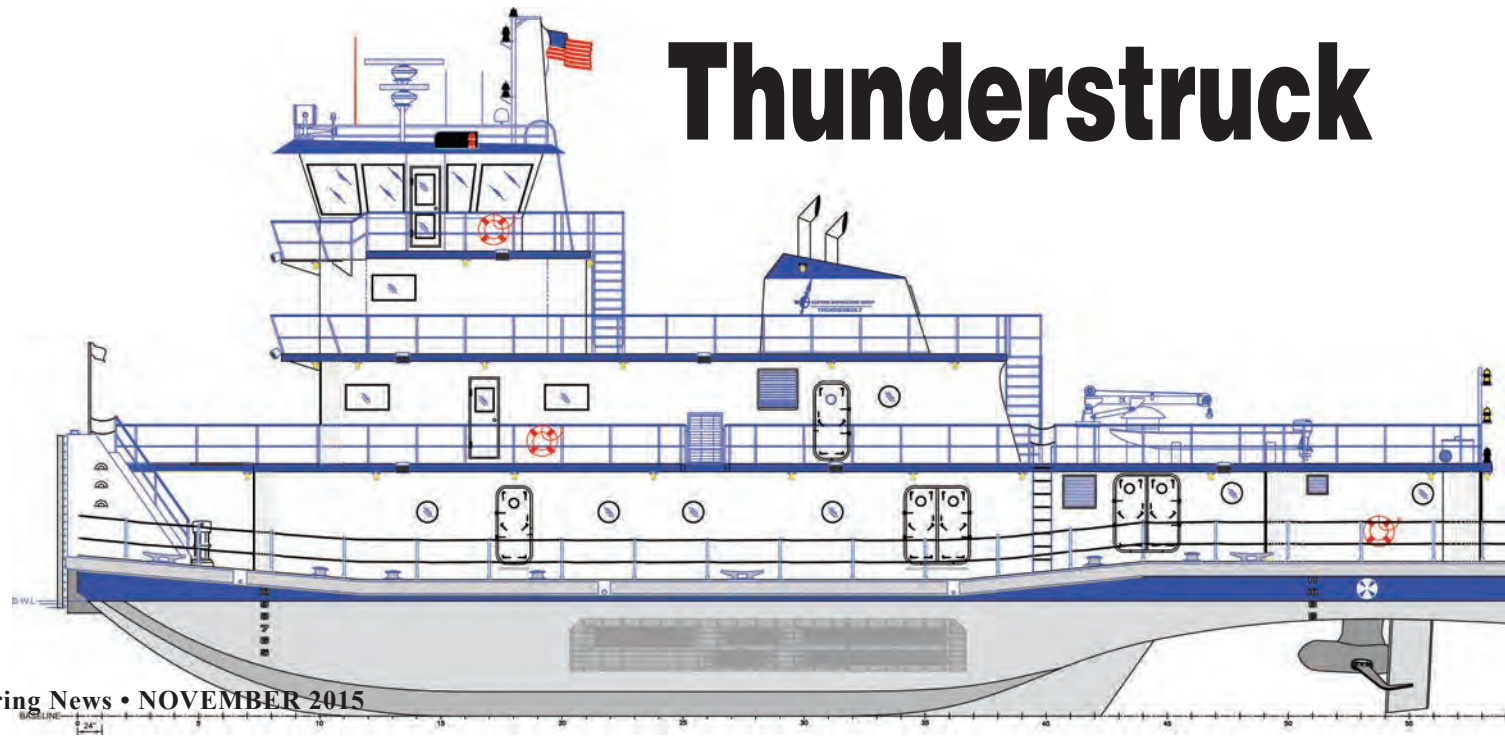
Image: Thrustmaster

In August and September respectively, Marquette Transportation Co. took delivery of the fourth and fifth 2,000-hp Z-drive towboat from Master Marine, Inc., Bayou La Batre, Ala. The 78 x 34 x11-ft. St. Peter was designed by Frank Basile of Entech & Associates, Houma, La., for Marquette's Gulf-Inland division, based in Harahan, La. Master Marine is continuing to build Z-Drive towboats, with more underway for Marquette, said the yard's president Randy Orr. The steel-hulled St. Peter is powered by a pair of Thompson Power Systems Caterpillar C32 Tier 3 1,000-hp engines at 1,800 rpm connected to ZF Marine ZF AT 5111WM-FP Z-drives with 1,650 mm (65-in.) four-bladed propellers in nozzles. The package gives the boat a running speed of 10 knots with a loaded draft of 8 ft. For ship's service power the towboat is outfitted with a pair of Kennedy Engine John Deere 4045AFM85 Tier 3 generator drive engines each driving an 80-kW Marathon Mariner generators. Cooling for all engines and z drives was provided by Eastpark Radiator Duraweld coolers. Doors and windows were provided by Dales Welding & Fabrication, LLC. Rubber bumper systems were provided by Schuyler Companies. The electronics was supplied by New World Electronics and the Rio Marine supplied the alarms and monitoring systems. To secure barge tows, there's a pair of Patterson 40-ton deck winches supplied by Donavan Marine. The St. Peter has tankage for 24,000 gallons of fuel; 6,550 gallons of potable water; and 17,560 gallons of ballast water.

Sneed Delivers Z-Drive

Houma, La.-based Enterprise Mariner Services, LLC (EMS) added its eighth Z-drive towboat, the fourth from Sneed Shipbuilding. The 87 x 34-ft. Sebastian D, with an 11.5-ft. molded depth, was built by Sneed Shipbuilding of Channelview, Texas. This boat is well-suited for working the Gulf Intracoastal Waterway where they routinely push two 30,000-barrel petroleum barges. Propulsion power is provided by a pair of 1000-hp Cummins QSK38M Tier III diesel engines coupled to the ZF Marine AT 5111 WM-FP Z-Drives fitted with 66-in. diameter propellers mounted in Kort nozzles. With these drives, the boats draw only 8.5 ft. As with the conventional boats, the QSK38M engines also give these very maneuverable Z-Drive boats plenty of power to safely handle the currents of the Mississippi River. Tankage of these boats include: 30,000 gallons for fuel, 16,000 gallons for water and 500 gallons for lube oil.

Thunderstruck



Eastern Shipbuilding offers the 4,200 hp Thunderbolt inland towboat designed around twin azimuthing Verhaar Omega electric V-Pod propulsion and diesel-electric technology. The ESG approach was collaborative, with input from operators, naval architects (Gilbert Associates, Inc. (GAI)) and propulsion OEM's (Verhaar Omega: since 2012, 19 Omega V-pods have been installed and are in service in Europe on various types of vessels). Thunderbolt will be built to ABS rules, but will not be classed. "Regulatory (ABS) Class Rules/Electrical IEEE-45 Standards/USCG Regulations are what is used to design and build vessels regardless of whether it is an In-

land or Offshore vessel, requiring class or not," said Steve Berthold, VP, Eastern Shipbuilding, in a recent interview with MR sister-publication MarineNews.

In selecting the podded propulsion system for inclusion on the design, Eastern came upon Verhaar Omega after meeting with two inland owner/operators that currently have Z-drive towboats, and others that didn't. Listening to each and noting their concerns, it was decided that the V-Pod was the best solution. Because the Thunderbolt will typically operate in shallow, sometimes turbid, debris filled water, ESG designed underwater protection in the form of a pipe guard protection system for each Omega V-Pod. These pipe guards protect the V-Pod allowing the vessel to ride over shallow water mud flats, protect the vessel from side bank impacts when turning in rivers and canals and stern impact protection when backing down.

Omega itself offers a propeller guard which is bolted directly to the nozzle which protects the propeller from debris entering and being lodged between the blade tip and the nozzle. The Omega V-Pod propulsion electric motor also has a shutdown sensor with alarm and is reversible, allowing the operator to reverse propeller rotation enabling nozzle/propeller jammed debris to be dislodged.

The Omega V-Pod is designed with reduced maintenance in mind. The V-Pods are enclosed in the aft main deck superstructure, with no drive shafts, couplings, drive gears, hydraulic systems or external piping systems. With the Thunderbolt mounting flange situated above the design waterline, dry-docking is not required for maintenance.

Thunderbolt was designed for the medium horsepower inland towboat fleet with twin 2 x 1,770HP (1,320kW) propulsion units and still be capable to operate in the ICW and canals at a design operating draft of 9.5 ft.. Currently, Omega has V-Pod units ranging from 445HP (330kW) to 2011HP (1,500kW), but the thrust efficiencies underway and the maneuvering capabilities are far greater than conventional tail shaft, propeller and nozzle propulsion systems. Comparing them to Z-drives the V-Pod efficiencies are most realized in reduced fuel consumption and higher thrust efficiencies.

No More 'Tug Dilemma'

Photo: Allan Klo, Statoil AS

LNG Helper: Gas carrier Arctic Princess helped by a tug at Melkoya, Norway.

An ABB-chartered cable-layer ordered in September 2015 might be the only hybrid battery-powered offshore service vessel (OSV) in anyone's new-build program right now, but don't say that to the ABB man who led the team that designed the radical electrical system, Onboard DC Grid. The new cable-layer design is the first OSV since the Dina Star to boast a new DC Grid, but in the coming months, "There could be several more," said ABB Global Product Manager, Johan Olav Lindtjorn. Some of those designs will eventually be tugs.

By William Stoichevski

When we meet him, Lindtjorn is just back from a summer spent on his high-performance dirt bike, the one he used in the Dakar Rally desert race. His off-putting youth, grey cardigan and hipster (or submariner) beard make it easy to overlook his leadership of ABB's power-storage development team.

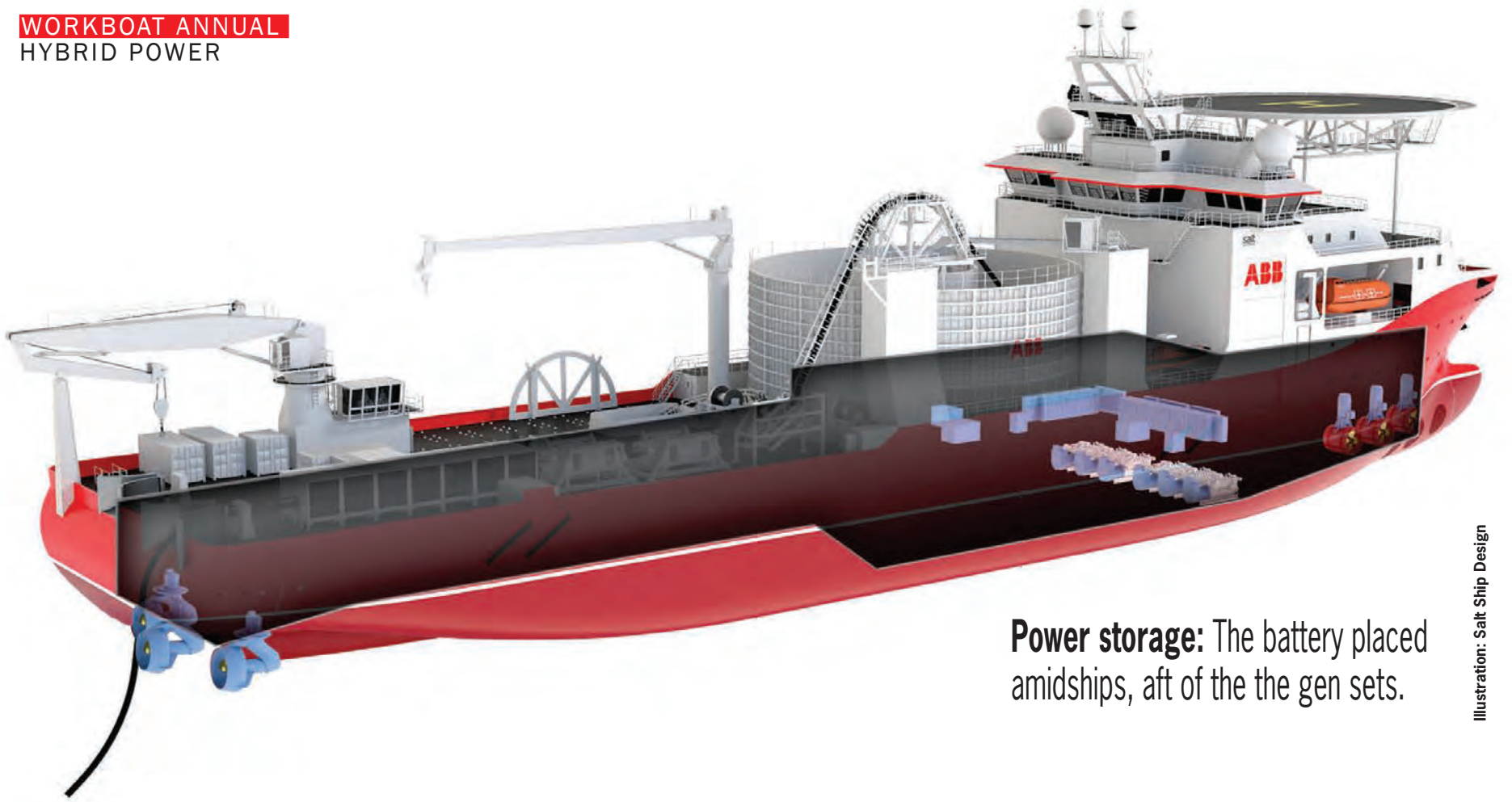
Like the DC Grid, ABB battery power conceptualizing has rolled on despite a limited early market: the odd coastal Norwegian ferry; the aforementioned OSVs and the hoped-for tugs. While DC Grid extends direct-current links already onboard a vessel for optimal power distribution, battery power is mostly about having a safety reserve and zero-emissions port- and port-approach work. Hence tugs — the workboat easily made to charge quayside when not pushing or pulling. Long-term, Lindtjorn says, power storage tug solutions will be "too hard to resist", as owner benefits are understood and tightened rules for emissions in and around towns enlarge the market.

Although tug-borne battery power "is just a scaled down solution" of the hybrid power available to OSVs, the "tug dilemma" is real. Tugs spend little time at high engine loads (sporadic nudges and tugs). In engineer language, their average engine loads are far below their rated power, so engines don't combust well while consuming and polluting when they don't need to. Batteries help

ABB Ace: John Olav Lindtjorn

by storing the power needed for peak usage (usually ship-assist). The trouble is, few seem to be listening. ABB has no tug-owning client reference they can point to with hybrid battery or exclusively battery power onboard. The DC Grid, too, is not aboard many vessels despite being the perfect fit for managing hybrid power. Lindtjorn said "in the tug world," battery power is unfairly compared to battery-only ferries or to diesel-mechanical tug systems. "In the OSV market we're fighting a slightly different communications battle than for tugs. In the OSV market, we're comparing ourselves to standard AC systems, whereas with tugs, we're really competing with diesel-mechanical."

Looking at an ABB graph of a typical tug load profile and its time analysis —



Power storage: The battery placed amidships, aft of the the gen sets.

Illustration: Salt Ship Design

at really low loads 70 percent of the time — and seeing how little time it spends doing high-load ship-assist, Lindtjorn's frustration simmers.

"It's ludicrous to be dimensioning your engine for this (tiny need for) full power, when you could have other energy sources cover that peak load for short periods in a more efficient way."

Telling Tests

It isn't just commentary. He's relaying the results of tests at a lab in Trondheim, where cooperation between ABB and Marintek — the electrical and control expertise of the one, the engine know-how of the other — produced system analysis that included emissions tests mirroring tug operations.

Connecting generator to rectifier and (a motor), they simulated load profiles. They connected a battery (up against a supercapacitor at the other end of a switchable circuit). The super-capacitors — good for repetitive, high-power use — proved not to have the flexibility of the battery. "We've seen that the battery is the go-to solution if you have slightly longer durations of any type, where you need a little extra energy," Lindtjorn says of having the battery in standby mode. In other tests, the battery is given the peak shaving and power-enhancement role in support of the motor, and then, finally, the engine is deliberately tripped (because in reality it's often at fault).

Measurements clearly showed that with the battery turned off, variable speed operation puts the full load on a generator. Translation: pricy gen-set maintenance. When on, the battery takes the full change in load (instead). It means designers can choose smaller gen sets of fewer cylinders and less output. For owners, it means extra space and a cheaper vessel. In all-electric hybrid systems, mechanical power from the engines converts to electrical current for propulsion and other onboard consumers. "So the generator now operates at a constant load, and the stable pressures and heat mean that everything in your engine works better. The battery doesn't mind (sharing the load)," says Lindtjorn, explaining that battery power on an AC system forces the use of more electric (transformers) and electronic hardware. "A DC grid solution is more streamlined for energy storage," he says, although this writer knows AC proponents in

Heave-compensated: Cranes on deck that can add battery power.

shipping hotbed Aalesund who say DC interferes with certain ship operations.

"Dilemma" Solved

"Basically, the tug dilemma is that you have a need for peak power but only for a limited duration. So what do you do," asks Lindtjorn rhetorically.

In the all-electric ABB tug-power and propulsion model, propulsion is controlled via variable frequency (speed) drives, or VFD. Engine speeds are independent of propulsion, so the engine can be regulated based on load rather than propeller speed. "With diesel-mechanical systems, you're really required to dimension your engine to meet that (peak) power. You can't say I only need it a fraction of the time, and so I'm not going to (put in a large engine)," he adds. With the number of zero-emissions harbors set to grow on MARPOL rules, the temptation, Lindtjorn says, is to address the challenge — at least for larger engines — with a different shaft generator and multiple-engine configuration, in which case, "You're still left wanting a little. You're still required to have multiple engines."

"Now have your engines running on variable speed and making their energy available to the DC system, so you can lose one engine and still use two propellers, rather than having to turn on two engines every time you start up the boat," he explains. The DC system makes energy storage available to all parts of the system, so power can be focused on propulsion rather than your AC needs.

"You can go all-electric, turn off all your engines and still have full functionality. With diesel mechanical you need to think of your minimum speed. That draws a fair amount of power from your engine, unlike an electrically driven motor driven by a converter."

All that appears to stand in the way of buying an all-electric tug is the availability of charging infrastructure. The exhausting process of choosing a battery type has already been endured by Lindtjorn and his teams in Finland, Norway and Singapore.

Only the Start

Although batteries are no longer investments requiring a national budget, they do come in a bewildering variety of types. Some are better at peak power buy cost more on a kilowatt-hour basis. You need the right one. "With (hybrid electric) tug, the big battery gets you near the ship and starts the operation, and then you have engines running. When you move back to quayside, you're operating on only batteries and you can do a bit of charging," Lindtjorn says of "Scenario A" which, back at the lab, offers about 25 percent energy savings. In "Scenario B", the battery is just big enough to assist the engines, taking the load at low loads and on standby. "B" offers 38 percent energy savings. "You don't have to have a huge diesel engine that's only really been put to proper use for 10 percent of its working life, and not even that."

Lindtjorn says ABB is "all-in" when it comes to developing battery power and is working with yards, charterers, owners and designers to "demystify" batteries and DC Grid. While DNV GL has accepted that peak power can be covered by a battery, it is understood to want one hour of (peak-power) coverage (if not for tugs). Class have approved a tug's Bollard pull by battery, so the game is on.

"We're only at the beginning of our understanding of the impact of energy storage on vessels," the Dakar Rally driver says.

Fire Hardened: ***The Reintjes gear manufacturing process has been honed over a long and distinguished history.***

Changing Gears

Reintjes is a name known well in maritime circles, a German engineering and manufacturing company which has designed and built some of the most rugged gearboxes on the waterways. Klaus Deleroi took the helm at Reintjes in January 2015, and he is in the midst of steering a change in mindset at the company: a mindset that is more customer-centric to better understand and fulfill the needs of the people and companies that own and operate vessels. We met with Deleroi in his Hameln, Germany, HQ for insights on the path ahead.

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By Greg Trauthwein

When Klaus Deleroi decided to switch gears on his career, leaving a life time of selling engines – first for MTU for 14 years including five years heading sales in Asia, and then for MAN Diesel & Turbo as the global head of 4-stroke engine sales – the decision to take the helm of Reintjes simply felt right. From the outset he liked the approach from the company, as his predecessor at the helm of Reintjes first came to him a full 30 months in advance of his retirement to gauge Deleroi's interest in running the company. Next he appreciated that Reintjes, as a trust-owned company, has the luxury of making decisions and business plans with the long-term in mind, not beholden to the oft fickle masses that can drive public companies.

"My dream always was to own a company, but running Reintjes is about as close as you can get to running your own company," Deleroi said. "I am the managing director, and we are a trust-based company, which gives to us very long-term incentives, meaning we think long-term and make long-term investments."

Finally, an entrepreneur at heart, Deleroi saw Reintjes as a challenge. While long-holding the dream of owning and running his own company, he viewed the Reintjes top post as an opportunity to meld his outgoing, people-first business principles with the exceptional engineering and manufacturing pedigree of Reintjes, ultimately aiming to make the company a more dominant player in the global maritime market while expanding its horizons into industrial applications.

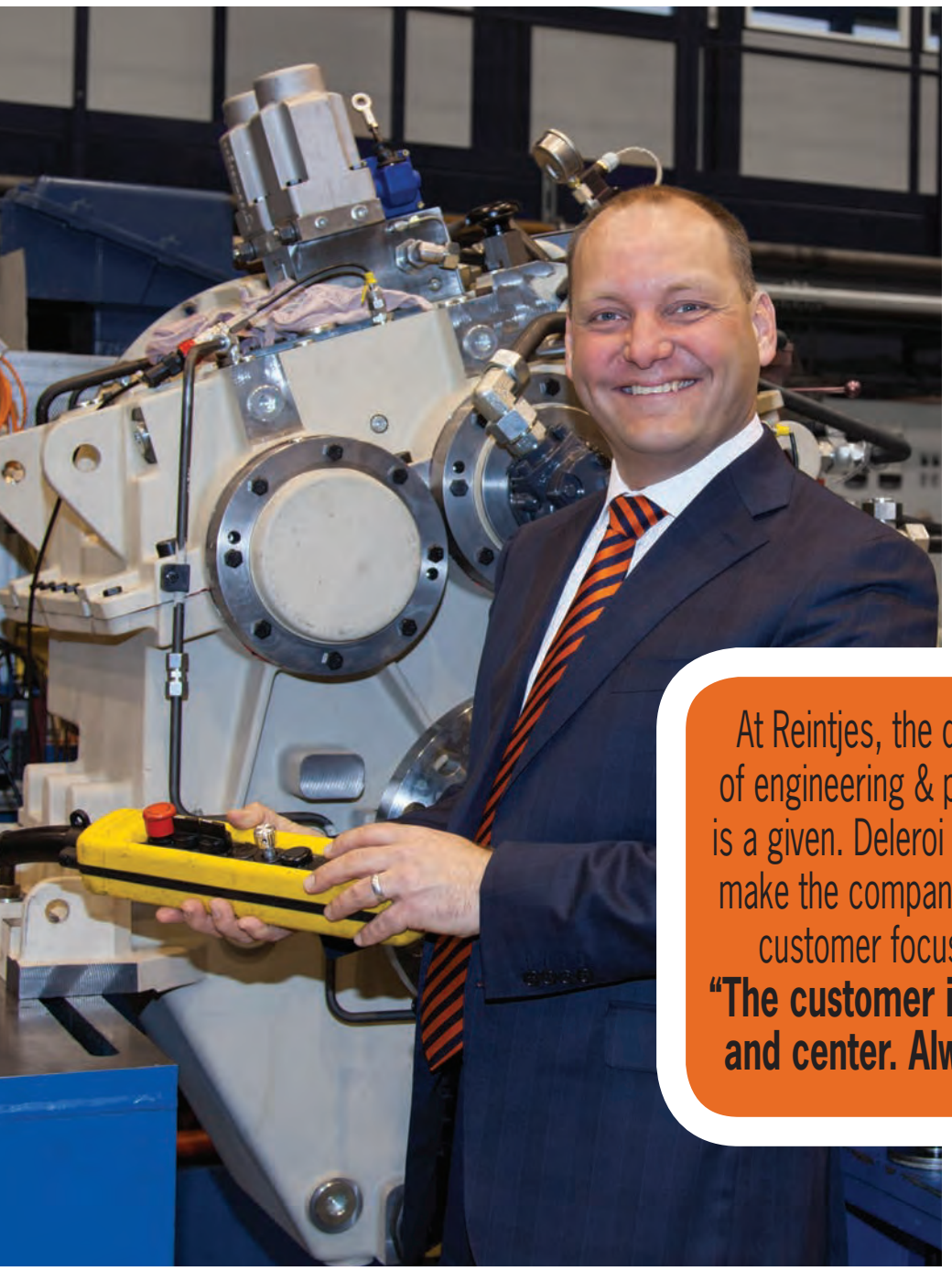
But Deleroi is quick to admit that his first inclination on taking the top seat was wrong.

"When I joined Reintjes I made an oath to myself: for two months I will sit here and I will talk to a lot of people and learn," said Deleroi. "I knew Reintjes from my MTU and MAN days, and I dislike new bosses that come in and think 'everything is wrong, this is right.' Unfortunately though, after three days, I sat in my 'hut' here and thought 'no, I cannot just sit here; I have to start making decisions now to make some changes.'"

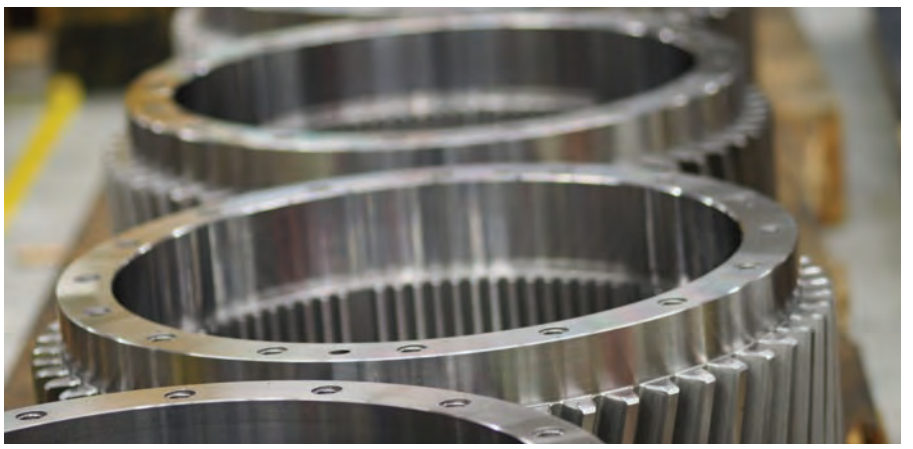
People First

Deleroi is well versed in German excellence in engineering, and he knows the quality of product is the rule to survive long-term in the rigorous maritime environment. But he also believes that producing a great product is simply not enough, particularly in the modern maritime world. His vision of Reintjes extends far beyond the factory floor, as he sees the company evolving to become a true knowledge partner on all matters maritime propulsion. His mission is to get the entire organization, top to bottom, moving forward with a unified understanding of the customer – an understanding their business, of the particular ways in which they operate their vessels, and of their needs. "The customer is front and center, always," Deleroi said.

"Engineering know-how is our strength; inside and out we know how the gearbox is functioning and how it needs to be fitted," said Deleroi. "But a



At Reintjes, the quality of engineering & product is a given. Deleroi aims to make the company more customer focused. **"The customer is front and center. Always."**



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weakeness is the organization structure, which is focused too much on production and product-related; we have to open up to become more flexible and to adapt to customer needs even on a per-order basis."

When he was being courted by Reintjes, he saw a solid company with robust products and good people, with that caveat. "The organization needed some fine-tuning to adapt to the market," said Deleroi. "What we have to do is put the customer in center of our focus in everything that we do. You need to understand the customer and their needs; you need to know how they use their boats. The same applies for our 'second leg' that we want to build up, and that is the industrial gear market."

The Propulsion Train Specialist

Just prior to our arrival Reintjes has completed its global sales and marketing summit, gathering sales and service personnel and distributors from around the globe for three days of intensive meetings and team bonding. From this emerged the skeleton of what Deleroi envisions as a long-term plan forward.

Deleroi and his team are working to deliver a 10-year plan, with incremental steps along the way, that will define not only the company will operate, but how and where it will sell it products and services. Part of that plan undoubtedly will be a substantial, prolonged investment in people and training; training with the goal of ensuring that all on the Reintjes team are pointed in the same direction with purpose and an eye on the customer and its needs. "We discussed that just this morning," Deleroi said. "I want to have the company work to be more of a consultant with our customers. I want this company to be renowned as the propulsion train specialist; in the end they might not sell me the whole thing, but they can consult with me on the whole propulsion train; This is my vision."

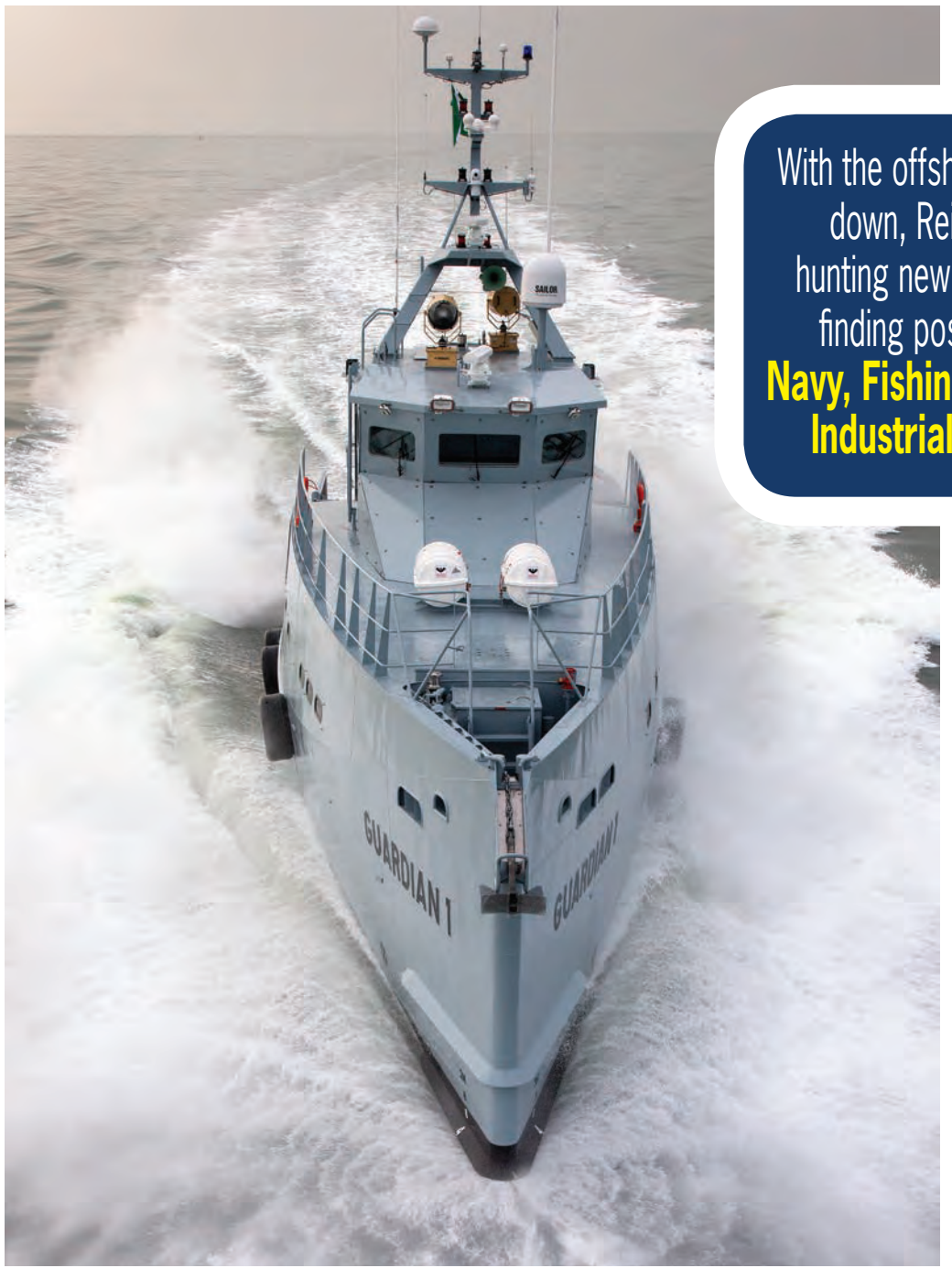
Playing the role of power train expert is particularly topical in today's maritime industry, as owners are under consistent pressure to meet ever stricter emissions targets. While the main focus has been on primary power plant and fuel, Deleroi said the changes can impact the entire power train. "The ratings and set up of the gearbox can be a bit different," said Deleroi. As the power range of the engine is changing, the speed is changing too, sometimes requiring different gearbox ratios. Also when the engine makers change their combustion, the momentum curve is changing too, meaning that consideration must be given to the gearbox too, to ensure most efficient operation.

Deleroi well understands the need to deliver a robust and technically correct gearbox solutions to its customers. It is the melding of the personnel and the technical though that is the critical factor in forging the company's path ahead, as understanding customer needs, working with customers to deliver the best technical solution, goes hand-in-hand with developing efficiently designed and manufactured custom products and systems to meet those demands. "There is an intelligent way in which we can bring both together," said Deleroi, meaning the manufacturing efficiency benefits of a standard product line melded with the individual customization per client requests. "It is possible to have lean manufacturing while having one-off products. I don't see Reintjes as a mass producer of gearboxes, meaning that we deliver 2000 gearboxes of one type, for example. I see our strengths in our engineering know-how adapted to special solutions for customers, while still having a base of standard gearboxes."

Fickle Markets

When asked about the indicators monitored by Reintjes to accurately assess the future direction of its business, Deleroi's answer was a bit ominous: the price of oil and activity in China.

"Of course one indicator is the oil



With the offshore market down, Reintjes is hunting new business, finding positives in **Navy, Fishing, Yacht & Industrial Power.**

price, which is a big indicator for the offshore oil industry. When the oil price goes below $70 per barrel," offshore oil and gas drilling activities tend to dry up.

While the price of oil bears a direct and readily visible connection to offshore oil and gas activities, the impact of Chinese industrial activity is perhaps a bit more obscure but equally significant. With industrial activity on the wane in China, there is lower-demand for coal, meaning lower demand too for the inland tow and barges that bring the coal to market or to offload to bigger ships. There are various other bits of information, following charter rates for example, but the real market intelligence comes from information gathered from our clients, from talking to people, said Deleroi, as it is the engine makers, the designers and naval architects that generally are the first ones to know of emerging trends, serving as bellwethers for the market at large. "Two of the market sectors are presently down – the offshore business and the tugboat business – so we have to compensate with additional business from other market segments," said Deleroi. In particular, he sees four market sectors primed for growth:

- **Yacht Business:** Reintjes sees growth here, particularly with its new Fortjes podded system;
- **Fishing Business:** The fishing fleet around the world is very old and is in need of being rebuilt and renovated.
- **Military & Government business:** As the world is increasingly in conflict, more countries are investing in patrol boats, frigates and corvettes.
- **Industrial Business:** This is a 'second leg' for Reintjes. To date it has seven gearboxes sold, with five running. "The customer's are currently very happy with our quality, and this is an area where we want to grow, mainly in the steam turbine market. We are lucky in that with MAN Diesel & Turbo we have a good references (the first six units are sold to them)."

The Reintjes Product Family

As a true German engineered solutions company, the Reintjes brand starts and ends with a rugged product line-up for the maritime market that is field-proven and manufactured to the highest degree of quality. First and foremost, the Reintjes name is synonymous with marine gearboxes, and it offers a broad selection from small to large, for propellers, waterjets and turbo gearboxes, mainly targeting rigorous applications in the Workboat, Fast Naval Craft, Fast Ferries and Yachts. The company has an expanded range of "Special" gearbox solutions that includes:

- **The Fortjes podded package,** a space-saving design with a hybrid option available.
- **A Hybrid Gearbox** which is ideal for slow-speed operations, and electric drives to promote smooth running, low noise and low energy consumption.
- **Dredging Gearboxes** developed specifically to handle the rigors of dredging, including on pumps installed inside the vessel and dredge pumps in use under water.
- **Step-up Gearboxes.**

Investment in People

On the occasion of interviewing Klaus Deleroi, the new managing director of Reintjes, a group of sales and service agents from around the globe, including Ralph, Karl and Chris Senner from Karl Senner Inc., the Reintjes distributor in North America were in Hameln, Germany for a week of sales and marketing meetings. The Senner organization is a unique entity in Deleroi's view, as it has fully embraced the notion of not simply selling product, rather gaining experience and knowledge of the product, system and manufacture process, and melding this with depth and insight on customer needs. Ralph, Karl and Chris have actually worked in the Reintjes factory for extended periods, with Ralph working in Hameln for three years in the 1970s, and brothers Karl and Chris living and working in Hameln for a full year recently, working in all aspects of design and manufacture to gain invaluable knowledge along the way. "I think our machining capability and our facilities are good, I think the biggest investment that we need to make is our investment in people, which goes together with our new philosophy to be more customer orientated, understanding our customer's needs and how they are using their machines," said Deleroi. "The Senner's are actually a perfect example" of the philosophy I am trying to impart across our entire sales and marketing network, in terms of learning the product, learning the process inside and out, and melding that with knowledge of the customer's needs. "We have to speak to our clients eye-to-eye, and not just to give a sales pitch. This is where we have to invest in the training of our people."

Japan's Ship Machinery × JAPAN JSMEA

Japan Ship Machinery and Equipment Association

In Japan, there is a maritime industry cluster of businesses, which include ship owners, shipbuilding companies and ship machinery and equipment makers. New products have been developed, while others have been improved within the framework of this maritime cluster. Japan has completed many vessels of a wide variety of types for years. Boasting high levels of performance and quality, Japan-built ships are highly rated by ship owners worldwide.

The Japanese ship machinery and equipment industry has grown hand in hand with its compatriot shipbuilding industry to deliver many different kinds of high-end products in large numbers to customers all over the world. We work hard so that customers are able to use Japanese products safely for a long period of time, having prepared to provide after-sales services around the clock in an extensive service network that reaches every corner of the globe.

Today, demand for cargo transport by sea is growing everywhere on this planet due to, among other factors, the growth of the global economy and the development of new energies. In line with the demand increase, newbuildings are being completed one after another in Japan and other nations. As such, shipbuilders have a backlog of many orders, while the shipping and shipbuilding industries are blossoming continuously in many economies in the world.

Currently, countries and regions engaged in shipbuilding are inflating in number, while domestic shipping services are becoming more and more important in developing economies. Energy development projects are being advanced increasingly greater worldwide. These trends are all factors behind the rise in need for operating various ships. The Japanese ship machinery and equipment industry is now paying attention to the global market, which is expanding under the influence of this demand increase.

Japan Ship Machinery and Equipment Association (JSMEA) is currently made up of 244 regular and 69 supporting members. Our activities are all focused on upgrading the Japanese ship machinery and equipment industry. The specific efforts that we make to this end include the following: (1) participating in exhibitions overseas and organizing seminars worldwide to promote member companies' products, services, technologies and other features; (2) helping member companies develop technologies to upgrade the reliability of their products so that they can comply with international conventions and ensure higher safety for vessels; and (3) secure and cultivate human resources to constantly enhance the quality of Japanese ship machinery and equipment and Japan's manufacturing technologies.

To encourage member manufacturers to expand their business in the global market, JSMEA participates in international maritime exhibitions held in Japan and other countries, providing up-to-date information on members to ship owners, shipyards and other customers. At exhibitions, we promote a Japan pavilion with member companies to introduce members and market their products. We also distribute a booklet on energy-saving and eco-friendly products, which is a powerful advantage enjoyed by the Japanese ship machinery and equipment industry; another booklet that contains detailed information on products for offshore oil and gas development projects and facilities; and a newsletter that introduces JSMEA activities and the latest information on member companies.

In developing nations where local markets are scaling up as well as those where we think the shipping and shipbuilding businesses are expected to expand in the future, in particular, JSMEA organizes seminars to provide up-to-the-minute information to customers and introduce affiliated ship machinery and equipment manufacturers and their products. As member companies unveil the latest information,

our seminars are always attended by many local parties involved with maritime affairs, who look on the occasions as opportunities to have interchanges with members.

While abroad for exhibitions and seminars, JSMEA visits ship owners, shipbuilders and other local organizations to exchange up-to-date information and conduct other activities to introduce member manufacturers.

The recent enhancements in international conventions have required the global maritime industry to comply with more rules and regulations. As such, needs are rising for new technologies and products. Moreover, we are becoming more and more aware of environmental issues attributed to factors including global warming and the issue of ballast-water treatment. At a time when circumstances surrounding ship operations are changing as drastically as described in the foregoing sentences, JSMEA assists member companies in developing new technologies and products. To help them invent more practical technologies, for example, we promote the development of technologies that precisely satisfy the needs of ship owners, shipyards and other customers. To meet the next stage of NOx emission regulations, Japanese ship machinery and equipment makers made concerted efforts to develop new technologies and products. Currently, we are striving to standardize telecommunication technologies for on-board devices to ensure greater safety for ships by consolidating on-board data and organically orchestrating on-board equipment.

JSMEA actively promotes member companies and their ship machinery and equipment to develop products that better satisfy customer demand and allow members to hold a greater share of the global market. Information on JSMEA-affiliated manufacturers is available at the international exhibitions that we attend and at our seminar, but also you may find it on our Web site. So, when needing to know the latest about JSMEA members as well as their products and services, please visit our Web site and/or contact us directly.

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JAPAN JSMEA Japan Ship Machinery and Equipment Association

Japan Ship Machinery and Equipment Association
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Tel.: +81-3-3502-2041 Fax: +81-3-3591-2206 http://www.jsmea.or.jp E-mail: info@jsmea.or.jp

JAPANESE MARINE ECO-PRODUCTS

Japan Ship Machinery and Equipment Association
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http://www.jsmea.or.jp/eco-products

Japan Ship Machinery and Equipment Association (JSMEA) has published a booklet called “Japanese Marine ECO-Products”, which introduces products that member companies manufacture and sell that contribute to saving energy and helping the environment. Copies are distributed widely among ship owners and shipbuilding companies worldwide.

The “Japanese Marine ECO-Products” booklet carries information on more than 40 items, such as engines, propellers and other energy-saving products as well as emission-gas and ballast-water treatment systems and other ecologically friendly products. As such, the booklet is a useful reference when ship owners, shipyards and other customers select machinery and equipment for new projects, as it contains product features and specifications as well as contact and other information.

The online edition of “Japanese Marine ECO-Products” is available at http://www.jsmea.or.jp/eco-products.

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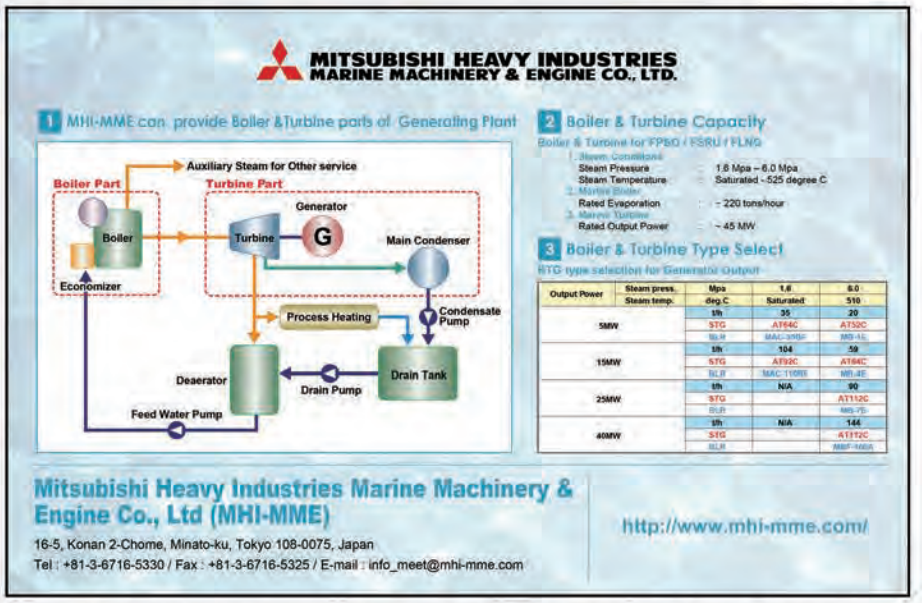

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Auxiliary boiler burner

For LNG fuel ship
Oil/Gas combination burners for auxiliary boilers
TYPE **SFUGX**
"Vignis"

Overview

This burner was designed and developed for the auxiliary boilers on LNG fuel ships and supports both oil and gas. We developed this burner based on our experience with SFFG II burners used for the main boilers on LNG carriers. Not only can this burner be configured for single-fuel combustion in both oil and gas applications, but it can also be used for mixed combustion to help save energy and reduce the impact on the environment. This high performance burner adapts well and can support any future changes in fuel types.

Specification

Evaporation rate: For 4.0 to 10.0 t/h
Oil combustion capacity: 330 to 835 kg/h
Gas combustion capacity: 370 to 935 Nm3/h
Turndown ratio: 10:1
Combustion configuration: Oil / Gas mixed combustion, single-fuel gas combustion, single-fuel oil combustion
Spray method: Gas / Diffusive mixing, Oil / Vapor spraying
Control method: Proportional control
Compatible fuel: LNG, HFO, MGO and MDO
Fuel viscosity: Supports 700 cSt

Bilge concentrator

Engine room bilge processing system
Bilge concentrator "Bilcon X"
TYPE **IREV**

Overview

This system concentrates the bilge water efficiently using humidification and evaporation (low temperature humidification). It significantly reduces the unloading costs and hassles related to bilge water processing, making it a labor saving system. In addition, the humidification and evaporation method uses a completely closed system and does not discharge any processed bilge water from the vessel, also helping reduce the vessel' s impact on the environment.

Specification

Processing capacity: 1,000 to 3,000 kg/day
Heat source: Water temperature: 80°C Vapor (0.49 MPa sat °C) Heat-transfer oil (140°C)

Main boiler burner

For LNG carrier
Oil/Gas combination burners for main boilers
TYPE **SFFG II**

Overview

This burner was designed and developed for the main boiler on LNG carriers and is currently being used by many LNG carriers. The boil-off gas from the LNG tank can be used as fuel, and it can also be combined with oil fuel for mixed combustion. The operation efficiency has been improved. This burner can also be configured as a single-fuel gas burner to reduce the impact on the environment and is ideal for complying with the tightening of regulations (for NOx and SOx, etc.) in the future. This burner offers excellent load-following performance, high load combustion, energy savings and a reduced environmental impact. Currently, its application is not just limited to LNG carriers but is also extending into other offshore fields, such as FPSO and FSRU.

Specification

Evaporation rate: For 6.0 to 70.0 t/h
Oil combustion capacity: 550 to 6,300 kg/h
Gas combustion capacity: 450 to 5,300 Nm3/h
Turndown ratio: Oil 15:1 Gas 7:1
Combustion configuration: Oil / Gas mixed combustion, Single-fuel gas combustion, Single-fuel oil Combustion
Spray method: Gas / Diffusive mixing, Oil / Vapor spraying
Control method: Proportional control
Compatible fuel: LNG, HFO, MDO, MGO and crude oil
Fuel viscosity: Supports 700 cSt

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Chassis Master

From clean hands to fast, stable boats, Hermann Ophardt is truly an "engineer, inventor and entrepreneur"

By Greg Trauthwein

Maritime Reporter & Engineering News was recently in Duisburg, Germany for a test run on some innovative new fast craft chassis designs from Ophardt R+D GmbH + Co. But the story extends far beyond high speeds and tight maneuvers on the river Rhine, as engineer, inventor and entrepreneur Hermann Ophardt and his son Thomas have built an impressive ultra-high-tech manufacturing venture with the intent to grow the company and expand its innovative maritime chassis into markets near and far.

The Ophardt design is fast, maneuverable and stable, with a hydraulic, adjustable propulsion drive and a unique hull form.

While the name Hermann Ophardt may be relatively unknown for now in many maritime circles, it is a safe bet that most everyone has been 'touched' by Ophardt at some point in time, as the man and one of his companies helped to revolutionize hospital hygiene globally with his disinfection dispenser design, which was founded in the 1960s with the creation of the Ophardt Industrial Group.

The success of the Ophardt Group began in Issum, Germany in 1962 when founder and owner Hermann Ophardt developed the company into a leading manufacturer of high quality dispensing systems for hygiene control in the medical industry; leading to developments for industrial and sanitary applications as well. As with most that are endowed with the combined 'engineer – inventor – entrepreneur' genetic make-up, Hermann Ophardt is remiss to rest on his laurels. When his eldest son finally took full control of the dispenser company, he wanted to find something else to do, as he simply explains with a smile; "I don't get any pension, so I have to continue working!" As the story of Ophardt unfolds, it is discovered that Hermann Ophardt, who celebrates his 80th birthday this year and is the eldest of eight children, comes from maritime roots, earning a ship engineering degree at the age of 23. But he learned at a relatively young age – just two years later at age 25 – that the aforementioned 'engineer – inventor – entrepreneur' gene was the dominant one, and he embarked on a career, a life of self-employment, a self-described 'problem solver.'

Making the Move to Boat Builder

With his eldest son firmly entrenched steering the dispenser company, Hermann founded The Ophardt R + D GmbH + Co. KG in January 2001 as the research and development center of the Ophardt Group in Issum. During the first five years, Ophardt R + D realized a number of projects concerning sanitary engineering, production automation and aluminum processing.

In September 2006, Ophardt R + D moved to Duisburg, and it is here where the focus was shifted primarily to the

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Thomas & Hermann Ophardt today

Hermann Ophardt earned a ship engineering degree at 23, but he realized early on that his would be a career of self-employment, a 'problem solver.'

The Ophardt Clone Tech production system ensures quality of weld, quality of build, across the complete portfolio of Ophardt boat chassis

development and manufacture of OPSHIPP Modules (Series Hull Integrated Precision Platform) using sea-grade 8mm aluminum. Today in Duisburg you will find one of the most modern small boat builders in the world, complete with high-end manufacturing capabilities and a heavy investment in computer aided technologies, CNC machines as well as welding, gluing, screwing and pressing operations.

Hermann Ophardt is an engineer inside and out, and he firmly believes that for every problem there is an engineered solution. When he made the decision to open a maritime operation in Germany, most people dismissed the idea, noting that the much of the maritime business had moved long ago from Germany to the Far East.

But Hermann Ophardt thought differently, envisioning an opportunity to meld his accrued engineering acumen with state-of-the-art manufacturing technology and technique. “I said I think there is a chance, you simply have to find a niche in the market.”

So he set out to found a company that was different from the GRP small boat construction model, believing that aluminum could be an optimal solution for both pleasure and work craft, and his long history of working with aluminum in the dispenser business aided the initial effort.

Building the Business

The Ophardt operation is customer facing and offers what it believes will be a concept readily accepted by many small and medium sized boat builders, as Hermann and Thomas see the Ophardt family of aluminum hull chassis as the missing piece for many companies that need good, consistent quality, whether the boat series is for two vessels or 200, allowing these smaller companies to enjoy unprecedented efficiencies and quality of hull, able to bid and compete for larger value, higher volume jobs.

According to Thomas Ophardt, the company sees itself as an enabler for small to medium boat builders globally, able to supply an efficiently manufactured hull chassis, sent for modernization based on boatbuilder capability and client demand. “There are so many small shipyards that make two, three, four small boats, but they don’t enjoy the benefits of mass production of small

Preparing for a test drive on the river Rhine aboard Ophardt’s largest model, 39.6 x 12.5 ft. with 900 hp.

The Ophardt Boat Chassis Family

- **Outer Wall:** Sea grade Aluminum (EN AW-5083), 8 mm thick
- **Manufacturing:** CloneTech mass production on CNC machines and industrial robots
- **Triple Tech:** The innovative aluminum manufacturing process is a combination of welding, bolting and gluing operations, for maximum joint strength and torsional stiffness. Gluing has the additional advantage of limiting crack corrosion

Model	OP5909	OP7909	OP9909	OP11909
Length, o.a.	6.15m (20.2 ft.)	8.08m (26.5 ft.)	9.9 m (32.5 ft.)	12m (39.6 ft.)
Beam	1.99m (6.5 ft.)	2.5m (8.2 ft.)	3.16m (10.36 ft.)	3.8m (12.5ft.)
Dry weight	0.65t	1.1t	1.7t	2.4t
Draft/Displacement	n/a	0.62m/3.7t	0.73m/6.5t	0.86m/10t

Hermann Ophardt built a global hand-sanitizer empire before turning his attention to boatbuilding several years ago.

hulls … they are all hand-made."

While the Ophardt engineered solution is available to all, Thomas Ophardt said that ideal partners would primarily be independent, private owned shipyards or vessels owners that share a similar thought process and philosophy. In his thinking, for the right companies the Ophardt chassis will be an extension of their business line with a proven, stable hull design.

The Ophardt operation benefits not solely from the long-standing engineering acumen of Hermann, but also from the fact that it is a small, flexible and fast-moving industrial operation, self-funded and able to makes changes quickly to product, process of selling angle as it is beholden to no one but itself.

Ophardt started from the ground up with its own proprietary, innovative and unique hull design, and has built and staffed its operation based on its patented Clone Tech production system, a production line more akin to cars than boats.

"If you look at the automotive industry, it is totally different with the production line concept and the reliance on automation," said Hermann Ophardt. "We build a platform, a chassis like a truck, a chassis (available in four sizes) that will be used by the small to medium size boat builders to customize to build multiple types of boats all using the common chassis."

Ophardt's Clone Tech is a combination of facilities, machine and software, a system that is designed to deliver exacting replicas of each boat, with a consistency of quality, price and performance. "Predictable is the best word" in describing Clone Tech, according to Hermann Ophardt, and to date the company has invested approximately 12 million Euro in buildings, machinery and engineering.

The Chassis Design

While much can be written about the Ophardt marine chassis manufacturing design, it should be noted from the outset that the performance and handling of two models test-driven by Maritime Reporter & Engineering News on the Rhine River with a light 1.5-ft. chop in early October – the 12m, 900 hp chassis and the 8m, 300 hp chassis – exhibited excellence in all phases of operation, from acceleration, maneuverability, as well as outstanding stability in all phases and turns at all speeds. All accolades regarding the hull design, engineering and manufacture were proven on the water in these conditions.

The Ophardt boat chassis incorporates a number of manufacturing advances and hull features that are designed to make the family of four chassis attractive to a diverse set of users, from traditional commercial to advanced fast craft owners in patrol and military applications.

"The vision was to build the best aluminum boat chassis," said Thomas Ophardt.

"Once we did this, we quickly learned that the 'chassis idea' was a new idea to many boat builders," and thus it was decided to focus solely on building a small family of exceptional chassis' instead of wading into the market with a fully designed boat.

There are many limbs to the Ophardt way, but Clone Tech is its heart and soul as it is in this efficient, effective, predictable engineered solution that best embodies the Ophardt philosophy.

"Only because of the computer aided design is it possible to create its Clone Tech," said Thomas Ophardt. "This is enabling a platform that can be used on different models. It is repeatable and predictable manufacturing … The first is the same as the 100th."

What goes Up, Must Come Down

Offshore Decommissioning

The Two North Seas & a $77B Market

By William Stoichevski

It's hard to know the true worth for vessel owners of a combined 5,000 Norwegian and U.K. North Sea oil wells that will one day have to be permanently plugged, abandoned and made harmless. The task is the main oilfield abandonment job available to the world's advanced, high-spec offshore fleets with their valuable cranes, moon pools and deck space. Some, like Norway-based Island Offshore, get the call for this work because they're able to partner with the new innovators of subsea abandonment work. Others will get the call because they are "heavy lift."

According to industry advocacy Oil & Gas U.K., U.K. offshore decommissioning alone represents around $77 billion in work over 35 years and recently reached $1.54 billion a year. Decommissioning in the U.K. has whipped up a gold-rush-like hysteria in what seemed a province in decline. Decoms has its own umbrella group, Decom North Sea, and at least two major decommissioning conferences and trade shows, plus an innovative technology base dedicated to reducing abandonment costs. As we write,

Never Abandoned: The Sleipner Field off Norway was once a decommissioning candidate.

Photo: Harald Pettersen, Statoil

Keeping busy: Island Offshore MD, Haavard Ulstein.

Photo: Stoichevski

the Dutch in Amsterdam are dedicating Day 2 of Offshore Energy Exhibition & Conference 2015 to decommissioning.

By wild contrast, no ship owners we speak to in Norway admit they have built or are building their top-hole drillers, inspection maintenance and repair (IMR) or offshore construction vessels (OCVs) for the decommissioning market. They concede, only, that they're vessels are "decommissioning-capable."

"It's probably not a very large market," says Clarkson Platou Securities equity research analyst, Turner Holm, who admits he doesn't hear it spoken about often (in Oslo).

"(Decommissioning) is pretty niche, so if there are thousands of vessels, then the ones on decommissioning are not that many, I don't think." He says demand for OSVs is something like "lower 50 percent related to rigs, 45 percent for production platforms and five percent the rest, including offshore construction and seismic."

Holm, a director in the firm, suggests the Norwegian fleet owners are doing well-abandonment work — said to be between 40 percent and 60 percent of the potential decommissioning market — because they're core rigs market is still trending downward. Island Offshore managing director, Haavard Ulstein, confirms two of his platform supply vessels, or PSVs, have been converted to walk-to-work (W2W) vessels

The SX130 design can do well abandonment work, too.

Reinvented: The Walk-to-work Island Diligence.

According to Oil & Gas U.K., U.K. offshore decommissioning alone represents around $77B in work over 35 years and recently reached $1.54B a year.

Parntered to Plug: The Island Valiant with its retractable A-Frame does well-abandonment work on the U.K. continental shelf.

and two more for well-stimulation work. A recent new-build PSV was remade a W2W. Ulstein says the market for ex-PSV W2Ws is wind and oil and gas, and the converted vessels joined the Island Crown as W2W "successes."

W2Ws are also in use for decommissioning work in the U.K sector of the North Sea.

"The PSVs that are cold-stacked aren't coming back," Ulstein says of the fleets generally. Meanwhile, none of his own vessels are out of work. His anchor-handler tug supply vessel (AHTS) Island Valiant is busy in the U.K. sector of the North Sea, buoyed by the popularity and marketing of well-abandonment partner Offshore Installation Services (OIS). They're hired by Centrica to shut six wells, and OIS is a veteran of 128 completed wells. As with seismic, decommissioning for OIS has sometimes been "multi-oil-company".

OIS will use a Suspended Well Abandonment Tool (SWAT) from Claxton Engineering Services via the Valiant's moon pool to set cement plugs in the wellbore and across its casing annuli. A second operation will use a cutting tool to sever and then remove the wellhead.

Recovery

"2014 was the best year in history for plug-and-abandonment," said Ulstein. It was timely market help, he says, since Statoil's lightwell-intervention campaign (LWI) of 2014 "ended on March 2014." Statoil did not renew and a planned 165 day campaign was also cancelled. The Island Dawn suffered a similar fate when Total terminated. LWI was the business Island Offshore was built on. Ulstein seems almost hurt just saying it, and he changes the topic to a large AHTS with 420 tons worth of Bollard pull that he has available.

"You go where the work is, and where the work will be in 2017, who knows," he confides. He also confides he reads Rystad Energy's reports that say the subsea services market for which the Island Constructor and Island Wellserver were built will be near normal by 2018 and recovering by 2017. We leave his office space with the sense that while decommissioning is the new Eldorado in the U.K., it's just a bridge to better times for sophisticated OSVs. Decommissioning on both sides of the North Sea meridian line might be curbed when oil price rises again.

"We're confident of higher-exploration rates next year," said Ulstein, adding that IMR is growing, too, as oil company maintenance has been on hold. "The backlog of wells that need maintenance has never been higher. Maintenance has been postponed and is accumulating for the future."

It doesn't mean he's in a hurry to drop decommissioning work. W2W vessels earn "three times" what the depressed market offers PSVs right now, and decoms represents some W2W demand.

"We do the easiest part of decoms. We set the plug, pull the tubing, maybe cut a riser, flush with hydrogen (peroxide) and set the cement," he says. The Island Vanguard is "cutting wellheads for Maersk."

He admits he sees the "thousands" of UK wells (many more than in Norway), and his ships can do two of three types of well abandonment operation.

(Illustration: Copyright Rolls-Royce)

Not just top-hole: The Rolls-Royce UT777 Island Navigator will be built by Kawasaki.

"The light-well intervention segment has been big for a long time, and it was once over 50 percent of our business. It's not like that now, but it's still very important for us. It's extremely important to keep those vessels operating because of the high cost of operations."

Same Game

Holm agrees on the need for the high-spec OSVs to keep working, and that decommissioning might not have much impact on the bulk of the fleet. "With certain types of vessels, maybe, but with OSV's it's not a market mover. Having said that, for complex construction vessels it may have more of an impact because all those SURF jobs have dried up, so they'll take what they can get. It's hard to say if there's a lot of it going on."

Unlike well intervention and IMR! There's always something to do. "It can be a fault that needs remedying or a safety valve that needs replacement, an X-mas tree can leak, or you need to go down and isolate certain zones," says Ulstein, adding, "There are many drivers. Some cannot be postponed, unlike decommissioning," he says, a nod to the long put-off but now on-again U.K. decommissioning bonanza, where Island vessels are active. For both decommissioning and a new specialized role — top-hole drilling —Island has just ordered the Island Navigator from Kawasaki in Japan. This time Island will have its own coil tubing abandonment tool. The 180-meter Rolls-Royce UT 777 design is due in January 2018. Its helideck will be amidships at the wave-action nodal point "so (decommissioning, drilling or reservoir) engineers can work undisturbed". Top holes are pilot holes drilled for 14 days with a vessel rather than a rig.

"We're assured that it'll be able to do a lot of other types of work, and well intervention is just one," Ulstein says.

So, while the U.K. decommissioning "gold rush" is on, in Norway "It's expected to grow out from a few corners over the next five years," says Holm, who adds, "Right now it's growing from a slow base. It's not enough to change the game."

By contrast, in September 2015, a Woodmac report put the number of imminent U.K. oilfield closures at 140, with decommissioning spend overtaking development spend by 2019.

‘Wildebeest’ Outfitted with custom crane cable

Lankhorst Ropes supplied crane specialists Lagendijk Equipment with a custom crane cable for a 40 tons AHC knuckleboom crane. The cable and crane will be installed on Edison Chouest Offshore’s ‘Wildebeest’ offshore support vessel servicing drilling platforms.

Lagendijk Equipment specializes in building service cranes, cargo cranes, and special crane projects for the offshore, dredging and shipping industries. Working with Lagendijk, Lankhorst Ropes and the in-house engineering department of Casar wire rope produced the tailor made crane wire. The wire rope is a 3,100 m crane cable wire with a diameter of 46mm and will be used for deepsea lifting operations. Due to the extreme depth, a high performance wire rope was required which could meet the subsea conditions. The custom built electric / hydraulic offshore subsea crane also includes active heave compensation (AHC). The Lagendijk crane will be suitable for work at up to 3,000m with a SWL of 10 tons at sea state 4.

Enerpac completed testing of the world’s largest offshore gantry crane at its Hengelo manufacturing facility in the Netherlands. The crane will be used in the construction of a 5,400 m bridge for an offshore highway on Reunion Island by French consortium Bouygues Travaux Publics, VINCI Construction Grands Projets, Dodin Campenon Bernard and Demathieu Bard Construction. The Over Head Travel Crane (OHTC) comprises two pairs of lifting beams, with an overall width of 30m, and a lifting capacity of 4,800 tonnes for lifting, moving and lowering the concrete blocks for the offshore highway. The crane is classified as A5 for the structure classification and M5 for the mechanism classification and designed to operate in tropical marine conditions (IP66).

New FRC Launch & Recovery System

Global Davit GmbH diversifies its product portfolio via collaboration with Dutch company TBV Marine Systems, part of High-tech Solutions & Design B.V. The company is in the process of developing, manufacturing and implementing of stern Launch And Recovery Systems (LARS) which can launch and recover bigger Fast Rescue Crafts (FRCs). The system is designed to be used in higher Sea States, with waves up to 2.25 meters.

Around the world FRCs are getting bigger, with a demand for quick launch and recovery procedures increasing as coast guards strive to be more operational in heavier weather conditions. The patented LARS system is developed to cover all of these demands. The production, installation and implementation processes for this system is already in progress for China Customs and the Kuwait Coastguard.

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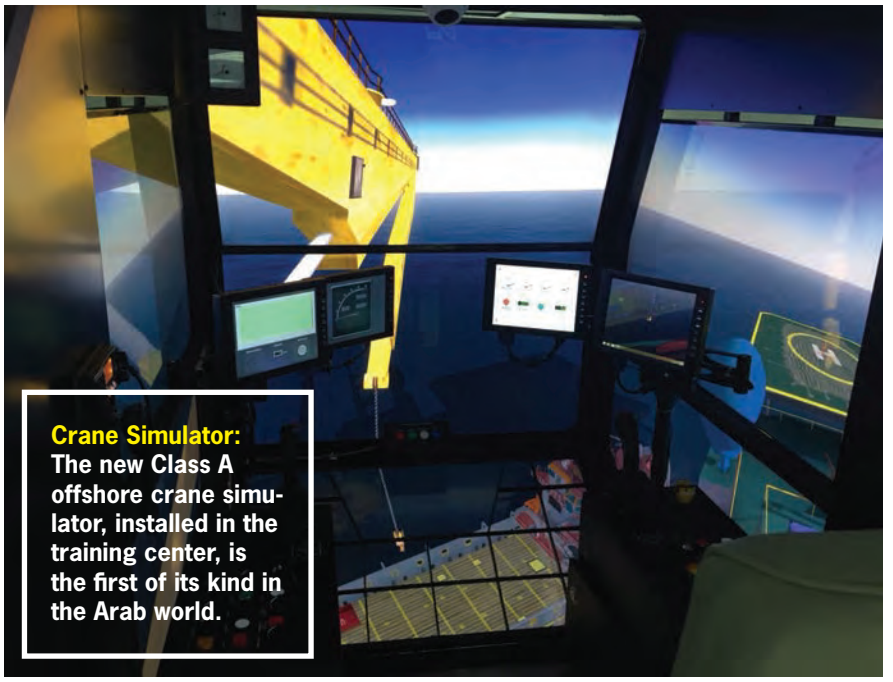


Crane Simulator: The new Class A offshore crane simulator, installed in the training center, is the first of its kind in the Arab world.

GE Offshore Crane Simulator

In 2012, the AAST-GE DP Center was established through a joint effort between GE and the Arab Academy for Science, Technology & Maritime Transport (AASTMT) in northern Egypt for the training of mariners. Operated by AASTMT, the facility joins a group of 12 centers in the world that are qualified by the Nautical Institute (NI) to offer Sea Time Reduction courses. This means that trainees are credited with 30 days of Sea Time when they complete five days of intensive training in the Class A Dynamic Positioning (DP) simulator. Selected to continue supplying and operating the simulator as a joint project with the Academy for the next five years, GE has upgraded the facility with GE Marine's Class A training simulator. "Since its inauguration the center has trained up to 800 students to become certified in operating DP systems," said Dr. Ismail Abd Ghafar, President of the AASTMT. "GE has been a central partner from the initial stages of this training center and they continue to play a role in ensuring the smooth upgrade of our systems. The technology they are providing for the training of mariners will allow us to offer a service that few other centers in the world can."

In order to run this Class A simulator the center is using hardware and software from GE Marine, including its C-series Dynamic Positioning and a simulator system. DP is an advanced ship position-control system which enables the vessel to maintain a stationary position or a precise course using its propulsion system, thrusters and rudders. Many of today's advances in deep water exploration may not be possible without it, thus this technology has become essential in offshore operations and DP training is now crucial to any professional offshore mariner.

Applied Research International (ARI) is the preferred simulator supplier for GE's DP training projects. The center will also be equipped with a new Class A offshore crane simulator, the first of its kind for local operators to obtain offshore crane training in the Arab world.

"With more than 900 of our DP systems deployed worldwide, the training center in Egypt will add to our capability in training future mariners for more efficient and safe maritime operations" said Tim Schweikert, VP, GE Marine.

560-Ton Shiploader Lift

Hansa Heavy Lift transported a shiploader weighing more than **560 metric tons** and measuring 36.5 x 56.4 x 31.5m.

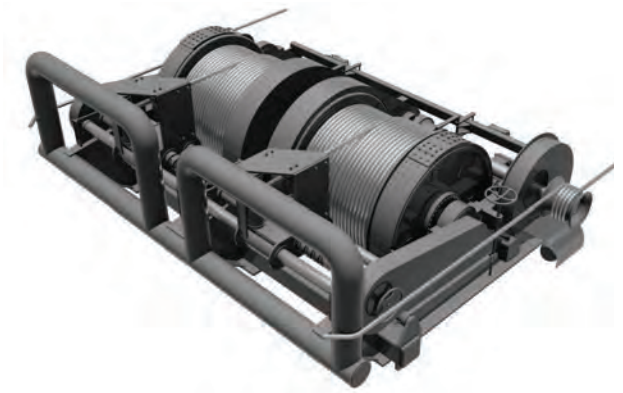
Hansa Heavy Lift transported a shiploader weighing over 560 metric tons from Nantong/China to Portland, Oregon for Sandvik Mining and Construction. HHL Richards Bay safely transported the shiploader, which measures 36.5m long, 56.4m wide and 31.5m high discharging it at the Port of Portland where engineers installed it onto the pier. “The biggest challenge was to lift the shiploader over the conveyor rail at the Port of Portland, while ensuring neither sustained damaged,” said Gareth Hamer, Head of Cargo Management, Americas, Hansa Heavy Lift. “We then completed the installation of the tripper car and portal under the direction of Sandvik. The discharge operation took place over five days and required detailed planning, as well as close cooperation with all parties involved.”

Hansa Heavy Lift engineers used three lifting beams to move the shiploader on and off the vessel at each port, as it only had lifting trunnions on one side. The size of the cargo and narrow width of the pier meant that the third lifting beam had to be lowered onto a barge after the discharge operation was completed. “Our specialized in-house team of naval architects, structural engineers and welding engineers with shipyard, offshore and installation background and the added benefits of our young fleet of vessels, enables us to customize solutions such as this for our customers,” said Joerg Roehl, Chief Commercial Officer, Hansa Heavy Lift.

Rapp Marine’s New Electric Tow Winch Design

Rapp Marine has more than a decade of experience of designing and delivering towing winches for workboat market, towing winches mainly powered using hydraulic systems. While some tugboat operators have maintained their preference for hydraulic driven winches, Rapp Marine recognized a growing demand in the workboat industry for electric driven winches and equipment for their new construction vessels, with electric winches offering advantages such as efficiency in energy consumption and environmental benefits. “We view this towing winch as a big step forward,” said Johann Sigurjonsson, president, Rapp Marine U.S., Inc. “Whether the operator prefers electric or hydraulic towing winches, we have the right winch for them.”

Rapp Marine has been delivering electric winches to commercial vessels in other industries such as research, oil & gas, and fisheries for years. Rapp Marine has designed a fully electric driven tow winch to meet market demand. Driven by a single 75, 100, or 125 HP motor, the winch can pull more than 50 tons and uses pneumatic cylinders in place of hydraulics, keeping the fluid off of the deck. The brakes offer a force of 250-300 tons on the barrel layer. The winch will feature an emergency payout system, and constant tension capability is available as an option. Both single drum and double drum towing winch designs have been developed.



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Ship Recycling

Where Ships Go to Die & Gain a New Lease on Life

By Tom Mulligan

(Photo-copyright NGO Shipbreaking Platform 2012)

Shipowners stand to recoup a substantial amount of their investment by selling ships for recycling, and the cheaper the recycling process, the more they make on steel. But bad breaking practices can cost more than just money and the shipping industry still has major ethical, moral, environmental and publicity issues to resolve when it comes to ship recycling. A recent IMMEDIASEA Shipping Debate Forum gave the watchdogs and the watched alike an opportunity to promote responsible practices as well as highlight persisting problems and the need for further change.

"In the beaching yards of Bangladesh, there is extensive pollution and no hazardous waste management. Workers experience poor working and living conditions and fatal accidents are a regular occurrence. Children and adolescents make up about one-fifth of the workforce, which is exposed to a high risk of cancer and occupational diseases. Another problem is the sheer scale of the task at hand, work being completed without heavy lifting equipment, structural supports or scaffolding, and there being virtually no mechanization. Dangerous conditions and practices also include poor downstream waste management, and the impossibility of containing pollutants on a tidal beach. There have been no substantial improvements on the ground."

This is how Patrizia Heidegger, Executive Director of the NGO Shipbreaking Platform, described Bangladeshi ship recycling conditions.

"The extent of workers injuries points out once again the total disregard on the employers' part for workers' safety," she said. "Ship-breaking yards in Chittagong are notorious for terrible work conditions and frequent accidents. Just this year, five workers have been killed in accidents and many have been severely injured at various shipyards in the district.

"It is unacceptable that an industry as huge and risk-prone as ship-breaking should still be in such a primitive state that allows these horrible accidents to occur. The apathy and negligence demonstrated by employers violate basic labor laws that make it mandatory for workplaces to maintain minimum safety standards."

The NGO Shipbreaking Platform is a global coalition of environmental, human and labor rights NGOs seeking to prevent dirty and dangerous shipbreaking practices and promoting clean, safe and just ship recycling. Heidegger cited its main achievements as putting ship recycling on the international agenda, with international and EU legislation now in place, greater awareness of the issues and industry transparency, and progressive shipowners and cargo-owners now demanding clean and safe recycling.

"More and more end-of-life vessels are now being recycled, a record number of

(Photo: Wilhelmsen Ship Management)

"Independent and qualified third-party supervision in the process of green recycling can assist responsible owners to achieve the objectives of green recycling"

Rakesh Bhargava, Head of Lay-up, Green Recycling & IHM Services at Wilhelmsen Ship Management

about 1,300 large ocean-going vessels being recycled in 2012," she said. "There are still a number of legal grey zones, for example the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships 2009 is not in force, the EU Ship Recycling Regulation is not applicable in many cases, export bans are often circumvented, and domestic law in these countries is weak or not implemented.

A major problem is that the majority of shipowners do not feel responsible. However, there are a number of best-practice examples, including Norwegian and Dutch ship owners, Maersk, Hapag Lloyd, Royal Dutch Boskalis, and oil and gas companies."

Another View on Ship Recycling

"It is important to be aware of the reality and other perceptions in ship recycling," said Nikos Mikelis of GMS Inc, a major purchasing company of ships for recycling. "The recent announcement by

Workers handling waste in Chittagong, Bangladesh.

(Photo copyright NGO Shipbreaking Platform 2014)

the Norwegian Shipowners Association that their members should not recycle their ships by the beaching method appears to vindicate the long campaigns of the NGO Platform, and also the position that was adopted by the Green Party of the European Parliament for an outright ban of beaching," he continued. "It also provides ample support to the European Commission on the viability of excluding all beaching yards in South Asia for the recycling of European-flagged ships. However well-meaning NSA's announcement may have been, it seriously undermines the improvements that are already taking place in South Asia's ship recycling industry. It also poses a question-mark over the feasibility of achieving a global regulatory regime for ship recycling under the standards of the Hong Kong Convention.

"The basis of the Convention is the recognition that shipping is a truly international business and, therefore, for a regulatory regime to be effective, it would have to have global application. Furthermore, as just five countries, consistently in the past 15 years, have recycled 97 percent of the world's recycled tonnage, the implementation of the Convention on a truly global basis is practically achievable.

"During the development of the Convention, the debate at IMO concluded that beaching should not be banned, because there is no evidence to suggest that ships cannot be recycled safely and cleanly on the beach; that banning of beaching would exclude 70% of the world's recycling capacity from the scope of the Convention and therefore it would thus fail to become a global standard; and banning of beaching would exclude the whole of South Asia, which is the region most in need for improved standards of safety and environmental protection," Mikelis said.

Stating the Facts

Ninety-five percent of a vessel's components are reused when a ship is scrapped. According to Gerhard Aulbert, Global Head of Practice Ship Recycling at advisory and consultancy company DNV GL, every year up to about 1,500 ships are recycled to rejuvenate the world fleet and regain valuable secondary resources such as steel, aluminum and copper. The majority of these vessels are recycled in Asian countries such as India, Pakistan, Bangladesh and China, with a smaller share going to yards in Turkey.

"The conditions under which recycling facilities dismantle the vessels vary," he said. "Depending on the yard, basic equipment such as helmets, shoes, protective gloves and masks are not provided to all workers. Hazardous materials such as heavy metals and fuel oils leak into the surf and the soil, polluting the area and creating serious health hazards for people working on-site.

"While there have been efforts to regulate the handling and disposal of hazardous materials, as in the Basel Convention 1989, and improve safety and environmental standards in ship recycling facilities, such as the Hong Kong Convention, they have proven to be difficult to enforce," he added. "For example, the Hong Kong Convention has only been ratified by three countries and is not expected to enter into force before 2020,

(Photo copyright NGO Shipbreaking Platform)

"More and more end-of-life vessels are now being recycled, a record number of about 1,300 large ocean-going vessels being recycled in 2012"

Patrizia Heidegger, Executive Director of the NGO Shipbreaking Platform

eleven years after it was adopted by the International Maritime Organization.

"Progress has been very slow until now. But the implementation of the European Ship Recycling Regulation will bring about some radical changes over the next few years. Of the roughly 60,000 ships worldwide, about two-thirds are affected by it."

Green Recycling, White-Listed

Rakesh Bhargava, Head of Lay-up, Green Recycling and IHM Services at Wilhelmsen Ship Management, described how the EU Ship Recycling Regulation dictates strict terms and conditions for green recycling in pre-approved white-listed ship yards. It was signed and approved by the EU Parliament and in force from December 2013 with companies needing to comply by December 2015. It applies to all EU-flagged vessels as well as vessels anchoring or visiting European ports. The main impact is that

Barrels on shore in Chittagong, Bangladesh.

(Photo copyright NGO Shipbreaking Platform 2014)

5 countries = 97% of ship recycling

Just five countries, Bangladesh, India, Pakistan, China and Turkey, perform 97% of the world's ship recycling. Bangladesh, India and Pakistan alone account for 70% of global business. The reason for this? It is due to the economics of steel production. Nikos Mikelis of GMS explains:

"The primary locations where ships are recycled are places where ferrous scrap is needed to be imported for making steel. Of course it is uneconomic for a small or damaged ship to sail thousands of miles to reach the main ship recycling centers, and for this reason ship recycling facilities also exist in many countries which have no need for ferrous scrap. Ship recycling in such cases can be seen as a service for disposing end-of-life ships, rather than an industry driven by the economics of steel making. Chinese imports of scrap steel have declined steeply and in this period the Chinese ship recycling industry has been surviving thanks to the government's policy to renew the Chinese fleet through substantial 'scrap and build' subsidies offered to Chinese shipowners. China does not allow beaching of ships and most yards are located on rivers with ships most often moored alongside a pier."

"Turkey is characterized by little usage of iron ore in its steel-making and by high demand for scrap steel. It has been, and it continues to be, the world's largest importer of scrap steel. In Turkey there is no rerolling of scrap steel, nor a vibrant second-hand market in equipment and machinery. Ship recycling in Turkey is restricted to a single beach in Aliaga, 60 km north of Izmir, where there are 22 recycling yards, each with about 50 meters' frontage to the beach. Turkey's capacity represents around 4 percent to 5 percent of the world's recycling capacity.

Pakistan produces little new steel, and most of this is by using iron ore. Nevertheless Pakistan's ship recycling industry has been growing fast in recent years, providing steel to the rerolling market, while enjoying the benefit of second-hand markets for machinery, equipment, spare parts, etc.

Bangladesh currently does not produce new steel. Its ship recycling industry provides scrap steel for the rerolling market which is very active due to the urbanization of this very densely populated country.

(Photo: DNV GL)

"I think we will see more of a division between the practice of recycling itself and the sale of recycled materials. At the moment, this is often still done by one and the same facility and shipowners often choose one that will fetch them a higher price for the recycled steel."

Gerhard Aulbert, Global Head of Practice Ship Recycling, DNV GL

Below: Workers on a partially dismantled vessel in Gadani, Pakistan.

Right: Sludge on Gadani beach, Pakistan.

Below Right: Dumped toxic waste in Gadani, Pakistan.

(Photos copyright NGO Shipbreaking Platform 2013)

it requires an IHM, a detailed document outlaying all potentially hazardous material onboard a vessel, for all vessels calling at European ports, and that green recycling will be mandatory for all EU-flagged vessels from 2015. By the end of 2016, all EU vessels going for recycling must have an IHM and, over the period 2015-2018, all new EU vessels must have an IHM. By December 31 2020, all EU existing vessels and non-EU vessels calling at EU ports must have an IHM. The EU SRR is in line with Hong Kong Convention requirements, with specifics for the EU region and EU-flagged vessels, and will be implemented without waiting for ratification of the Convention.

The key characteristics of a quality IHM are a detailed visual sampling check plan in which samples are gathered and clearly marked by qualified hazmat experts, with equipment types and models verified against original documentation. Proper IHM maintenance needs to demonstrated through an updated IHM.

The Regulation states the responsibility of ship owners clearly: “Ship owners shall be responsible for the ship and shall make arrangements to maintain that ship in compliance with the requirements of the administration of the Member State whose flag the ship is flying up until such time as the operator of the ship recycling facility accepts responsibility for that ship.”

General requirements for shipowners include the preparation of documentation with all ship-relevant information for the development of a Ship Recycling Plan by the operator of the ship recycling facility.

Shipowners should also ensure that ships are recycled at facilities included in the European list, these being yards that have been audited to ensure true compliance with the regulations. Weekly reports on recycling progress are required as well as a final document of completion, including an auditable trail for hazardous material.

“Independent and qualified third-party supervision in the process of green recycling can assist responsible owners to achieve the objectives of green recycling,” said Bhargava.

“Some ship recyclers have already upgraded their facilities, but most recycling facilities still violate the Basel Convention’s standards for disposing of hazardous materials and have a long way to go,” said Aulbert. He noted that while more sustainable practices are expected to increase the costs of ship recycling, the number of yards is expected to decrease in the long run, and shipowners could profit from the regulation: “I think we will see more of a division between the practice of recycling itself and the sale of recycled materials. At the moment, this is often still done by one and the same facility and shipowners often choose one that will fetch them a higher price for the recycled steel. The EU regulation allows shipowners to have a vessel recycled by one facility but sell their steel globally. This makes owners more independent from recycling facilities regarding the profit from the ship. The list of EU-vetted facilities will also give shipowners a better basis for deciding which recycling yard to use and can ensure that their vessels are scrapped in a sustainable way,” Aulbert concluded.

Scrapyard in Turkey – note the concrete floor but the absence of a proper drainage system.

(Photo: DNV GL)

The modern standard/future vision: A Chinese shipyard that builds, repairs and recycles vessels.

(Photo: DNV GL)

Heidegger said that the NGO Shipbreaking Platform recommends that shipowners only sell their end-of-life vessels to modern ship recycling facilities and use the future EU list as a reference: "They should have an inventory of hazardous materials on board before demolition and allow independent monitoring and audit of the recycling process, as well as full documentation and reporting of activities. There have been some improved yards in India, where there has been an honest evaluation of shipbreaking in the intertidal zone, with independent audits instead of self-certification and transparency and openess for researchers, but ship owners should not cooperate with actors involved in dirty and dangerous ship recycling, they should prefer facilities in the OECD if the vessel contains large amounts of hazardous waste or they should pre-clean the vessel as far as possible. Shipowners should also engage in green ship building.

"Ship recycling companies should operate from built structures, while operating in a way that prevents adverse effects on human health and the environment, including the demonstration of the control of any leakage, in particular in intertidal zones. It is essential to contain all hazardous materials during the entire recycling process and in addition only handle hazardous materials and waste generated during the recycling process on impermeable floors with effective drainage systems. It is also necessary to ensure rapid access for emergency response equipment such as fire-fighting equipment and vehicles, ambulances and cranes to the ship and all areas of the ship recycling facility," Heidegger concluded.

Improvements in South Asian ConditionsMikelis pointed out that over the past five years some improvements have taken place across the ship recycling industry in Bangladesh and also in individual recycling facilities whose owners have realized that higher standards will progressively be demanded, not only by regulations but also by shipowners selling ships to them:

"A lot still needs to be done, especially in the area of hazardous waste management and disposal and also on training for safety and environmental protection. IMO together with UNEP are currently implementing a Norwegian-funded project to help Bangladesh satisfy the technical requirements of Hong Kong Convention and in due time to accede to the Convention.

"India has made considerable progress, especially following the Supreme Court's judgment in the case of the 'Blue Lady' in September 2007. Since then, the industry has had to satisfy new national legislation requiring recyclers to conform to the Hong Kong Convention on matters relating to safety, training, waste management, and environmental protection," he said.

In two visits in 2015 to Alang, the primary ship recycling location in India, Mikelis witnessed significant improvements across the industry and stated a number of Indian recyclers are investing in safety measures, environmental protection and social welfare that are above statutory requirements. He also quoted Anil Sharma, President of GMS, who reflected on the announcement of NSA about beaching:

"It is interesting to note that negative stories or negative comments are generally made by people who have either never visited the yards in India or not visited them recently. On the other hand, those who have visited recently have made positive comments such as the Danish Shipowners Association and the Japanese Shipowners Association."

This controversial area will no doubt remain the subject of intense debate for some time to come.

For further information visit the following websites:

www.shipbreakingplatform.org
www.gmsinc.net
www.dnvgl.com/maritime
www.wilhelmsen.com/shipmanagement

SCHOTTEL's New Plant in Dörth

The Gowth of a Company, the Future of a Village

SCHOTTEL invests in new Rudderpropeller Plant and expands at the same time its production capacity

By Peter Pospiech

Germany's SCHOTTEL continued its successful course in 2014. With a global workforce of more than 1,200 it achieved sales of EUR $377.9m, a growth of around nine percent on 2013. In an environment, characterized by increasing competition and concentration, the strategy of the German propulsion specialists has paid off once again, and underlines the leading position that it has occupied in the marine propulsion system market.

The New Factory

"We call the new factory the most efficient Rudderpropeller plant in the world because efficiency has been achieved in every conceivable area here," explained Prof. Dr.-Ing. Gerhard Jensen, CEO of the SCHOTTEL group. "It begins with the connection to the existing traffic system and continues on to well thought-out logistics. This includes a completely roofed incoming goods and shipping area and an intelligent flow of materials based on an optimum overall layout of the factory. Quality assurance is directly next to incoming goods and shipping, and the distances for employees in production and production-related areas are short, despite the large size of the factory. Further efficiency gains and flexibility are, of course, also achieved through the versatility of the new machinery. The new factory provides us with the basis to cement and expand our worldwide leading position also in the future. When it came to the question where to build a new factory we decided to stay in our region in Rheinland-Pfalz. Here are our roots, and here are our employees" said Jensen.

"The establishment of SCHOTTEL shows clearly that the investment has paid off and different further companies already decided to build up new operations in Dörth", said Rheinland-Pfalz Economic Affairs Minister Eveline Lemke. "Young people do not see any professional opportunities and moving away. Companies like SCHOTTEL create long-term perspectives."

The new production facilities are the

Images (Clockwise starting right):
1. Vertical shaft production; **2.** Shrink fitting of shaft and bevel gear; **3.** Assembly of a Rudderpropeller; and **4.** Aerial view of the new SCHOTTEL plant.

1

2

3

4

"We call the new factory **the most efficient Rudderpropeller plant in the world** because efficiency has been achieved in every conceivable area here."

Prof. Dr.-Ing Gerhard Jensen, CEO SCHOTTEL

culmination of two years of construction time and a $49.6m investment, and includes four production and assembly halls (up to 270m long and 18m high) and a three-story building for administration, social and technical purposes. In total this amounts to 23,000 sq. m. of production and office space. The development of the industrial area "Budenbach," which is the new site of SCHOTTEL, has been supported by the Ministry of Economics by the European Fund for Regional Development (EFRE) with some $1.2m.

The new plant will comprise 290 jobs in production and administration, and about 20 young people will be primarily trained in the following professions: industrial mechanics, cutting machine operators, technicians and technical product designer.

The factory has been designed using the latest methods and is so versatile that it can be adapted to changing requirements over the long term. With the new site, SCHOTTEL will increase its production capacity by roughly 30%.

In addition, SCHOTTEL has invested heavily in a new machinery park. Thanks to the mechanical production facility, the company is able to efficiently produce all of the essential parts of the Rudderpropeller in-house. The largest multi-axis turning/milling center for the machining of structural support tubes (with a diameter of up to 5m) and gear box housings (with a machining height of 5m) offers a payload of 120 tons. The new cranes for lifting range from 10 to 50 tons are also noteworthy, and they can be retrofitted for up to 100 tons should this become necessary in the future. "This safeguards our know-how while ensuring availability and consistently high quality," said Jensen.

Besides the plant in Dörth, SCHOTTEL has further manufacturing facilities in Wismar (Germany) and Suzhou (China). They are all modern facilities and are regularly updated according to the state-of-the-art.

HW Elektrotechnik

Added to this, the new site of the SCHOTTEL subsidiary HW Elektrotechnik – with about 4,200

Preparation for painting in the new paint shop.

sq. m. of shop and office space – is nearing completion. Here, amongst others, the electrical equipment for the SCHOTTEL marine propulsion systems and controllers will be manufactured in the immediate vicinity of the Dörth plant. Product quality, energy efficiency, a healthy work environment and a forward-looking design were also important guidelines here.

HQ in Spay Expands

The headquarters of the SCHOTTEL Group will continue to be in Spay/Rhine. The company's service division will obtain new capacity here: the former production site will be used to accommodate the service warehouse, which was previously split across different sites. There will be a larger repair area with separate mechanical production facilities. A paint shop as well as a test and development shop will also be available. With short lines of communication and efficient logistics, SCHOTTEL will thus be able to respond to customers' requirements even more quickly in the future.

Also the well-established SCHOTTEL Academy remains in Spay. Since Q3 2014 customers can exercise their handling and knowledge of SCHOTTEL propulsion systems in the SCHOTTEL Academy by using a training simulator. Academy participants are seated as if they are on the bridge of a real vessel, learning how to operate safely with the different SCHOTTEL propulsion systems, control levers, operator panels and displays.

New SCHOTTEL-EcoPeller

With the newly developed SCHOTTEL-EcoPeller (SRE) the company gears up to meet the continuously increasing requirements of environmental and safety regulations as well as emission restrictions. Expanding environmental areas minimized operating costs and pollution emissions as well as crew comfort play an important role here. At the same time technical aspects like a high overall efficiency, course keeping stability and precise positioning in the DP mode are significantly influencing the future of the shipping industry.

The new SRE will be suitable, according to company information, for applications on the open sea as well as in coastal areas. The SRE combines proven SCHOTTEL quality and technology with the latest, hydrodynamic insights from CFD simulations and model tests.

The company explains that, as a result, the new EcoPeller offers top value for the overall efficiency and course keeping stability of the ship and thus enables future owners to achieve lower fuel consumption – not to mention low operating costs and low emissions.

The SRE is based on the SCHOTTEL SCD design principle: a vertical electric motor integrated into the Rudderpropeller. This eliminates the upper of the two angle gears as well as any necessary shaft lines. On board, the EcoPeller offers unbeatable comfort thanks to extremely low vibration and low noise levels, explains SCHOTTEL.

Besides an in-house, ready-for-installation assembly with a highly efficient electric motor from SCHOTTEL, the EcoPeller will optionally be available with additional electric motors according to customer needs.

SCHOTTEL says, the EcoPeller will be available from mid-2016 onwards in a variety of sizes for power ratings between 1,000 kW and approximately 5,000 kW, each as FP and CP variants.

Work on the Amsterdam Canals

Anyone who has ever visited Amsterdam can certainly attest to the unique nature of the city and its inhabitants. But this doesn't end on the streets, as the cities extensive canal system and the sightseeing ferries that ply the waterways are an indelible feature of the city. Time to comply with new emissions output regulations has now expired for Amsterdam's famous sightseeing ferries, but with the help of marine power provider Volvo Penta, it iss still business as usual on the canals of the Dutch capital — and now NOx emissions are down by as much as 45%.

In 2005 Amsterdam's local governing body laid down an ultimatum for operators of the city's famous glass sightseeing water ferries — as of January 1, 2015, all boats of this kind had to either be fitted with a repowered engine and aftertreatment system, or replaced by an electric alternative.

Terlouw Rotterdam, the Volvo Penta Center in the Netherlands, worked with Slot Jachtbouw, an Amsterdam shipyard, between 2012 and 2014 to systematically swap out many of the old engines and replace them with repowered new ones that are fitted with STT Emtec's marine DNOx after-treatment system.

Since repowering ended at the beginning of this year, a total of 50 out of 150 canal boats operating on Amsterdam's waterways are powered by Volvo Penta D5A TA marine diesel engines, including ferries operated by Canal Company, Blue Boat, Rederij Kooij and Rederij Lovers.

"Amsterdam is one of the most popular urban tourist destinations in Europe — thousands come every year to experience the magic of this city," explains Jeroen van Liefland, sales manager for Terlouw Rotterdam. "The canal boat operators needed to find an engine and aftertreatment combination that met the requirements of the local authorities and didn't result in a long repowering process that would cause costly downtime. Volvo Penta and STT Emtec proved to be a winning combination."

Prior to the repowering operation — which fitted the ferries with 4-cylinder engines — the ferries ran on 6-cylinder engines. This additional power was less of a help and more of a hindrance; because the speed limit on the Amsterdam canals is only 6 kph, the sightseeing vessels had a very low specific load profile. But with Volvo Penta's engines, the ferries can run at a higher load at low speed limits, resulting in higher exhaust temperatures. These high exhaust temperatures allowed for the use of the DNOx aftertreatment system, developed by STT Emtec.

Aftertreatment

The D5 engines were fitted with a marine DNOx system, which reduces NOx by diluting the charge air with recirculated exhaust gas. The amount of NOx being produced since the repowering project has significantly declined — thanks to Volvo Penta and fellow Swedish company STT Emtec.

The exhaust gas recirculation (EGR) system operates with a patented EGR value, which precisely controls the exhaust and inlet air mixture. In addition, the CCT active uses the on-board fuel as a reacting agent to help control the soot loading in the diesel particulate filter (DPF).

Soot can be burned automatically when exhaust temperatures are high enough but, given the low speed limit in the city, which prevent the exhausts from consistently reaching high temperatures, the CCT active controls soot buildup at lower temperatures. Using the system, the engine's carbon monoxide, hydro carbon and carbon particle emissions are all reduced by up to 90%, and NOx emissions are reduced by up to 45%.

Together, Volvo Penta and STT Emtec tested the D5 engine with and without the DNOx system, and found the results to be exceptional. The D5 engine's lower fuel consumption and cleaner performance, coupled with STT Emtec's advanced system, are helping Amsterdam work towards its goal of becoming a zero emission city by 2025.

MAN Diesel & Turbo's New Test Center

Inauguration of one of Europe's most advanced, eco-friendly Test Centers for diesel engines

By Peter Pospiech

MAN-Chief Dr. Uwe Lauber, who heads the company since the beginning of this year, came to Frederikshavn, Denmark, to open the new test center for diesel engines. The new diesel engine testing facility is strategically- located at the northern tip of Denmark, and vessels of different sizes can reach the MAN Test and Service Center which courtesy of a direct access to the water.

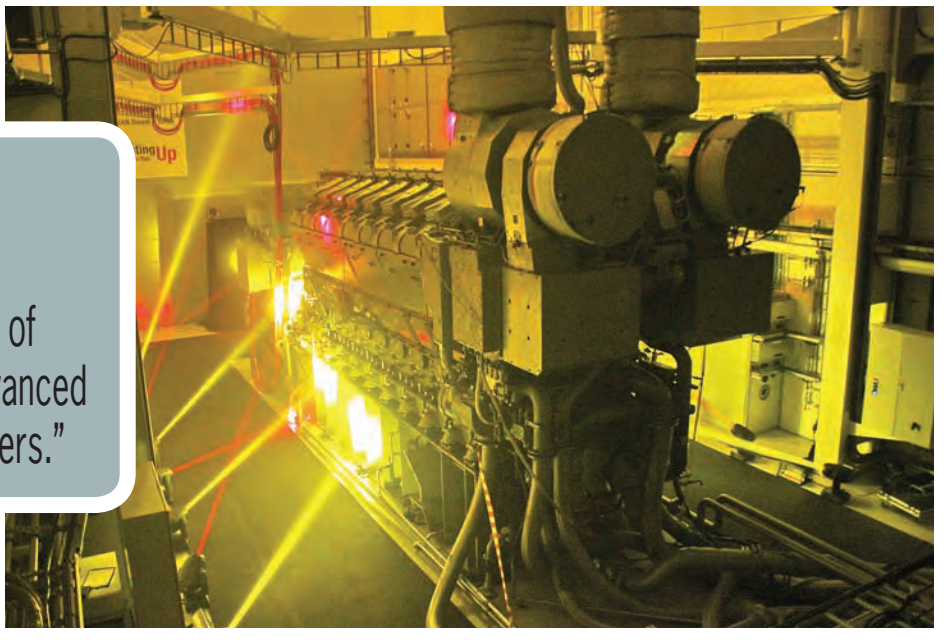
In recent years MAN Diesel & Turbo Frederikshavn has expanded and modernized its Test Center for diesel engines and generator sets for ships, power plants and offshore installations, and today some 150 employees are working here. "Depending on the market situation we will increase our workforce," said Poul Knudsgaard, Head of PrimeServ Four-Stroke Denmark.

Dr. Lauber said "We now have one of Europe's most advanced maritime test centers with, for example, an inclination test bench, which can tilt a generator set weighing 200 metric tons to an angle of 25 degrees while running. These inclination tests are particularly relevant for the offshore sector, which has stringent requirements with regard to reliability and performance in extreme conditions."

Dr. Lauber said, in regards to the aim of the test center: "Presently we are only mounting the 32- & 35-bore engines assembled in Augsburg on a baseframe together with a generator (both baseframe and generator is delivered direct from sub supplier to Frederikshavn) in order to make a complete generator set that is then tested here. Complete GenSet's could not and cannot be tested in Augsburg. When performing the full GenSet test in Frederikshavn we can deliver the ready-to-install product direct to the harbor area in Frederikshavn (in one piece up to 200 tons) and afterwards transported direct to the shipyard. Also the inclination bench tests are only possible here in this new facility."

"Soon we also will start with the production of our brand new MAN 175D high speed engine, introduced to the public at the last SMM show in Hamburg, here at the Frederikshavn plant," said Dr. Matthias Schlipf, Project Manager of MAN 175D, during the inauguration event.

MAN-Chief Dr. Uwe Lauber
"We now have one of Europe's most advanced maritime test centers."



Danish Prince Joachim opens the new test center.

”The site Frederikshavn is the expert center of MAN Diesel & Turbo for small bore engine production and marine system competence (control lever & propellers). Deliveries of MAN 175D engines will start in the early months of 2016,” he said. ”During early 2015, the first major inspection of one of the prototype engines was carried out, in which the engine was stripped completely apart. The inspection showed very good results, signaling that the engines are ready for the first customer projects. In summary, the engine validation program is on track and hence, several 1000 hours of validation could be ensured before the first engines are in operation. We are sure that we can thereby demonstrate a high standard of reliability from day one”.

The Opening Event

Around 150 MAN business partners witnessed the inauguration ceremony of the new Test Center, which was officially opened by Danish Prince Joachim. Prince Joachim was clearly impressed reviewing one of the big MAN gensets, the engine a 16 cylinder common rail engine type MAN 16V32/44CR.

The test center is able to recover the energy from the engine testing for the benefit of the local community. This is part of the companies targets on energy efficiency and environmental sustainability. As Dr. Lauber said: ”We convert the energy from the test center, which would otherwise just go to waste, and as a first step, we use it to heat at least 200 households via the district-heating network.”

The MAN 16V32/44CR engine has an output power of 9,600 kW and the electrical output is about 9,400 kWe from the generator (GenSet power at 100%). This corresponds to 13,500 HP. The complete GenSet weighs 140 tons.

On the inclination test bench is a MAN 7L35/44DF. Engine and generator assembled and tested on a common baseframe – as a complete GenSet, shipped and delivered to the customer as one unit.

The engine output power is 3,570 kW (510 kW/cyl) when running at 720 rpm, 60 Hz. The electrical generator output is of 3,470 kWe. The fuels burned in this dual fuel engine are both diesel and gaseous fuels.

Heat Exchange to the City Grid

Waste energy from engine testing is the main protagonist in Test Center Frederikshavn’s heat recycling system. The waste energy is converted to hot water, which heats up homes in the city of Frederikshavn. This way, the inhabitants of Frederikshavn not only benefits from having an international knowledge and service company in its midst, with the resulting demand for local jobs and regional trade, 200 families will also benefit directly from MDT’s engine testing. The maximum heat transfer is around 10,000 kW. Delivered energy to the city grid since commissioning early 2015: approx 2,265 MWh – corresponding to heating of 120 households. The annual target for 2015 will be 200 households. When in full swing (next two years) up to 1,000 households/yearly are heated.

MAN 32/44CR Engine for Trawler Newbuild

Voyager Fishing Company, Ltd., based in Kilkeel, Northern Ireland, ordered a new trawler/purse seiner for delivery in 2017, designed by Salt Ship Design in Norway and to be built at Karstensens Skipsværft in Skagen, Denmark. The boat will be powered by a MAN 12V32/44CR main engine, driving a 4,400-mm ø MAN Alpha VBS 1100 propeller via a two-speed RENK Type RSVL1000 gearbox, managed by an Alphatronic AT3000 remote control system.

Voyager will be one of the most powerful pelagic-fishing vessels in the world with a bollard pull of more than 120 ton and commented on its very high efficiency when comparing the bollard pull with the size/power of the engine, according to Tage Rishøj, Director, Karstensens. “The engine has gained a good foothold in the market for its flexibility, low levels of noise/vibration, reduced smoke during engine start and operation, and is already building a reputation as an excellent workhorse. We are also very pleased with how well the common-rail system has performed in this key segment.”

Voyager will replace the existing 75.6-m vessel of the same name that Karstensens built in 2010, and represents the largest vessel built at the shipyard to date. Upon completion, the 86.4-m fishing vessel will have a loading capacity of more than 3,200 cu. m. Notably, when comparing the two vessels, the newer model’s larger, optimized propeller means that the shipowner has been able to employ a smaller engine, despite the larger newbuild.

Bearings

COMPAC for Containership

Thordon’s COMPAC for U.S.’ Largest Containerships

Thordon Bearings signed a contract to supply COMPAC seawater-lubricated propeller shaft bearing solutions to two Jones Act containerships under construction at the Aker Philadelphia Shipyard Inc. (APSI) for Matson Navigation Company, Inc.

The order represents the first large containership reference for the manufacturer and the largest commercial ship propeller shafts to be fitted with COMPAC bearings, Thordon noted. The 3600TEU Aloha Class vessels, the largest Jones Act containerships ever built, will each feature a COMPAC bearing system for a 930mm diameter shaft driving an 8.1m diameter fixed pitch propeller.

“The COMPAC solution is very much in keeping with Matson’s environmental and sustainability objectives,” said Craig Carter, Thordon Bearings’ Head of Marketing and Customer Services. “As with all its vessels, the Aloha-class will feature a number of environmentally safe technologies, but the addition of seawater-lubricated shaft bearings will reduce even further the impact its operations have on the marine environment. Our COMPAC system obviates completely the risk of non-compliance with U.S. Vessel General Permit stern tube oil to sea interface rules and ensures that the vessels can operate safely, responsibly and legally in U.S. waters.”

The U.S. Environmental Protection Agency (EPA) ruled in December 2013 that vessels over 24m must adopt environmentally acceptable lubricants (EALs) in all oil-to-sea interfaces before their next drydocking, recommending that seawater lubricated bearings be used in propeller shaft lines.

Each 259-m long, DNV GL classed vessel features double hull fuel tanks, a freshwater ballast system and an energy-efficient hull form and a dual-fuel propulsion system future-proofed for conversion to LNG. Main engine output is rated at 38,000kW at 84 rpm to deliver a service speed of 23 knots.

Thordon’s scope of supply includes COMPAC elastomeric bearings with a tapered keyset, a Thordon Water Quality package, bronze liners and Thor-Coat shaft coating, meeting classification requirements for extended shaft withdrawal periods. When delivered from the Aker Philadelphia Shipyard in the third and fourth quarters 2018, the Aloha newbuilds will enter service on Matson’s West Coast-Hawaii route in anticipation of an increased demand for higher cargo capacity and diversity.

www.thordonbearings.com

AIS as an Asset Monitoring Tool

With the August 2015 launch of an innovative new pipeline safety program in Port Fourchon, Louisiana, Automatic Identification System (AIS) data has cemented its role as one of the most powerful resources available for pipeline and broader asset protection initiatives. The Coastal and Marine Operators (CAMO) pipeline alert system and numerous other private-sector programs are demonstrating the value of using AIS data to monitor vessel activities around pipelines and other infrastructure, alert stakeholders when there is danger, and generate the analytics necessary for risk assessment and asset-management resource allocation and other decisions. In addition, the use of AIS data is quickly being extended to include monitoring and preventing encroachment and damage to a broader range of infrastructure including subsea cable and other remote un-manned assets, as well.

Safety First

One of the first applications for AIS-based asset protection is pipeline safety programs. Today's marine pipeline incident costs an average of at least $1 million to repair, not counting reputational damage and the incalculable costs of injury or death, making infrastructure protection increasingly important. By enabling companies to proactively monitor and control encroachment on marine pipelines, AIS-based vessel-tracking tools help pre-empt problems before they occur. These tools are significantly more useful than surveillance fly-overs, which are generally not conducted frequently enough to observe the majority of in-progress threats to the pipeline infrastructure. Relying on fly-overs, alone, also doesn't provide a way for pilots to precisely identify infrastructure location and/or whether nearby vessels are encroaching and posing the threat of a strike. Nor can fly-overs help identify problems before they occur, or assist with identifying any possible responsible vessels or activities associated with the incident. Fly-overs are also insufficient for assessing long-term vessel traffic patterns and associated risk.

Another alternative is to use vessels on the waterway for inspection and surveillance, but they generally aren't where they need to be when a pipeline strike is imminent. There also is the option of public participation in the 811 "call before you dig" telephone notification service and other surveillance and reporting programs, but these initiatives still can't provide the necessary real-time, round-the-clock visibility across the entire pipeline infrastructure. Even when a work area has been declared clear of pipelines, supporting vessel traffic and activity can easily threaten nearby pipelines that weren't part of the original approved work area. The solution to this gap in information and monitoring capability is to use AIS-based technology to continuously monitor all vessels in every pipeline "zone of interest".

This approach has already been demonstrated by CAMO with its marine safety and pipeline alert system, developed in partnership with the Greater LaFourche Port Commission and Oceaneering. Oceaneering's PortVision AIS-based vessel-tracking service is used to monitor two charted pipeline corridors north and south of Port Fourchon that pass under its main navigable channel. When the PortVision service shows that a vessel is operating at a speed less than .5 knots for three minutes or more within one of these corridors, an addressed, one-time AIS Safety Related Message (also known as message 12) is immediately transmitted directly to the vessel's wheelhouse that says, "PIPELINE BELOW."

To implement the CAMO marine safety and pipeline alert system, Port Fourchon and Oceaneering incorporated all pipeline maps into the PortVision vessel-tracking tool. Based on each specific pipeline segment, alerting parameters and criteria were determined and built into the solution, including vessel speed in or near zones of interest and duration of time spent near the pipeline segment. These and other variables can be problem indicators that should be scrutinized.

Extending AIS to Risk Analytics

One of the highest-value uses for AIS data in pipeline and asset protection programs is for optimizing decision-making around inspections, permitting and planning. Kinetica Partners LLC has taken this approach in managing more than 1664 miles of pipe serving producers in and near the Gulf of Mexico. The company has incorporated data from its AIS-based pipeline monitoring system into their risk-based inspection program, which focuses on assets in water less than 15 feet deep where there is a greater chance of exposed pipeline or navigation hazards. There are about 50 such locations, roughly 90 percent of which are in remote areas that had typically been inspected via helicopter at costs averaging $3,000 per flight.

AIS vessel-tracking data gives Kinetica both the real-time and historical data it needs to make significantly better resource allocation decisions. The company no longer wastes budget on fly-overs where there are very low traffic volumes, and has the necessary information to schedule more frequent inspections of higher-risk locations.

In some cases, the company has determined through an integration of AIS data with other data that threat risk levels in a given area are acceptable and it could reduce re-directing inspection resources there to other uses.

Kinetica also now has access to historical AIS data with which to further analyze the most effective notification parameters for monitoring and managing pipeline threats. There is also the option to receive alerts when pipeline segments hit traffic thresholds that could potentially warrant changes to inspection and vessel notification policies. Historical data can also provide insight into specific vessels and fleets that appear to regularly operate near assets, to assist in targeting awareness and prevention efforts.

Another analytics application using historical AIS data is to inform decisions about permitting and whether to seek an emergency coastal zone permit for a location with high vessel traffic. The data also can be used to examine notification procedures and determine whether the standard USCG "notice to mariners" will suffice or another communication mode should be employed. Other valuable uses are for improving decisions

One of the first applications for AIS-based asset protection is pipeline safety programs. Today's marine pipeline incident costs an average of at least $1 million to repair, not counting reputational damage and the incalculable costs of injury or death, making infrastructure protection increasingly important.

about regulatory compliance, training, and where to install new pipeline based on historical vessel traffic patterns.

In the event of an emergency, AIS data can also be one of the first sources of corroborating information. For example, a pressure drop reported by an operator's pipeline flow monitoring system might indicate a major rupture in a remote area. Decision-making can be difficult in the absence of eyewitnesses. But by reviewing historical AIS data, it is possible to not only confirm the event but also to identify the responsible vessel, assess prevailing traffic patterns and optimize response planning and implementation.

Protecting Other Assets

Several oil companies are extending the use of AIS-based tools beyond pipeline protection to include monitoring and preventing encroachment and damage to a broader range of infrastructure such as unmanned platforms and subsea cables. Additionally, AIS is being combined with radar and other data sources to enable the owners of remotely operated fixed structures to establish a virtual "watch team" over multiple remote assets, anywhere in the world.

Pipeline safety continues to grow in importance for oil companies. Traditional surveillance methods can now be augmented with AIS-based vessel tracking tools that provide real-time visibility in all areas where encroachment could lead to a pipeline strike. AIS-based tools also provide an automated alerting system when a strike may be imminent, and a collaborative platform for assessing risk, determining next steps and coordinating action.

The Author

Jason Tieman, Director of Maritime Operations for PortVision/Oceaneering, has served as a professional mariner on various commercial vessels. His maritime knowledge and experience has been critical in the development and implementation of PortVision and other custom software solutions for the maritime industry. Tieman maintains an Unlimited Tonnage Third Mates License, earned a BS in Marine Transportation from Texas A&M University Maritime Academy and a MS in Quality Systems Management.

Shakedown @ Sea New Ships Join RV Fleet

The nation's newest oceanographic research vessel, the R/V Neil Armstrong (AGOR 27), has completed acceptance trials, and the U.S. Navy turned the ship over to Woods Hole Oceanographic Institution (WHOI) on Sept. 23, which will operate the vessel as part of the U.S. Academic Research Fleet (ARF).

"The U.S. Navy is proud to support the national research fleet by delivering state-of-the-art research vessels like the R/V Neil Armstrong," said Chief of Naval Research Rear Adm. Mat Winter about the event. "The Navy's innovative scientific mission will directly benefit from the fielding of this next-generation research ship focused on maritime technology discoveries and break-through capabilities."

Sister ship R/V Sally Ride (AGOR 28) will join the fleet next year and will be assigned to Scripps Institution of Oceanography.

The new ships will replace R/V Knorr (AGOR 15) and R/V Melville (AGOR 14) as part of the Navy's portion of the ARF. Both ships have reached their expected service life, but they are still capable science platforms.

"During their 45-year careers, they sailed millions of miles and supported significant oceanographic projects," said Program Officer Tim Schnoor, who oversees Office on Naval Research's (ONR's) oceanographic research vessel programs.

"These two vessels are destined for additional oceanographic service, as they will be transferred to the navies of Mexico and the Philippines respectively," says Schnoor.

According to Schnoor, the new deep-ocean, general-purpose research vessel will study ocean chemistry and geology, underwater acoustics, marine biology and ecosystem management, and marine technology development. "There is still much to be learned about our oceans and the Neil Armstrong will certainly be a part of many future discoveries."

With its crew of 20, the 238-foot vessel can conduct science expeditions up to 40 days for as many as 24 scientists and research staff.

"The Neil Armstrong and Sally Ride will support the current practice of oceanographic research with both shallow water and deep ocean multi-beam bottom mapping sonars, multiple acoustic-doppler current profilers, and the latest over-the-side handling gear for collection of ocean samples. The vessels themselves represent the latest in research vessel design and construction to support science operations, minimize cavitation noise impacting sonar operations, and maximize safety and stability for science operations in higher sea states," Schnoor says.

The six Navy-owned vessels are charter leased to U.S. oceanographic research institutions.

The U.S. ARF includes six Navy oceanographic research vessels known as Auxiliary General Purpose Oceanographic Research (AGOR) vessels. These vessels are purpose-built to commercial standards, classed by the American Bureau of Shipping, and certified by the United States Coast Guard for oceanographic research.

In addition to the new ships, the Navy's research fleet include R/V Thomas G. Thompson (AGOR 23), operated by the University of Washington: R/V Roger Revelle (AGOR 24), operated by Scripps Institution of Oceanography; R/V Atlantis (AGOR 25); operated by Woods Hole Oceanographic Institution; and R/V Kilo Moana (AGOR 26), operated by the University of Hawaii.

According to Schnoor, oceanographic research vessels within the U.S. ARF are owned by federal agencies (the Navy and the National Science Foundation) and state institutions, such as universities. Vessels are leased to competitively selected, oceanographic research institutions via charter party agreements or cooperative agreements for a period of five years, and are generally renewable with the same institution for the service life of the vessel. The vessels are operated and maintained by licensed mariners hired as university employees. Operations and maintenance costs are sponsored by federal agencies who sponsor the scientific research carried out on the vessel. Depending on vessel size and capability, and the scientific objectives, vessels generally complete from 10 to 25 separate cruises annually lasting from a few days up to two months.

Cruises take place the world over, in every ocean, major body of water, the Great Lakes, in U.S. and foreign exclusive economic zones (EEZs), says Schnoor. "Teams of scientists accompany the research vessel and crew on planned science cruises. The teams are headed by a chief scientist, and can include from a few to as many as 35 other scientists from the same or different in-

(Courtesy of Dakota Creek Industries, Anacortes, Washington.)

Dakota Creek built the nation's newest oceanographic research vessel, the **R/V Neil Armstrong** (AGOR 27), which completed acceptance trials. Tthe U.S. Navy turned the ship over to Woods Hole Oceanographic Institution (WHOI) on Sept. 23, which will operate the vessel as part of the U.S. Academic Research Fleet (ARF).

stitutions. The chief scientist is responsible for planning the research objectives of the cruise, ensuring the data and samples are collected, and assisting the crew in the operation of the oceanographic mission equipment. In an effort to maximize the effectiveness of cruises, and to economize on cruise costs, vessel scheduling is coordinated by the University-National Oceanographic Laboratory System (UNOLS) with the UNOLS vessel operators as part the U.S. ARF. For cruises pursuing science objectives in foreign EEZs, vessel operators coordinate cruise schedules and science objectives with the US State Department, which coordinates these requirements with foreign ministries."

"The assignment of Naval auxiliaries to academic institutions for oceanographic research purposes traces back to the post-WW II era when surplus Navy support vessels were donated to oceanographic institutions, and modified to support federally sponsored oceanographic research activities," says Schnoor. "Navy research vessels have been purpose built to commercial standards since the 1960's, and as with just about all Navy auxiliaries, they are not crewed by US Navy personnel, but rather licensed, civil mariners."

UNOLS

The University-National Oceanographic Laboratory System (UNOLS) is a non-profit consortium of U.S. oceanographic research institutions, formed in the early 70's to assist in the effective and optimized scheduling and operation of the U.S. ARF. Membership includes both research vessel operating institutions and non-operator institutions.

A support staff and office are currently hosted at the University of Rhode Island Graduate School Of Oceanography, sponsored and funded by the National Science Foundation, the Office of Naval Research, and the National Oceanic and Atmospheric Administration (NOAA), the Bureau of Ocean Energy Management and the United States Geological Survey. UNOLS is governed by a chartered Council representing member institutions, and includes nine committees chartered to support the operations of research vessels and the scientific endeavors supported by the vessels. The committees support the following areas of vessel operations: cruise scheduling, vessel operations, vessel technical enhancements, fleet improvement. Vessel-based scientific disciplines in deep submergence, seismic oceanography, airborne oceanographic research, Arctic operations, and ocean-based observing systems are supported by individual committees, which meet twice annually and provide direction and planning for optimizing science operations and future improvements.

According to Jon Alberts, UNOLS executive secretary, the research community is looking forward to the new Neil Armstrong and Sally Ride. "The new ships will take advantage of advances in technology. They will have more efficient propulsion systems, have improved crew and science staff habitability, be more environmentally friendly and be quieter research platforms. The ships will have better navigation systems and state of the art dynamic positioning. Automated handling systems will streamline launch and recovery of scientific instrumentation, requiring fewer people and conducting those evolutions

(Photo courtesy of Gary McGrath, WHOI)

ROBOTICS FOCUSED

The focus of the November "Chief Scientist" cruise will be a UNOLS Robotic Platforms Chief Scientist Training Cruise, will focus attention on integration of robotic platforms (i.e. ROV, AUV, UAV) into the training cruise.

more safely."

UNOLS is working with NSF to plan and develop the next regional class research vessel to replace the existing coastal class of vessels.

ONR, NSF and NOAA will sponsor the next meeting of the International Research Ship Operators (IRSO) in October, to be hosted by Scripps Institution of Oceanography in La Jolla, Calif. UNOLS will coordinate the agenda and logistics of this annual gathering. The IRSO meeting brings together operators from around the world to share lessons learned, discuss common problems and solutions, and learn about new ship builds. "We're making a concerted effort to coordinate research vessel schedules across nations to maximize utilization and help each other whenever we can," Alberts says. "We're also facilitating barters where nations can use ships that may already be conducting missions in their geographic areas of interest, thereby reducing transits to the far corners of the globe.

Chief Scientist Cruises

Alberts says UNOLS institutions is conducting Chief Scientist two training workshops and cruises this year, sponsored by both the National Science Foundation and ONR, to provide early career scientists, post-doctoral candidates and graduate ocean science students an opportunity to prepare themselves as the next generation of chief scientists. "They spend a few days alongside the pier in a workshop setting to learn how to plan shipboard field work, how to request ship time, and the mechanics of leading a research cruise. They then they go out for a week or so to go through steps executing a planned science mission underway."

The next program will take place in Lewes, Delaware, home port of the University of Delaware's RV Hugh Sharp, and will include a five day cruise on the Hugh Sharp to locations along the eastern seaboard as well as Delaware Bay and Chesapeake Bay.

The focus of the November program at UDEL will be a UNOLS Robotic Platforms Chief Scientist Training Cruise, will focus attention on integration of robotic platforms (i.e. ROV, AUV, UAV) into the training cruise. While there will be platforms provided, participants are encouraged to bring their own platforms and systems, providing an opportunity to operate their own instrumentation and collect preliminary data to potentially initiate their own novel research projects or programs." "This cruise and a pre-cruise information workshop will instruct early-career marine scientists—including senior PhD students, postdocs, and first or second year faculty members–on how to effectively plan for, acquire, and utilize time at sea for multi-disciplinary research and education," he says.

Participants have found the training to be valuable.

Diane Adams, PhD, of the Institute of Earth, Ocean and Atmospheric Sciences at Rutgers University in New Jersey, says the chief scientist training cruise provided an opportunity to get a behind the scenes look at what it really takes to prepare and run a cruise. "Often, we get the hands on training on the at sea technical work, but there are important tricks for the management and personnel side that make a cruise a success."

Amanda Nicole Netburn, a PhD candidate in biological oceanography at

Scripps Institution of Oceanography at the University of California San Diego, says many students do not become actively involved in research cruises until it is time to start loading the ship, which it turns out is typically a year or more after the planning begins. "The UNOLS Chief Scientist Training program taught me that there is so much more to the process of planning and executing a successful expedition that will greatly benefit my own research programs into the future. Participating in the program was an enlightening opportunity to learn about the details of cruise planning all the way from making ship time requests in proposals to always walking off the ship with all data in hand."

"There is no better way to learn about this process than working directly from UNOLS and NSF staff, the Marine Technicians, and experienced PIs. I believe my future research cruises will be far more efficient than they otherwise would be due to the knowledge with which I am now equipped through this training," Netburn says. "On top of all that, I collected ancillary specimens of deep sea fishes for my research, met a group of bright and friendly young scientists, and got to spend a few more days of my life in my favorite place in the world- the sea!"

Arctic Research

UNOLS has a standing Arctic Icebreaker Coordinating Committee that works closely with the Coast Guard and the polar science community. "The committee serves as a liaison between funding agencies and the Coast Guard to make the best use of the USCGC Healy as a research vessel, and to improve its science capabilities," Alberts says.

The Coast Guard has two heavy Polar-class icebreakers that also have science capabilities, but has struggled to keep at least one of them operational. President Barrack Obama recently called for new icebreakers, but building new ships for the polar regions is costly.

"We expect we'll be asked to help develop science mission requirements for the new icebreaker class," Alberts says.

Speaking in Alaska, President Barak Obama called for an accelerated procurement of new Coast Guard icebreakers. "These heavy icebreakers will ensure that the United States can meet our national interests, protect and manage our natural resources, and strengthen our international, state, local, and tribal relationships," the president said. But the vessels will cost an estimated $1 billion each, and Congress has not approved the funding.

By Edward Lundquist

Meet the RV Fleet

Operating Institution	Ship	Owner	Length (ft.)
GLOBAL CLASS SHIPS			
University of Washington	THOMAS G. THOMPSON	Navy	274
Scripps Institution of Oceanography	ROGER REVELLE	Navy	274
Woods Hole Oceanographic Institution	ATLANTIS	Navy	274
University of Alaska Fairbanks	SIKULIAQ	NSF	261
Lamont-Doherty Earth Observatory	MARCUS LANGSETH	NSF	235
OCEAN/INTERMEDIATE CLASS SHIPS			
University of Hawaii	KILO MOANA	Navy	186
Oregon State University	OCEANUS	NSF	177
University of Rhode Island	ENDEAVOR	NSF	185
Scripps Institution of Oceanography	NEW HORIZON	SIO	170
Bermuda Institute for Ocean Sciences	ATLANTIC EXPLORER	BBSR	168
REGIONAL CLASS SHIPS			
University of Delaware	HUGH R. SHARP	UD	146
COASTAL/LOCAL CLASS SHIPS			
Scripps Institution of Oceanography	ROBERT GORDON SPROUL	SIO	125
Louisiana Universities Marine Consortium	PELICAN	LUMCON	116
University of Miami	F.G WALTON SMITH	UM	96
Skidaway Institute of Oceanography	SAVANNAH	UG	92
University of Minnesota - Duluth	BLUE HERON	UMD	86
University of Washington	CLIFFORD A. BARNES	NSF	66
NOAA GLOBAL CLASS VESSEL (scheduled in cooperation with UNOLS)			
NOAA	RONALD H. BROWN	NOAA	274
USCG ICEBREAKERS (scheduled in cooperation with UNOLS)			
USCG	USCGC HEALY	USCG	420
USCG	USCGC POLAR STAR	USCG	399
USCG	USCGC POLAR SEA	USCG	399

Something Old is Something New

Celestial Navigation Returns to USNA

Picture this: A naval vessel is navigating the high seas thousands of nautical miles from land. Suddenly all navigation systems become inoperable. What happens next? What does this mean? The Navy looks to its past to chart its future. With today's technology rapidly advancing, the Navy realized that many basic techniques are still relevant to safe operations at sea.

Celestial Navigation (CELNAV) is one skill that has not been formally taught to Navy officers, depending on one's commissioning source, for more than 15 years. Officer Candidate School did not teach CELNAV, NROTC stopped teaching it in 2000 and the Naval Academy removed it in 2006.

Based on direction from the Chief of Naval Operations, CELNAV has been reinstated into the navigation curriculum and is a requirement in the Officer Professional Core Competencies Manual. The Naval Academy resumed classroom instruction during the summer session of 2015. The class of 2017 will be the first in many years to graduate with a basic knowledge of CELNAV. During their junior year, all second-class Midshipmen currently take Navigation 310: Advanced Navigation. This course has been adjusted to contain three hours of celestial familiarization, providing students basic principles and theories of CELNAV. It includes PowerPoint presentations along with homework and tests based on material from the 15th Edition of Dutton's Nautical Navigation by Thomas J. Cutler. "It is a core competency of a mariner," said Director of Professional Development Cmdr. Adan Cruz. "If we can navigate using celestial navigation, then we can always safely get from point A to point B." Midshipmen also take two cyber classes during which they learn about the vulnerability of electronic navigation systems and how they can be affected by cyber threats. The classes include how information moves, jamming, the RF spectrum, and many other topics in cyber security.

By Lt. j.g. Devin Arneson,
U.S. Naval Academy Public Affairs

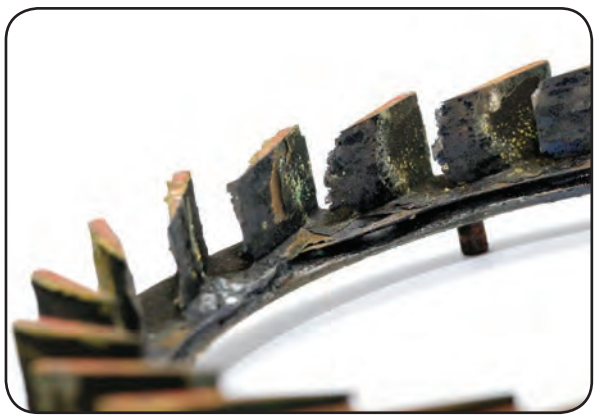
Pictured Above:
Quartermaster 2nd Class Stephanie Hudson from Plymouth, Mass., peers through a marine sextant, a navigational instrument used to determine celestial navigation aboard USS Ronald Reagan (CVN 76).

U.S. Navy photo by Photographer's Mate 3rd Class Kevin S. O'Brien (U.S. Navy)

World First in 3D Printing

Tru-Marine's 3D Printed Turbocharger Nozzle Ring

Eroded Nozzle



3D Printed Nozzle

Tru-Marine reports that it has successfully printed the world's first nozzle ring for marine turbochargers using exotic super metal alloy. The premature erosion of nozzle rings has been a commonly reported problem, creating unplanned down times and emergency service attendance. In such situations, spare part replacements are usually unavailable and come with long lead times at high costs. Tru-Marine has developed proprietary processes in 3D printing. The company offers nozzle ring repairs by way of layerwise building which enables reconstructing worn out areas directly onto the original component.

Damaged nozzle rings can now be reclaimed to 'like-new' condition as and when the vessel calls for it, either as an intermediary option, or as a reconditioned spare part, within a fraction of the time required by commonplace repair methods.

The parity of high quality raw materials and cost cannot be achieved with conventional metalworking production that requires economies of scale. With additive manufacturing like 3D printing, production is initiated in piece rate, resulting in lower production costs and minimal material wastage since material that is only required is used. Components can be made of multiple metal alloys or exotic materials to improve their physical properties in the areas that are necessary. 3D printing also gives rise to simpler designs that do not incorporate fasteners or welded seams, thus enhancing performance and reducing production and delivery times.

By using exotic metal that surpasses current casting standards, Tru-Marine promises improved heat and corrosion resistance as a value gain. Exotic alloys have a high ultimate tensile strength such that when they are processed using additive manufacturing, near perfect densities of greater than 99.5% are achieved, as porosities show up as insignificantly small with negligible effect on strength. In addition, the capability for geometric complexities with 3D printing also allows for the perfect match of every intricate profile in accordance to the technical specifications of each nozzle ring model.

Yielding positive results in tensile strength and microstructure laboratory examinations, the 3D printed nozzle rings have been tested to be suitable for turbocharger applications. This breakthrough comes with the support of government agencies and local research institutions, lending greater confidence and acceptance of the repair innovation.

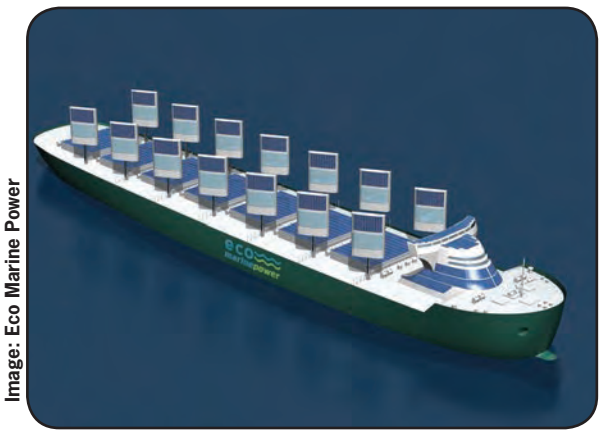


Image: Eco Marine Power

Wind/Solar Ship Power System

Earns Patent

Eco Marine Power's (EMP) Aquarius Marine Renewable Energy (MRE) System, a wind and solar power solution for ships, has been granted a patent in Japan, paving way for commercial production. The Aquarius MRE System is an integrated system of rigid sails, solar panels, energy storage modules and marine computer platforms that will enable ships to tap into renewable energy by harnessing the power provided by the wind and sun. The rigid sails that will be used by the Aquarius MRE System

ABB Invests in New Marine R&D Lab

ABB, already well-regarded for its continuous investment in R&D in the maritime market, has strengthened this commitment with the opening of a new laboratory. The new R&D facility is in Helsinki next to the Azipod factory, and it is designed to bring together all ABB's offerings for the shipping industry under one roof. The facility will be used by 30 ABB engineers dedicated to marine research, and also to demonstrate products to customers. In addition, it will support the pillars of ABB's marine technologies, including: automation, remote control systems, propulsion, integrated operations and waste heat recovery systems. "We are constantly testing and developing new technologies," said Mikko Lepistö, VP of software and automation operations at ABB. "This laboratory is a wonderful step forward and enables a full range of innovation activities, now that all of our marine systems can be tested and developed in the same place."

The lab will fully use the Integrated Operations concept which joins up the shore operation to what happens on-board, an outcome of ABB's commitment to the Internet of Things, Services and People. "Digitalization allows owners to monitor remotely entire fleets using cloud services," said Lepistö. "When data collected by automation systems is utilized in the most optimal way, we can save both costs and environment. The Internet of Things, Services and People opens new possibilities for the marine industry and especially for the development of the service business."

Mikko Lepistö, Vice President of software and automation operations at ABB

are based on EMP's EnergySail technology (patent pending). EMP's EnergySail technology has already passed feasibility and function testing at the Aquarius Innovation Lab in Osaka, Japan, and earlier this year it was announced that Teramoto Iron Works in Onomichi, Japan, would be the production center for the EnergySail. In addition, the marine solar power component of the Aquarius MRE System was evaluated this year on board the high speed car and passenger ferry Blue Star Delos.

Wärtsilä: Making LNG Production Mobile

A new liquefied natural gas (LNG) storage and regasification barge concept was introduced by Wärtsilä, a solution designed to provide a flexible means of meeting small to medium scale requirements where pure land-based LNG options are limited. The Wärtsilä Mobile LNG is designed to be combined with a barge-mounted power plant having an output capacity of up to 250 MW. Alternatively, it can be used to supply conventional land-based power plants.

The Wärtsilä Mobile LNG solution will make LNG available to new consumer segments, and in particular, the flexibility of location can bring clean energy to areas that have only limited or no access to the national electricity grid.

"Wärtsilä's solutions support the entire gas value chain, from drilling and production, to delivery, liquefaction, regasification, storage and power generation," said Timo Koponen, VP, Flow and Gas Solutions, Wärtsilä Marine Solutions. "This latest innovation is one more important step towards completing our LNG infrastructure offering. Most existing facilities are geared for larger-scale users, whereas the Wärtsilä Mobile LNG offers a flexible and mobile option for small to medium requirements."

The Wärtsilä Mobile LNG has been developed for challenging locations where pipelines and large-scale LNG receiving terminals are not feasible, or where the quantities of LNG needed are smaller. Compared to building land-based terminals, the barge can represent a significantly lower capital investment (capex) and faster delivery. In addition, being mobile, it can be easily relocated ,giving it a high resale value.

The Wärtsilä Mobile LNG can easily be combined with a barge-mounted power plant having an output capacity of up to 250 MW.

Polar Code Will Force Investment

With the prediction of higher levels of shipping activity through polar sea routes for the years to come, the IMO's Polar Code sets standards that are likely to affect operators in a big way when they come into force in 2017. The Polar Code, adopted by the IMO via amendments to the SOLAS (Safety of Life at Sea) and MARPOL (Prevention of Pollution from Ships) Conventions, sets a number of mandatory shipping rules, in addition to a number of recommendations and guidelines, aiming to help protect the environmentally sensitive region. The new rules cover the gamut of shipping-related matters relevant to navigation in waters surrounding the two poles, such as ship design, navigation, crew training and education, search and rescue activities, and the discharge of oil, chemicals, sewage and garbage.

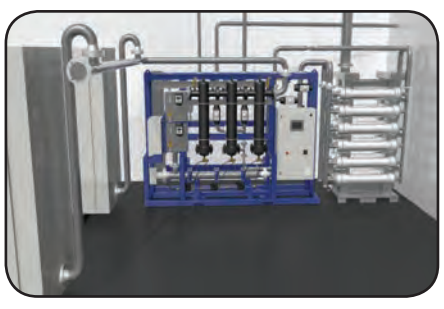
Photo: IMO

"The impact that the Polar Code will have on operators trading in the region remains to be seen," said Hannah Charles, Senior Claims Executive, UK P&I Club. "The Code brings with it numerous requirements for all ships trading in the Polar Regions and therefore a great deal of investment will need to be made by operators."

Charles called IMO's adoption of the code a "reflection of the shipping industry recognizing the sensitivity of Arctic ecosystems," and added that it "acknowledges the need for a higher degree of care when navigating polar waters, given the increased trade throughout these regions."

"It is without doubt that these requirements are necessary, especially given that the standard SOLAS ships are generally considered to only be adequate in open water conditions, where ice coverage is less than 10 percent and the average lowest daily air temperature is not lower than minus 10 degrees," Charles said.

WTS' Maritime Protection Nitrogen System



Wilhelmsen Technical Solutions has reintroduced the Maritime Protection nitrogen inert gas system, a system first introduced in 1984 but reengineered as a state-of-the-art unit. The primary enhancement is a unique system design with a smaller physical footprint. In addition, it only requires service access from two sides, meaning that it can be located in a corner. The system is also fitted with a fully automated control and monitoring system that protects the membranes.

"We are very excited to reintroduce this improved version of the Maritime Protection nitrogen system," said Stein Loevskar, commercial development manager, Wilhelmsen Technical Solutions. "In addition to the performance enhancements, we now fully own the system design and have moved the assembly in house. This gives us better control and enables us to provide customers with a high quality and optimized solution that delivers value throughout its service life."

Designed to protect flammable and sensitive cargo during transportation, nitrogen inert gas systems are the preferred solutions for applications where cargo contamination could be an issue.

The Maritime Protection system is designed and built in accordance with IMO SOLAS regulations and the MODU Code, and is delivered with all necessary class approval certificates. The system is fitted with longer lasting membranes, which are specially designed for the maritime environment. These have improved resistance to high temperatures, enabling the ship to operate the inert gas system at ambient temperatures up to 55°C. To ensure optimal system performance at all times and reduce risk of failure, WTS is introducing a range of support and service solutions.

www.wilhelmsen.com/technicalsolutions

Project MARS

The Future of Autonomy in Shipping

Image: Shuttleworth Design

A new collaboration between Plymouth University and MSubs, has set a course to build the first fully autonomous state-of-the-art ocean research vessel that will demonstrate the possibilities of autonomy within the shipping industry. The potential of autonomous vehicle technology to address the challenges of working in conditions that are dangerous or inaccessible has been recognized in recent years. The concept of autonomy has already reached many areas within the maritime sector, such as oil and gas, and particularly the military. While the terrestrial sector pushes on with drone technology, where major companies such as Amazon are investigating the potential of using drones for home deliveries, the shipping industry has yet to embrace it.

"Some might see the lack of interest as conservatism on their part, and engrained adherence to having 'eyes on' the bridge at all times," said Brett Phaneuf, Managing Director of MSubs. "But human error accounts for the majority of accidents at sea, so there needs to be a reassessment and a debate around this issue – autonomous technology should not be seen as some form of inherent threat to the safety of seafarers."

Plymouth University and Plymouth-based partner MSubs are now aspiring to build the first full-sized autonomous unmanned ship to sail across the Atlantic in 2020 – replicating the 'Plymouth to Plymouth' Mayflower route. Designed and developed in collaboration with award-winning partners, the Mayflower Autonomous Research vessel (MARS) has the potential to transform and influence the future of world shipping, and inspire a new generation of ocean explorers and researchers.

"The idea arose organically from discussions taking place between some of our academics and Brett Phaneuf of MSubs," said Professor Kevin Jones, Dean of the Faculty of Science and Engineering, Plymouth University. "Plymouth University has a number of academics who conduct research into the capability and usage of underwater autonomous vehicles (UAVs), and we have a great working relationship with MSubs, a company that has a great track record of winning international contracts, particularly in defense. At that point, the conversation was a conceptual one around technology and its adoption in the industry."

The concept was pushed forward by the Mayflower 400 anniversary in 2020, which the city of Plymouth will be celebrating with a huge range of events and initiatives.

THE DESIGN

MSubs will lead the construction, using its experience in building autonomous marine vessels for a variety of customers. The vessel, designed by Shuttleworth Design, will operate as a research platform, conducting numerous scientific experiments during the course of its voyage. MARS will also be used as a test bed for new navigation software and alternative forms of power, incorporating huge advancements in solar, wave and sail technology.

"One of the key aims has always been to ensure the Mayflower Autonomous Research vessel is powered from renewable sources, and that will include solar power and wind power," said Phaneuf.

Committed to working with renewable energy sources, the design of the vessel will be developed with

these limitations in mind. The solar cell area required for effective motoring is too large for efficient sailing and safety in large waves. To overcome this, the design will likely include a folding wing system to increase the solar cell area by 40% in calm conditions.

The trimaran hull configuration was designed to account for a low motoring speed and reduce wind. Without the need for accommodation, the center hull has been kept low to the water and the wings and deck are separated and raised above on struts. This allows waves to break through the vessel and significantly reduces roll induced by wave impact. The outer hulls are designed to skim the water reducing resistance by 8%.

"From a technical standpoint of a different nature, how do we help start that debate over regulatory issues?," asked Phaneuf. "We can put a rover on Mars and have it autonomously conduct research, but we can't yet sail an unmanned vessel across the Atlantic Ocean."

MARS will conduct wide ranging meteorological, oceanographic and climate data gathering and research. The vessel is intended to house one or more modular payload bays, much like a Space Shuttle, which will allow for flexibility on what research can be conducted into the future.

PROPELLING FORWARD

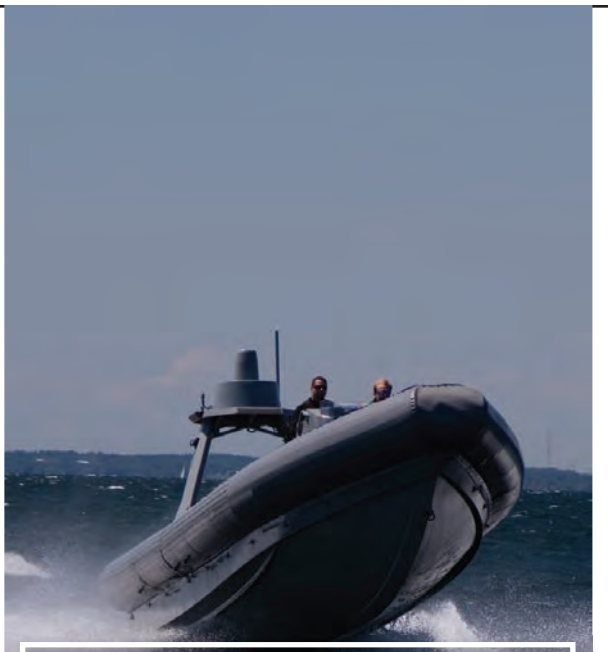
"There are a number of financial, technological and regulatory hurdles that we will need to be cleared. At this stage, it is an aspiration not a realization," said Professor Martin Attrill, Director of the Plymouth University Marine Institute. "We are adopting an aggressive rapid prototyping program. And we'll work with leading technology companies in the defense and civilian marine sector to integrate commercial and existing bespoke technology solutions from other areas of R&D."

The group are working towards readying a model in spring/summer of 2016. There will be a testing phase, with some of that taking place in the Plymouth University Marine Building, using its cutting edge wave tanks. Following the year-long testing phase, the planned Atlantic crossing in 2020 will mark the 400th anniversary of the original Mayflower sailings from Plymouth, England to Plymouth, Massachusetts.

"If we can deliver the Mayflower Autonomous Research vessel, and obtain the various permissions required to have it sail across the Atlantic, then we will have a lasting legacy for the shipping sector. We are hoping to play a vital role in the introduction, management, de-risking and technological advancement in use of unmanned and automated systems," said Jones

The project is part of the University's 'Shape the Future' fundraising campaign, recently launched at the House of Lords. Initial funding has been provided by the University, MSubs, and the ProMare Foundation, and corporate and private sponsorship will be sought for ongoing support.

By Kira Coley



MetalCraft's New RIB on the Block

Blending Commercial-Off-The-Shelf with Customization

Features

- Commercial off-the-shelf availability
- 45-55 knots
- High payload
- tability to ISO 12217 Category B
- Rapid reconfigurable seating
- 24" collar for alongside operations
- Rapid automatic tube inflation system
- Road transportable
- C-130, C-5, C-17 transportable

Main Particulars

Length, o.a.	10.45 m (34.5 ft.)
Beam, o.a.	3.2 m (10.5 ft.)
Beam (deflated):	2.59 m (8.6 ft.)
Weight (dry)	10,500 lbs.
Weight (full load)	14,500 lbs.
Fuel capacity	264 gal.

Options

- Multiple seating configurations
- Raymarine or equivalent electronics package
- 2 x 300-400 hp engines
- Option snorkel kit (Mercury Verado only)
- Hinged arch
- 8-24" Round or D-Shaped Collar

MetalCraft Marine Inc. launched a new high-speed aluminum rigid inflatable boat (RIB), a unique, flexible boat design that the company envisions as opening new markets across military and commercial markets.

Though MetalCraft has already built a number of RIBs for navy and search/rescue customers, the builder is known foremost for its work in the fireboat market. With its latest nine-meter RIB offering, however, the MetalCraft diversifies to tap deeper into the RIB segment, brining to the market a product that is fast to manufacture, yet is configured to be versatile, robust and highly customizable.

Designed to operate at speeds up to 55 knots and to be especially adept at running alongside other vessels, the end product is a rugged, high-performance boat that performs with a wide range of payloads, is ergonomically designed around the end user and can operate in diverse conditions, particularly in high sea states. The RIB also boasts broad functionality in terms of transportation and trailerability, further adding to its versatility.

"We've spent almost two years developing this craft, and we wanted to make sure that when we brought a boat of this nature into a very competitive arena that we were brining something different, something above what everybody else already had, and I think we've done that in this case," explained Michael Allen, general manager at MetalCraft.

Built on a multipurpose platform, the RIB has been engineered to lend itself to multiple mission profiles – military, paramilitary, government agencies or a general workboat – so its aptness for customization is key. To that end, most of the vessel's equipment and systems – from engine horsepower to electronics – are specifiable based on customer requirements.

For example, the vessel is available in multiple collar configurations, it can be built with either a center console or with a cabin, fuel capacity and horsepower can be varied, and the boat lends itself to wide variations in weight and centers of gravity. Furthermore, the RIB's large open deck allows it to carry a wide range of equipment or personnel for various jobs, and its seats can even be configured from 12 down to two in a matter of minutes.

"What we were looking for with this particular vessel was a multifunction high-speed RIB that gave a lot of versatility, both in terms of the performance of the boat and in terms of its application," said Ryan Hunter, MetalCraft design manager.

MetalCraft counts as part of its competitive advantage its capabilities for system integration, with a team of project managers, engineers and craftsmen able to integrate a range of different technologies, in line with new RIB platform's readiness for customization.

But customization does not change the vessel's fundamental lines, meaning the builder can begin producing the platform immediately once an order is placed, working with the customer to sort out the alterable specifications based on the fact that these are topside to the general arrangement, explained Christ Toller, MetalCraft project manager.

"There's a lot of focus on making sure that they keep that production timeline down, that the fundamental structures stay the same and consistent, and everything is built on top of that, giving the customer the chance to work through the finer details," Toller said.

And while the builder's average timeline to construct one of its fireboats will generally stretch out over the course of a year and require much development up front, MetalCraft's intent for the new RIB is to be able to offer a potentially off-the-shelf boat that is easy to configure based on customers' needs and objectives.

New Boat for Tampa Bay Pilots

Photo: Gladding-Hearn Shipbuilding

The Tampa Bay pilot association took delivery of its second Chesapeake Class launch and the first in a new generation of Gladding-Hearn Shipbuilding's mid-size pilot boats. According to shipyard officials, the latest improvements incorporate the performance benefits of Volvo Penta's IPS 2 pod system. "The IPS 2 system was created to improve the performance and the arrangement of planning hulls like our pilot boats," said the shipyard's president, Peter Duclos. "This new generation of Chesapeake launches, named Chesapeake Class MKII, is equipped with the IPS 2 pods, which provide what pilots have been asking for higher speeds, lower fuel consumption and more comfort."

With a deep-V hull designed by C. Raymond Hunt & Associates, the all-aluminum pilot boat measures 52.7 ft. overall, with a 16.8-ft. beam and a 4.5-ft. draft. It is powered by twin Volvo Penta D11, six cylinder, EPA Tier 3 diesel engines, each producing 503 Bhp at 2,250 rpm. Each engine is connected to a Volvo Penta IPS propulsion pod, which is fitted with dual forward-facing, counter-rotating propellers and integrated exhaust system, and Volvo Penta's integrated EPS electronic steering and control system.

The EPS control system and three-axis joystick increases the boat's overall maneuverability alongside a ship and when docking, said Duclos. A Northern Lights generator, with 9kW of output, provides electricity. The vessel's top speed is 28 knots, said shipyard officials.

The wheelhouse, with forward-leaning windows, is outfitted with five Stidd seats and a settee and cooled by two 16,000 Btu air-conditioning units. The forecastle, with a 12,000 Btu AC unit, has one berth and an enclosed head. Outside of the wheelhouse are wide side-decks and boarding platforms, port and starboard, on the foredeck. At the transom is a winch-operated, rotating davit over a recessed platform for pilot rescues operations.

Ulstein Debuts DP Construction Vessel

With the ULSTEIN S182 design, ULSTEIN introduces a new dynamically positioned multipurpose construction vessel suitable for shallow water operations. Main design driver was to develop a CAPEX friendly DP vessel with good capabilities to support various offshore operations, including cable lay and offshore construction. The vessel offers a combination of deck area, accommodation and station keeping capability for a compact vessel, its developers noted, adding this results in a cost efficient platform capable of supporting a variety of operations, including cable laying, offshore construction, shallow water installation, dive support, rock installation and salvage work.
The mooring and DP2 (optionally DP3) station keeping capability, in combination with the large endurance and adequate transit speed, ensure that the ULSTEIN S182 can operate autonomously in remote shallow water and offshore areas, Ulstein said.

‘Trash Boats’ Help Keep Waterways Clean

Elastec, a U.S. based manufacturer of pollution control equipment, is producing trash and debris collection boats to assist local governments in meeting Clean Water Act standards, aid in the reduction of floating pollutants in waterways and help protect aquatic ecosystems. The trash and debris collection vessel, designed to skim floating litter from harbors and waterways, can also be used for various marine maintenance duties from its 8- by 11-foot work platform. Designed to be maneuverable in hard to reach areas, the aluminum boat has an inverted bow to usher floating refuse into its 98 cubic feet trash basket.

Marine litter and debris control is an emerging environmental issue as a result of the regulation of water pollution under the Clean Water Act. Of primary concern are municipalities with Combined Sewer Systems (CSS). The Metropolitan Water Reclamation District of Greater Chicago (MWRD) recently purchased two ELASTEC Trash Boats to skim debris from the Chicago River. The MWRD is located primarily within the boundaries of Cook County, Illinois serving an 883 square mile area which includes the City of Chicago and 125 suburban communities. The MWRD owns and operates one of the world’s largest water reclamation plants and treats an average of 1.4 billion gallons of wastewater each day. The MWRD controls 76.1 miles of the Chicago Areas Waterways (CAWS), which are part of the inland waterway system connecting the Great Lakes with the Gulf of Mexico. The MWRD receives flow from combined sewer collection systems, which means that wastewater and stormwater flow together in a single pipe. During heavy rain events, storm-water runoff can cause the sewer system to reach maximum capacity and overflow into the waterways.

This is called a Combined Sewer Overflow (CSO). Some of the excess water is stored into the MWRD’s Tunnel and Reservoir Plan (TARP) system, but too much runoff finds its way to the CAWS – and so does the trash. Floating debris such as Styrofoam, plastic bottles and cigarette butts create health risks, kill marine life and cause flooding.

To help keep the Chicago River clean, Elastec and MWRD worked together to develop two custom trash and debris collection boats. MWRD requested a simple design, with few moving parts, and easy to operate. The 23-foot MWRD boats, named Skimmy Dipper and Skim Pickens, are designed to perform daily trash skimming near Navy Pier and along seven miles of the river.

Elastec said similar vessels have been delivered to the cities of Waco and Austin, Texas’ Watershed Protection Departments.

www.elastec.com

Eastern Launches Tug for Suderman & Young

Eastern Shipbuilding Group launched escort tug Triton for Suderman & Young Towing Company. Triton (ESG Hull #235) is scheduled to for delivery in Q4 2015, and is the first of a series four Z-Tech 2400 Class Terminal & Escort Tugs designed by Robert Allan, LTD. (RAL) and currently under construction at Eastern’s Nelson Street facility for Suderman & Young Towing Company. Eastern is also constructing an identical series of four tugs for Bay Houston Towing Company. G&H Towing Company is the Owners’ onsite Representative and Agent during the engineering, construction and delivery for both Suderman & Young and Bay Houston. G&H Towing Company will operate the vessels after delivery.

RAL will provide the Z-Tech 2400 Class Terminal & Escort Tugs design and engineering. G&H Towing’s fleet currently consists of eight “Z-Tech” tugs in operation. This “Z-Tech” incorporates the latest technology for escort service and ship assist.

(Photo: Eastern Shipbuilding Group)

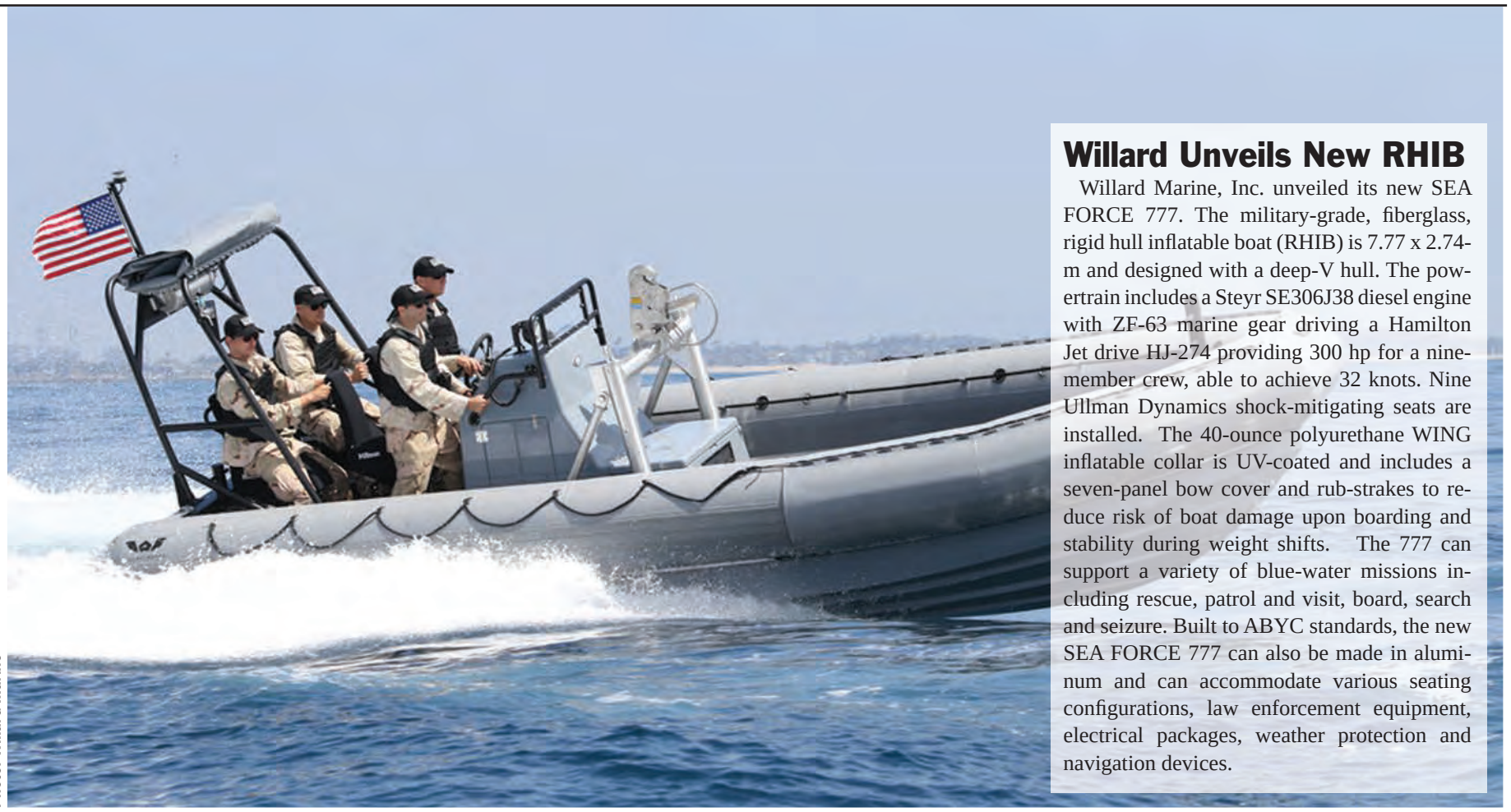


Photo: Willard Marine

Willard Unveils New RHIB

Willard Marine, Inc. unveiled its new SEA FORCE 777. The military-grade, fiberglass, rigid hull inflatable boat (RHIB) is 7.77 x 2.74-m and designed with a deep-V hull. The powertrain includes a Steyr SE306J38 diesel engine with ZF-63 marine gear driving a Hamilton Jet drive HJ-274 providing 300 hp for a nine-member crew, able to achieve 32 knots. Nine Ullman Dynamics shock-mitigating seats are installed. The 40-ounce polyurethane WING inflatable collar is UV-coated and includes a seven-panel bow cover and rub-strakes to reduce risk of boat damage upon boarding and stability during weight shifts. The 777 can support a variety of blue-water missions including rescue, patrol and visit, board, search and seizure. Built to ABYC standards, the new SEA FORCE 777 can also be made in aluminum and can accommodate various seating configurations, law enforcement equipment, electrical packages, weather protection and navigation devices.

Kohler Tier 3 Diesel Generators

Photo: Kohler Power Systems

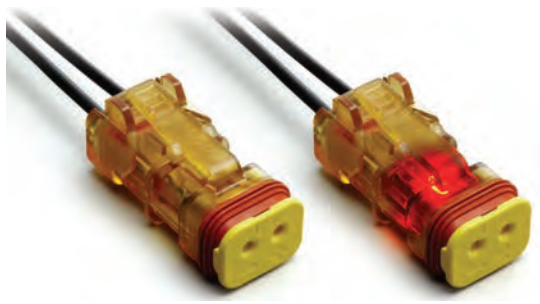
Kohler Power Systems is introducing new 175 kW (50 Hz) and 200 kW (60 Hz) models to its lineup of EPA Marine Tier 3-compliant diesel generators. The new 200EOZDJ/175EFOZDJ are suited to superyacht applications, while the 200EOZCJ/175EFOZCJ are designed for commercial applications. All models feature the Kohler Decision-Maker 3500 controller (DEC 3500), which offers the ability to parallel two or more of the company's generators with a single communication wire. Greg Klompenhouwer, senior product manager for Kohler Marine, said the new models incorporate standard features such as electronic high pressure common rail engines and permanent magnet excitation systems. In addition to accommodating for easier and more cost-effective paralleling, the Decision-Maker 3500 controller's space-saving design also eliminates the need for oversized switchgear. According to Kohler, other benefits of the controller include built-in load management software, which removes over-fueling issues and the need for exhaust treatment systems; remote monitoring, which provides the ability to monitor and control the generator from anywhere on the vessel; fully potted circuit boards and sealed connectors, which protect against corrosion; and fewer failure points for an enhanced level of reliability.

www.kohlerpower.com

New Transparent Connector with Integrated LED

TE Connectivity (TE) Industrial & Commercial Transportation offers the new DEUTSCH DT Detector connector which provides a visual confirmation of power by producing a distinct glow, which helps with troubleshooting, especially in areas with difficult connector visibility and accessibility. The new two-way plug features a transparent housing and a wedgelock with an integrated 12 or 24 volt LED. The Detector connector is environmentally sealed and designed to withstand the demands of the construction, agricultural, trucking, marine and mining industries.

www.te.com/DTDetector



Polymer Serves an Array of Workboat Applications

Vesconite offers a line of low-friction, long-lived polymers that it says thrive in a dirty, marine environment. The company's flagship product, Vesconite is a self-lubricating, low-wear material able to carry high loads at slow speeds. It doesn't swell in water or need to be greased, and offers up to 10 times the usable life of bronze, the manufacturer claims. The polymer is suited for rudder necks and pintles. On deck, it excels when used with winches, sheaves, rollers and pulleys, and in dockyards for slipway bogies and syncrolifts.

www.vesconite.com

Image: Norsafe

Norsafe's New Lifeboats

Norsafe launched two new lifeboats for the shipping and offshore markets. The new GES 21 is a free fall lifeboat designed for ships, featuring a maximum drop height of 21m, capacity for 26 people and a davit specially designed to take up less deck space. Norsafe's newly designed Maxima-120, is a totally enclosed 12-m-long conventional lifeboat with capacity for 150 people, making it the largest in the company's range. It is designed for large ships and offshore vessels and is built to meet full SOLAS requirements, NORSOK R-002, NMA Reg. FOR853, GOM, UK Sector (HSE), with design features based on latest OLF studies.

www.norsafe.com

Amron International Debuts Pressure Limiting Valves

Amron International offers the Inline and Angled Pressure Limiting Valves (ALV) with three different pressure ranges for each series. Adjustable pre-set limiters assure the ALV will automatically close preventing pressure from exceeding a pre-set limit, and then to reopen when back flow pressure drops down below a 10% threshold. The ALVs have a maximum inlet pressure of 3,000 PSI with our primary model having an adjustable outlet pressure range of between 500 to 1,000 PSI.

www.amronintl.com

New Insulation Range

Photo: Rockwool

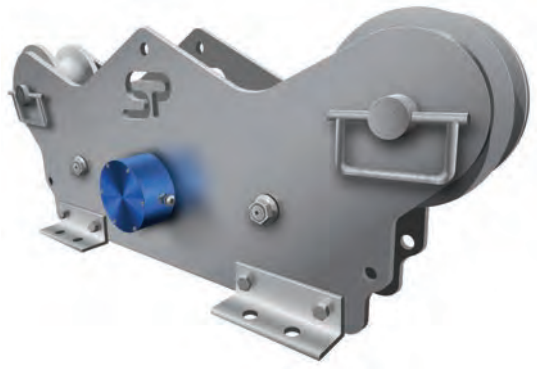
ROCKWOOL Technical Insulation introduced a range of lightweight stone wool fire boards suitable for maritime and offshore applications. This product range, new generation SeaRox FB 6000, has been tested and approved for main A-class rated steel constructions especially targeting passenger ships, naval ships, offshore modules and supply vessels, where weight savings are essential. The SeaRox FB 6000 product range makes it possible to create solutions that are up to 40 percent lighter in weight, while retaining all the insulation benefits of genuine stone wool. These include highest fire safety, excellent acoustic properties, highest water repellency grade – lowest water absorption, and outstanding thermal insulation. Increasingly, ship owners, shipbuilders, naval architects and marine engineers face pressure to improve performance in terms of safety, environmental protection, efficient operation and resource conservation, as well as energy efficiency, reduction of CO_2 emissions and efforts to mitigate climate change. The new generation SeaRox FB 6000 range helps to address these challenges by combining the solid product performances in fire, thermal and acoustic insulation of ROCKWOOL stone wool with an exceptional lower weight.

www.rockwool-rti.com

Royal Purple Debuts New Line of EALs

Synthetic lubricant manufacturer Royal Purple launched the BioMax line of Environmentally Acceptable Lubricants (EAL). Royal Purple said its BioMax Environmentally Acceptable Lubricants meet all environmental standards mandated by the Environmental Protection Agency (EPA) and are Vessel General Permit (VGP) compliant for use in oil-to-sea interfaces in vessels measuring 79 ft. or greater in length. All BioMax lubricants are formulated with Royal Purple's base oils and proprietary advanced additive technology, Synerlec. This ensures the lubricants protect and perform well beyond most synthetic and conventional EAL products, Royal Purple said. Synerlec creates an ionic bond that adheres to metal parts and forms a tough, slippery, synthetic film on all metal surfaces, improving lubrication and maintaining longer lasting results due to the oil film's thickness and strength. It also displaces moisture and protects all metals from rust, corrosion and the detrimental effects of heat, which often leads to oxidation.

www.royalpurpleindustrial.com



The finished product was the result of a three-part consortium representing the UK, USA and Sri Lanka.

Consortium Collaborates on Running Line Dynamometer

A three-part consortium from the UK, USA and Sri Lanka developed a new product for measuring tension on lines recently launched by Straightpoint, the Running Line Dynamometer (or TIMH), part of the manufacturer's tension in motion range. The TIMH is constructed from marine grade stainless steel and is suitable for many wire rope configurations up to 80t and will, as an option, calculate lineout in meters or feet along with line speed. It is available as a wireless or cabled system utilizing the HHP range of handheld displays or SW-MWLC software.

www.straightpoint.com

K-Sim Cargo Handling Simulator

Kongsberg Maritime released its latest K-Sim Cargo simulator model, SCC-II, based on a Suezmax crude oil carrier with 12 cargo tanks and two slop tanks. The new simulator model enables integrated, real-time exercises based on actual ship specifications and performance data on liquid cargo handling operations. The model is delivered with a sophisticated new Integrated Automation System (IAS) to replicate Cargo Control Room (CCR) operations. The CCR can be represented by different combinations of interactive mimic panels, operational panels or consoles or desk-top stations, allowing it to be laid out according to the specific requirements of any training facility. The new model contains a Closed Circuit TV system with three camera angles providing a view from both manifolds and a third camera with view from the jetty to give students a complete training scenario. The SCC-II model is equipped with an inert gas plant to provide training on cleaning the flue gas and replacing combustible gases in the cargo tanks with low or non-flammable gases. The pump configuration represents a typical crude oil carrier with three cargo pumps, two ballast pumps, three oil/gas separators, a stripping pump and ejector.

www.km.kongsberg.com

Photo: Kongsberg Maritime

Allspeeds Cutting Tools

For more than 30 years Allspeeds' Webtool range of cutting tools has been standard equipment in ROV fleets around the world. Recently Webtool guillotine cutting technology has been developed for both maritime and subsea emergency disconnect. Webtool is a leader in hydraulic guillotine cutting and gripping tools for use subsea, on deck and for deployment in emergency disconnect systems. Suitable for cutting wire rope, guide wire, cables, hoses, umbilicals and fiber rope, Allspeeds cutting tool design allows for easy positioning of the cutter and is suited for operation in confined spaces. In addition to blade-on-anvil cutting, recently Webtool has developed a new blade-on-blade cutting design. This requires less of the available cutting force capacity compared to the standard blade-on-anvil, increasing efficiency. However, the main benefit is the reduction in deformation of wire rope after the cut. By spreading the load, the wire is cut on both sides rather than cut and squashed. Maintaining the roundness of the steel wire section makes it much easier to re-use cut ropes during drilling operations.

A recent development in Webtool cutting technology is the emergency disconnection tool for tugs and offshore support vessels, and subsea well intervention systems. The Webtool EDT tool can be readily integrated within subsea intervention systems to ensure rapid disconnection of multiple fluid transfer lines in the event the surface vessel drifts off-station.

www.allspeeds.co.uk

VEGA Inflation Valve

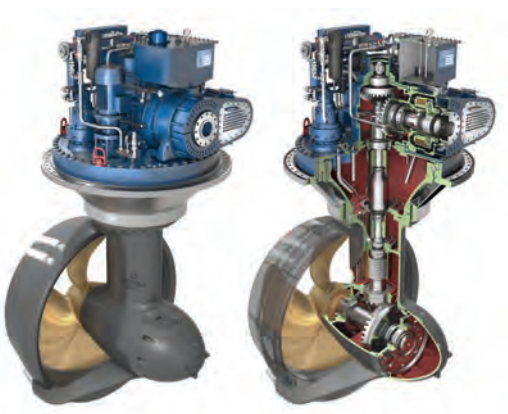
SI TECH launched VEGA Inflation Valve, an Inflation Valve with cable entry – for extended range diving in cold environments. VEGA combines inflation of gas and passage for power cables to heated undergarments etc. Both ports are swiveling for optimized equipment configuration. VEGA Inflation Valve is available with Int´l nipple, high or low push button and M12 x 1.5 or M16 x 1.5 cable entry. The design of the cable port makes it ideal for a variety of cables. VEGA Inflation Valve fits all SI TECH Valve ports and comes with an anti-friction washer and nipple cover.

www.sitech.se

Wärtsilä's New Thruster

The Wärtsilä WST-14 steerable thruster is the latest from the company's stable of azimuthing propeller technology, and it is aimed primarily at inland waterway cargo vessel applications. The WST-14 is a space-saving compact design with an integrated slipping clutch for manoeuvring when combined with a fixed pitch (FP) propeller. It also comes with the ability to maintain and service the propeller shaft and steering seals without a complete overhaul of the thruster. It is ice-class rated.

www.wartsila.com



Yanmar: New Common-Rail Diesels

Yanmar Marine International (YMI) is scheduled to show its new range of common-rail fuel injected marine diesel engines rated for leisure marine and workboat applications at METS 2015, RAI Amsterdam, November 17 - 19. Top of the line for Yanmar of new inboards is its in-line six-cylinder is rated at 440 mhp at 3,300 rpm. This will be a world marine-trade debut for the engine, which will also be offered in a 400 mhp version and will go into full production early in 2016, YMI said.

Although new, the 6LY440 and 6LY400 have a pedigree derived from the mechanically controlled 6LY2A engine series, which during its nearly 20-year long production run was purchased by thousands of performance-cruiser owners around the world.

The new engines inherit their predecessors' narrow and lightweight block with a compact profile. Nearly all else is new, however. Single mechanical injector units are replaced by a Denso digitally-controlled common-rail fuel injection system with new pipe work designed to cope with higher injection pressures. The 24-valve cylinder head is all-new too, as is the inlet and exhaust manifold designed for optimal engine breathing and high torque output throughout the engine's operating range.

The electronically managed engine is also designed with all the benefits of plug-and-play operation, using Yanmar's Vessel Control System (VCS) which gives the options of wireless controls and fingertip low-speed maneuvering with the company's advanced joystick.

www.yanmarmarine.com

New Cat Fines Test Kit

Parker Kittiwake announced a breakthrough in the early detection of catalytic (cat) fines with the launch of its Cat Fines Test Kit. In minutes, this onboard test identifies the presence of abrasive silicon and aluminum catalytic fines, which can become embedded into engine components and cause abrasive wear, causing irreversible damage to a vessel's fuel system if left undetected.

When fuel is stored for extended periods of time, cat fines – leftovers from the refinery cracking process – settle out of the fuel and build up as sediment in storage tanks. If the tanks are not drained regularly, this sludge can enter the fuel system and cause substantial damage to fuel pumps, injectors, piston rings and liners. The quality of fuel brought on board is increasingly difficult to predict. Until now, the detection of cat fines in fuel oil was only possible by obtaining a fuel sample, which is then sent for laboratory analysis. The Parker Kittiwake Cat Fines Test Kit provides accurate results onboard and in a matter of minutes, providing ship owners with an accurate picture of the level of corrosive elements present almost instantly, potentially preventing critical damage before it occurs.

The Cat Fines Test Kit is a simple to use chemical bottle test which determines the level of cat fines present in a representative sample of fuel oil, allowing the operator to identify the ingress of abrasive and potentially damaging components in the fuel oil before it enters the system. The test kit can be used in conjunction with both laboratory testing and a range of other onboard condition monitoring tools, ensuring that operators have reliable and accurate data readily to safeguard against potentially catastrophic damage.

www.parker.com

Workboat 2015

December 1-3, 2015, New Orleans

Next month in New Orleans the domestic North American industry gathers for an annual workboat event on the banks of the mighty Mississippi. Following is a short preview of new products and services scheduled to be on display in some form at the exhibition.

JMS Completes Research Vessel Design

JMS Naval Architects completed the Contract Design Package of a 93 ft. research vessel for Virginia Institute of Marine Science of Gloucester, VA to replace its current research vessel, Bay Eagle. A solicitation will be issued to shipyards by the end of the year. The primary mission of the Institute's fleet is to provide inshore and offshore work platforms for the support of fisheries related oceanographic research projects. The new vessel will be capable of conducting fisheries assessments of greater capacity in deeper waters and with a larger science complement than the Bay Eagle. In addition, the new vessel will greatly expand VIMS' capability to perform general oceanographic research in the Chesapeake Bay and the mid-Atlantic near coastal waters. This design is intended to remain flexible and support a wide range of science missions, oceanographic outfitting, and geographic areas. It is also designed to be affordable to build and operate.

Propulsion is provided by a pair of Cummins QSK-19A tier III diesel engines coupled to a two–in/one-out marine gear driving a controllable pitch propeller shrouded within a nozzle. This unique arrangement will provide the capability to operate the vessel efficiently on a single propulsion engine when on station or during slow speed transits. This system will reduce overall engine hours and thus reduce the cost of operation and improve fuel efficiency minimizing its environmental footprint. It also powers a robust hydraulic system required to support the suite of deep water trawl winches and load handling equipment. The electrical system is comprised of a pair of 99 ekW generators which provide redundant capability or can be run in parallel during peak power demands. LED lighting will reduce both power consumption and heat emitted into the accommodation spaces. A high lift Barke rudder and 250 HP azimuthing water jet bow thruster provide excellent maneuverability. The vessel's capabilities are further enhanced by the installation of a state-of-the-art dynamic positioning system for station keeping.

The arrangement includes large Wet and Dry Labs which have been designed for maximum flexibility. The 1,000 sq. ft. main working deck allows for a 20 long ton science payload and provides a significant working platform for conducting fishing operations, over-the-side sampling and coring activities. There is also ample room and services to install a 20 foot science van for specialized science missions.

The aft deck is fitted with a stern A-Frame with an 8,000 lb safe working load and side J-Frame for conducting CTD operations. The principal fishing arrangement consists of a pair of trawl net reels and a pair of trawl winches with 13,000 lb linear pull with 750 fathoms of 5/8" wire to support large mesh (400 mm net) bottom trawl surveys offshore with catches up to 7 tons. The winch arrangement can easily be swapped out to conduct smaller mesh surveys within the Chesapeake Bay. An electric CTD (Conductivity, Temperature, and Depth) winch with 2,000 m of 0.322" wire will also be fitted for operation from the side mounted J-Frame. There is also a knuckle boom deck crane with a 2,240 lbs capacity to support load handling operations.

Booth 1256 at the International Workboat Show

Gangway Controls

Sentinel, a Beier Radio company, engineers technology solutions that help preserve multi-million dollar investments. After the manufacturer of a gangway system went out of business, threatening to render that investment useless, a vessel company looked to Sentinel to engineer new gangway controls and provide new control software to get the gangway back into operation quickly and cost-effectively.

Sentinel's team of engineers and marine electronics professionals did just that, designing and manufacturing new control systems and PLC for a Master Control Console Chair for a fraction of the cost of replacing the unit. The master control chair outfitted by Sentinel includes joysticks to operate the gangway, which can be manually controlled during approach and switched to automated mode for a free-float landing that allows a seven-foot safety toleration. Monitors installed by Sentinel in the chair console and in the wheelhouse allow the operator and vessel captain to view the gangway activity. The control systems and PLC were designed and manufactured by Sentinel at Beier Radio's 20-acre facility in Gray, LA. Sentinel is an original equipment manufacturer of high quality control and instrumentation products and systems, and is an affiliate of Beier Integrated Systems and The Marine Training Institute within the Beier Radio family of companies.

Booth 3227 at the International Workboat Show

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AME

Advanced Mechanical Enterprises/AME is a marine and industrial engineering services company specializing in vibration, noise and alignment of rotating machinery. As an ABS Recognized External Specialist for Condition Monitoring, AME is always looking for the most advanced technology and equipment to meet their clients' maintenance needs. Over the years, AME President, Rich Merhige, has found a condition monitoring system that by far surpasses the other systems on the market – the 6320 portable analyzer by Windrock. Windrock's portable analyzers and fixed systems have enjoyed much success in the oil and gas industries worldwide. Engineers and maintenance professionals use Windrock's products, both portable, and stationary, to monitor, analyze, and troubleshoot machinery. The systems starting being implemented into maintenance programs for naval fleets, and Merhige has since seen it gaining popularity among his workboat, cruise ship and even yachting clientele.

The Windrock 6320, allows data to be collected from reciprocating and rotating machinery to trend stress, vibration, proximity, cylinder pressure, and temperature. By utilizing systems such as these, remote engineering has become very real, allowing for non-intrusive monitoring on a consistent basis with minimal supervision, which translates to minimal expense. Learn more about condition monitoring and the Windrock 6320 in New Orleans when visiting ...

Booth 3562

Viega SeaPress

Viega LLC offers the Viega SeaPress system for marine pipe-joining applications. The Viega SeaPress system, available in copper-nickel, can be used in a variety of pipe applications from potable water, to fuel, to fire sprinkler. The Viega SeaPress system is a 90/10 copper-nickel alloy that's specifically suited for sea-water systems. It is the only copper-nickel press fitting with a double-press connection. Viega SeaPress is available with adapters to easily transition to imperial and metric sizes.

"Viega SeaPress comes from a line of reliable products that has the widest range of materials and marine industry approvals," said Paul Switzer, Technical Manager, shipbuilding and offshore with Viega. "This product was designed with Viega's trusted quality to handle rugged, corrosive seawater environments. Fittings are installed using a battery tool and the most innovative tooling available allowing presses into very tight areas."

Booth 603

Scotchman Saw

Scotchman Industries adds the SUP-600 NF to its existing lineup of circular cold saws. The SUP-600 NF is an Upcut Circular Cold Saw designed specifically for cutting non-ferrous material. Featuring a 24-in. (600 mm), 132 tooth carbide blade that is capable of producing round cuts up to 9-in. in diameter and rectangular cuts up to 15 x 6-in., the SUP-600

NF offers an increased cutting capacity. This upcut saw coupled with the new AngleMaster measuring system, creates a semi-automatic programmable saw system that automatically rotates to any cut angle, pushes material into the saw & automatically rotates to the next desired angle. Plus, you can store cut lists on its 17-in. touch screen control.

Standard features include an adjustable feed rate, mitering capability with fixed stops at 22.5º, 45º, 90°, -45°, and -22.5º, two horizontal and two vertical pneumatic clamps to secure material being cut, and a 4.5-in. port for chip collection plus a drawer under the bottom of the saw. The SUP-600 NF is available in 230 volt and 460 volt configurations.

Booth 4851

Marine Suspension Seats

Shockwave's product line of marine suspension seats is the result of suspension building experience dating back to 1965. From economical lightweight solutions to cutting edge three-axis suspended consoles, the company offers North American made shock mitigation solutions. Shockwave has developed a complete line of seats which the user can mix or match components to provide the ideal seat for their requirements. All products are manufactured on Vancouver Island, Canada, using premium American-made parts from leading manufacturers such as FOX, Corbin, BSCI, Speedway Engineering and Ride Tech. Shockwave Seats feature the FOX Float H20, a suspension shock developed in tandem with FOX Defense and our company to meet specific marine and military requirements. Shockwave seat cushions are manufactured in the U.S. by motorcycle seat manufacturer Corbin, who sculpts them to specification for maximum durability and support.

The choice of the U.S. Coast Guard for its RBS MKII and OTH fleets, Shockwave has been selected and used in more contracts worldwide than any other seat manufacturer. Other clients include the U.S. Navy, USSOCOM.

Booth 4435

Nord-Lock/ Superbolt

Bolt securing companies, Nord-Lock, Inc. / Superbolt, Inc. and P&S Nord-Lock AG of Switzerland, both have certifications by Det Norske Veritas (DNV) for several series of Superbolt multi-

jackbolt tensioners. DNV is an independent foundation aimed at safeguarding life, property and the environment, at sea and onshore. DNV provides service specifications, standards and recommended practices.

Superbolt's tensioners are used for offshore applications such as mounting cranes to the drilling rig and securing the draw works.

A DNV approval certificate number is often crucial. DNV certification is proof that our products are trustworthy and safe to use in this field.

Miller Electric

Miller Electric Mfg. Co. will showcase the latest in welding equipment for the shipbuilding industry during the International WorkBoat Show in New Orleans. Visitors to the Miller booth can see first-hand solutions for addressing productivity, quality, safety and cost issues, and experience live welding demonstrations featuring Miller power sources and Hobart filler metals. Miller representatives will also be available to answer product and welding questions.

Products of interest at the show include:

- **ArcReach** multiprocess welding systems: These systems provide welding operators with complete voltage control at the weld joint without the use of control cables, allowing them to minimize downtime, costs and safety risks by reducing unnecessary trips to the power source to make parameter adjustments. The greater arc-on time helps improve productivity, and the remote control capabilities also encourage best-practice weld settings and techniques.
- **LiveArc** welding performance management system: The reality-based training system has been designed to simplify the recruitment, screening, training and management of users through both simulated and live-arc welding modes. Featuring advanced motion-tracking technology, along with customizable and Miller-designed welding assignments, the system offers immediate feedback that helps improve welding skills faster and more cost-effectively.
- **AlumaFeed** aluminum MIG welding system: XR-AlumaFeed and AlumaPower 350 MPa or 450 MPa, this system simplifies and improves MIG and pulsed MIG welding applications for aluminum welding. Built-in pulsed MIG programs automatically set the optimal parameters for the most commonly used aluminum alloys, such as 4000 and 5000 Series, with wire diameters up to 1/16 inch for high-deposition applications.
- **Dynasty 280 welder:** This AC/DC TIG/stick welder is a powerful combination of capability and portability. Weighing only 52 pounds, its energy-efficient inverter design gives welding operators the ability to weld up to 3/8-inch thick material — as much as other machines with similar output, but in a much smaller and more portable package.

Booth 2911

FloScan's Software Solutions

If you operate a diesel-powered commercial vessel or fleet FloScan should be high on your list of companies to visit while attending the International WorkBoat Show in New Orleans. FloScan has been providing systems to enhance economy of operation for over 40 years. By routing FloScan sensor data through the FloNET network module real-time fuel burn data is available to ensure any vessel is achieving the highest fuel economy under any load. The result is an immediate verifiable reduction in operating costs through reduced fuel consumption.

But it's the latest version of its proprietary DataLog software has inland fleet operators interested. Inland fleets are required to track propulsion fuel consumption through specific geographic "tax zones" to comply with the Inland Waterways Revenue Act and FloScan DataLog can be an ally in achieving this. DataLog does it all automatically through a process called "geo-fencing" and provides instantly accessible reports that can be interfaced with your fleet operational software. It's affordable, accurate and meets all requirements for tracking fuel

use for regulatory purposes. DataLog with Geo-Fencing is FREE with the purchase of all FloScan FloNET fuel monitoring systems and there are no recurring licensing fees. DataLog with Geo-Fencing is also the ideal program for tracking total vessel fuel consumption to provide accurate billing information for charters. With it you can show your clients that your company is operating its vessels in the most fuel efficient manner possible providing them with demonstrable cost savings.

All this data and much more is captured by DataLog and can be quickly retrieved directly from the system or via prescheduled broadcast email uploads to fleet operations for ease of access. It saves time and money, eliminates guesswork, and provides irrefutable evidence of how equipment was used in the field for tax, regulatory, legal and billing applications.

FloScan systems have been at work on vessels around the world for over 40 years and have maintained an unmatched track record of safety, accuracy and dependability. FloScan systems can help you reduce overall fuel consumption, act as an early warning troubleshooting system during vessel operation, and now offers advanced software applications at no additional charge. No wonder FloScan is the industry leader in fuel computers and monitoring systems. **Booth 3210**


Odfjell
Fotland


NCL
Pitbull


LR
Darley


Harley Marine
Carlson


Carnevale


Scandinavian Bunkering
Vinde

Fotland Heads Odfjell Tankers

Odfjell appointed Senior Vice President Harald Fotland to new Head of Odfjell Tankers. Fotland comes from the position as SVP/Chief of Staff and has for the past 18 months also been responsible for the cost-cutting and efficiency program in Odfjell. He succeeeds the shipper's previous head of tankers, Morten Nystad, who stepped down from his position in July. The company also appointed Vice President Arild Viste to Global Head of Tanker Trading in Odfjell Tankers. Viste comes from the position as VP for Commercial Development.

NCL Names Pitbull Godfather

Norwegian Cruise Line said that musician Pitbull will serve as godfather for its newest ship, Norwegian Escape, slated to be christened next month in Miami. On Monday, November 9, Armando Christian Perez, aka Pitbull, is scheduled to be the honorary godfather and headline performer at a christening ceremony at PortMiami for the new ship Norwegian Escape. Built at Meyer Werft in Germany, the 164,600 gt Norwegian Escape will carry 4,200 guests. "Pitbull has been an excellent partner and great friend to Norwegian Cruise Line," said Andy Stuart, Norwegian Cruise Line's president. "A Miami native, he epitomizes and contributes to the energy, excitement and local flavor that our ships so proudly embody."

LR Americas Names Darley

Mark Darley recently assumed the role of Americas Regional Marine Manager and President of Lloyd's Register North America (LRNA). In these positions, he leads LR's Marine business for the Americas region, overseeing commercial and business planning and developing strategy to improve the company's competitive position within the region. He coordinates with the Marine Group in London and is responsible for achieving operational goals for safety, quality and financial performance in the Americas. Darley has been with Lloyd's Register for the last 15 years in various operational and business roles. He has served in a wide variety of leadership positions within LR to include positions in the United Kingdom, Middle East and Asia. Most recently, Darley led the South Asia Area. He assumes the position from Tim Protheroe, who will continue as the Operations Director for the Lloyd's Register Americas region.

Voith Turbo CEO Reinhardt Resigns

Carsten J. Reinhardt, President and CEO of Voith Turbo and member of the Corporate Management Board of Voith GmbH, has resigned to pursue other interests, the company announced. Dr. Uwe Knotzer will become the new Chairman of the Board of Management of Voith Turbo GmbH & Co. KG and member of the Corporate Board of Management of Voith GmbH with immediate effect Dr. Knotzer has been on the Board of Management of Voith Paper since 2012, where he is in charge of the Products & Services business line.

Bon to Retire, Sturm Named Samson President & CEO

Samson announced that after 41 years with the company, Tony Bon will step down as CEO on January 1, 2016. Andrea Sturm has been appointed as successor and joins the Samson team this month. Sturm comes to Samson with a strong background in international business management, product management, new product development, and marketing and sales. She holds degrees in Business Administration, International Management, and Marketing.

HMS Names Carlson, Martin VPs

Harley Marine Services (HMS) expanded its management team, naming Don Martin as Vice President and General Counsel and Steve Carlson as Vice President of Engineering. Prior to joining Harley Marine, Martin was the Vice President and General Counsel for Delta Western and Hawaii Petroleum. Before tha Martin served as the Director of U.S. Flag Shipping for ConocoPhillips and held previous positions with Crowley Maritime Corporation, Exxon Shipping Company, and Olympic Tug & Barge. Carlson joins Harley Marine Services from Alaska Marine Lines (AML) where he served as General Manager of Marine Engineering. Prior to joining AML, Steve held senior leadership positions with Kvichak Marine and the U.S. Coast Guard.

OMSA Names Smith President, CEO

The Offshore Marine Services Association, Inc. (OMSA) appointed Aaron Smith as President and CEO, following the resignation of Ben Billings, who has led OMSA since 2013. Smith has held a variety of positions in government and public affairs. He has been instrumental in the development of OSVDPA, a dynamic positioning certification authority for the OSV industry.

Carnevale Retires from SCA

The Shipbuilders Council of America (SCA) announced the retirement of Senior Defense Advisor RDML Joe Carnevale (ret). The retired U.S. Navy Admiral has been with the trade association for more than ten years. Prior to joining the Shipbuilders in 2005, Mr. Carnevale served as the Director of Fleet Maintenance for the Commander, Fleet Forces Command where he addressed the complete range of Fleet maintenance issues. He is the 2013 recipient of the Marine Machinery Association's Jack Flannigan Award and the 2013 recipient of the American Society of Naval Engineers' Frank G. Law Award.

Scandinavian Bunkering Names Vinde MD

Marine fuel supplier Scandinavian Bunkering A/S announced that Erik Vinde has been appointed as Managing Director, effective from August 1. Vinde joined Scandinavian Bunkering in 2006, and prior to his promotion held the position of COO.

Radzik Named LCA Fellow

Edward C. Radzik of Marshall Dennehey Warner Coleman & Goggin, has been named a fellow of the Litigation Counsel of America (LCA). LCA is a trial lawyer honorary society. Fellows are selected based upon excellence in litigation and superior ethical reputation. Radzik is an active member of the Maritime Law Association of the United States and is a marine engineer and graduate of the Massachusetts Maritime Academy.

Abeyta Joins SAFE Boats

Joseph Abeyta, President of Allwater Marine Group, LLC, has joined SAFE Boats International to increase foreign military sales and business development. Joe is a recently retired 24-year veteran of the U. S. Coast Guard (USCG). During his career with the USCG, Joe was an accomplished operator, held multiple commands, served as a vessel platform manager and as a regional security assistance officer.

IMCA Names Leatt, Benzie

Allen Leatt has been named Chief Executive at the International Marine Contractors Association (IMCA). He joins from Subsea 7 where he has been Senior VP for Engineering and Project Management. Richard Benzie has been appointed Technical Director to replace Jane Bugler who retired at the end of September after 18 years in the role.

Port Canaveral's CEO Tenure Ends

Port Canaveral Commissioners and John E. Walsh have agreed that his last day as Canaveral's chief executive officer would be January 21, 2016. Walsh will continue to serve in the role until that time. Walsh has served as CEO since March 2013.

Foss Welcomes Nguyen-Bull

Lam Q. Nguyen-Bull has joined Foss Maritime as Vice President, General Counsel and Chief Ethics Officer. Nguyen-Bull will lead Foss's Legal and Risk Management Group, where in addition to providing counsel on legal issues and business strategies and practices, she will head up the company's ethics and compliance programs. Nguyen-

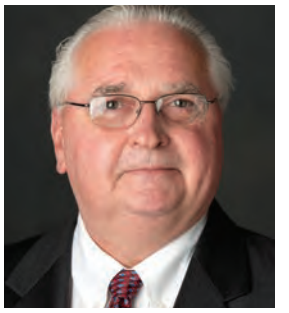
Abeyta

IMCA Leatt

IMCA Benzie

Walsh

Foss Nguyen-Bull



Foss Tirpak

Bull came to Foss from parent company Saltchuk, where she served as Associate General Counsel and Compliance Officer. Nguyen-Bull graduated from Harvard University magna cum laude and from Yale Law School.

Foss Maritime Opens Houston Office

Foss has opened a new office to support its customer base in Texas, as well as the formation of a new project management group. John Tirpak will lead the Houston office as Vice President of Business Development & Contract Services. Mike Lauer of Foss has been appointed Director of Marine Transportation Project Services and will be leading the project management unit. This group is comprised of project management and global logistics specialists focused on analyzing and finding solutions for the transportation activities of Foss. Both Tirpak and Lauer are long-time Foss employees.

Whitehouse Named Business Development for Yacht Services, MTN

George Whitehouse has been named director of business development at Yacht Services, MTN. He will be responsible for creating new business opportunities and relationships that enhance the MTN client community, particularly in the large yacht segment. Most recently, he was vice president of business development and sales for Rybovich. He maintains both USCG 1600 and MCA 3000 GRT licenses, and is a graduate of SUNY Cortland.

Cordero Reconfirmed at FMC

Mario Cordero was reconfirmed as a U.S. Federal Maritime Commissioner. Cordero joined the Federal Maritime Commission (FMC) as a Commissioner on June 3, 2011, having been nominated by President Barack Obama on September 17, 2010, and confirmed by the Senate on April 14, 2011. President Obama designated Mario Cordero Chairman of the Federal Maritime Commission on April 1, 2013.

Burdeau Appointed COO of GTT

GTT, a designer of membrane containment systems for the maritime transportation and storage of LNG liquefied natural gas (LNG), announced that its board of directors met on October 14 and appointed Julien Burdeau as chief operating officer of the company, following the proposal of Philippe Berterottière, chairman of the board and CEO.

Teekay Veteran Glendinning to Retire

Long-time Teekay leader David Glendinning, president of Teekay Gas Services, will retire December 17, 2015, after more than 28 years at Teekay. Stepping up to replace Glendinning is Mark Kremin, currently vice president in the same division, Teekay Corporation announced. Kremin recently took over reporting line accountability for the Teekay gas operations team, and will complete the full handover of leadership accountabilities on Glendinning's retirement date.

USMMA Mourns Passing of Sue Petersen Lubow

The United States Merchant Marine Academy has lost a beloved, long-time member of the USMMA family, former Athletic Director Susan "Sue" Petersen Lubow. Petersen Lubow started her Kings Point career 36 years ago as a physical education instructor, and quickly rose through the ranks and earned an appointment as Athletic Director in 1989. This marked the first time that a female held that position at any of the Federal Service Academies. She was also honored by the ECAC as the 1998 Jostens Female Administrator of the Year. A funeral service was held in October at the Mariners' Memorial Chapel on the campus of the United States Merchant Marine Academy.

Crowley Scholarships for University of Alaska Fairbanks Students

Crowley Maritime Corporation has awarded Crowley Scholarships to four University of Alaska Fairbanks (UAF) students, Allyson Wukovich, Isaac Peacock, Ashley Johnson and Gabriel Smith. Chosen for their academic achievements and meeting other scholarship criteria, each received $2,500 toward tuition from Crowley. Preferences for Crowley-funded UAF scholarships are given to

students from rural Alaska from Crowley-served communities throughout the state.

Brann Joins The Shearer Group

The Shearer Group, Inc. (TSGI) said that Harrison Brann joined the company as a naval architect.

MatthewsDaniel launches Approved Vessel Archive

MatthewsDaniel has launched an enhanced Approved Vessel Archive (AVA) service for offshore support vessels and their operators. The AVA provides vessel owners with an accessible certificate that can be presented to prospective customers, serving as evidence that their vessel is held to a standard acceptable by a leading marine warranty survey company. MatthewsDaniel CEO Kevin Jarman explained, "For operators, the MatthewsDaniel Approved Vessel Archive provides a system for preemptively managing their fleet's suitability status for a wide range of offshore activities and also helps provide a competitive edge when tendering for contracts."

Crowley Orders BWT Retrofits

Crowley Maritime Corporation entered into strategic partnership agreement with South Korean-based green technology developer Panasia Co., Ltd. for ballast water treatment systems to be installed during retrofitting of its ATB fleet vessels.Panasia GloEn-Patrol treatment system uses a filter to remove 50 micron or larger size organisms and medium-pressure UV lamps to disinfect smaller organisms. The GloEn-Patrol models treat from 50 to 6,000 cu. m. of ballast water per hour. They have IMO-type approval and certification from many classification societies including American Bureau of Shipping (ABS) and DNV GL, and U.S. Coast Guard Alternate Management Systems (USCG AMS) for non-hazardous areas such as engine rooms, and explosion proof models for installation in areas such as the main decks of articulated tug barges (ATBs) and tankers. Mark Miller, Crowley vice president of corporate communications, said the company competitively bid with more than 20 ballast water treatment systems manufactures from all major technologies, including UV, electro chlorination and chemical. "[Crowley made its] decision on a weighted value based on crew work load, operational parameters, installation and integration, manufacture assurances and warrantees and best overall package, based on price, spare parts, engineering services, regulatory approved containerized turnkey units for deck mounting, services, training and commissioning." Miller said 34 of Crowley's vessels are presently candidates to undergo BWT system retrofitting. The retrofit work will be carried out through competitive bids as part of Crowley's dry docking process with U.S. shipyards. Crowley will see BWT systems retrofitted aboard four of its vessels in 2016, 16 in 2017, eight in 2018, two in 2019 and four in 2020.

FleetWeather Opens Office in Greece

FleetWeather Business Intelligence, a provider of maritime business intelligence solutions and consulting services for global shippers, announced the opening of a new office this October in Athens, Greece. Jess Hurwitz, FleetWeather's Director of Global Sales & Marketing and Chief Technology Officer, said, "We have experienced tremendous growth and new business in Greece over the last few years with interest and inquiries continuing at a high level."

BUYER'S DIRECTORY

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

ALUMINUM BOATS

Moore Boat, LLC, 12303 N Piney Point Rd, Bishopville, MD 21813 , tel:(410) 524-3456, mikeearly@mooreboat.com contact: Mike Early

ANCHORS & CHAINS

Anchor Marine & Supply, INC., 6545 Lindbergh Houston, Texas 77087 , tel:(713) 644-1183, fax:(713) 644-1185, david@anchormarinehouston.com

ANTI-CONDENSATION COATINGS

Mascoat Products, 4310 Campbell Rd., Houston, TX , USA , tel:(713) 465-0304, fax:(713) 465-0302, wconner@mascoat.com

ATTORNEYS

Blank Rome LLP - Admiralty & Maritime Law, 600 New Hampshire Avenue, NW, Washington, DC , USA , tel:(202)772-5927, fax:(202) 772-5858, Grasso@BlankRome.com contact: Jeanne M. Grasso, www.BlankRomeMaritime.com

AUTOMATIC IDENTIFICATION SYSTEM

Saab TransponderTech AB, SE-589 41 Linkoping , tel:46 13 180000, fax:46 13 182377, Info.transpondertech@saabgroup.com

COATINGS/ CORROSION CONTROL/ PAINT

Hempel A/S, Lundtoftegårdsvej 91 2800 Kgs. Lyngby , tel:45 4593 3800, fax:45 4588 5518, marine@hempel.com , www.hempel.com

Tri-State Coating and Machine Co. Inc., 5610 McComas Road, PO Box 296, Salt Rock, WV V4W 3S8, USA , tel:1-800-477-4460, fax:304-736-7773, brichmond@tscminc.com contact: Beverly Richmond, www.tscminc.com

COMMUNICATIONS

David Clark Company (Wireless Headset Communication Systems), 360 Franklin Street, Worcester, MA 77060, USA , tel:(800) 298-6235 , www.davidclarkcompany.com/marine

CORDAGE

Helkama Bica Oy, Lakimiehenkatu 4, KAARINA FI-20780, Finland , tel:+358-2-410 8700, sales@helkamabica.fi

DRILLS

Hougen Inc., 3001 Hougen Drive Swartz Creek, MI 48473

ENVIRONMENTAL SOLUTIONS

Environmental Solution, Inc., P.O. Box 788, Wake Forest, NC 99835, USA , tel:(919) 740-0546, john@totalbiosolution.com

FILTERS/FILTER SYSTEMS

UT 99 AG Oil Mist Separators, Schaubenstrasse 5 CH-8450 Andelfingen , Switzerland , tel:+41 52 397 11 99, fax:+41 52 397 11 90, info@ut99.ch , www.ut99.ch/en

INSURANCE SERVICES

WQIS (Marine Pollution Insurance Policies), 60 Broad Street, 33rd Floor, New York, NY , USA , tel:1-800-736-5750, fax:(212) 292-8716 , www.wqis.com

WQIS (Water Quality Insurance Syndicate), 60 Broad Street 33rd Floor, New York, NY 18974, USA , tel:1-800-736-5750, fax:212-292-8716

LIFESAVING EQUIPMENT

CM HAMMAR AB, CM Hammar AB, August Barks gata 15, 421 32 Västra Frölunda, Sweden, , tel:+46 31 7096550, info@cmhammar.com , www.cmhammar.com

LIFT EQUIPMENT

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

MARINE AND PROTECTIVE COATINGS

Sherwin Williams, 101 W. Prospect Avenue, Cleveland, OH, 44115 , USA , tel:800.524.5979, klarmstrong@sherwin.com , sherwin-williams.com/protective

MARINE TRANSPORTATION

Central Boat Rentals, Inc., P.O. Box 2545, Morgan City, LA , USA , tel:985-384-8200, fax:985-384-8455, earl@centralboat.com or gary@centralboat.com

MECHANICALLY ATTACHED FITTINGS (MAFS)

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

MILITARY PATROL CRAFT MANUFACTURERS

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com , www.brunswickcgp.com

MOORING PRODUCTS AND SYSTEMS

DCL Mooring and Rigging, 4400 North Galvez Street, New Orleans, LA , tel:504 944-3366, fax:504 947 8557, codys@dci-usa.com

DCL Mooring and Rigging, 4400 North Galvez Street, New Orleans, LA , tel:504 944-3366, fax:504 947 8557, codys@dci-usa.com

NAVAL ARCHITECTS, MARINE ENGINEERS

Bristol Harbor Group, Inc., 99 Poppasquash Road Unit H, Bristol, RI 85714, USA , tel:(401) 253-4318, design@bristolharborgroup.com

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com

NAVAL ARCHITECTS, MARINE ENGINEERS & SURVEYORS

The Shearer Group, Inc., 3101 NASA Parkway Suite I, Seabrook, TX , USA , tel:(281) 532-2080, info@shearer-group.com , www.shearer-group.com

NITROGEN GENERATORS

Air Product AS, Vige Havnevei 78, 4633 Kristiansand, Norway, P.O.Box 4103 Kongsgaard, 4689 Kristiansand, Norway , tel:+47 38 03 99 00, norway@airproducts.com , www.airproducts.no

PRESS FITTINGS

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

SALT REMOVING PRODUCTS

Holdtight Solutions, PO Box 27907 Houston, TX 77227-7507

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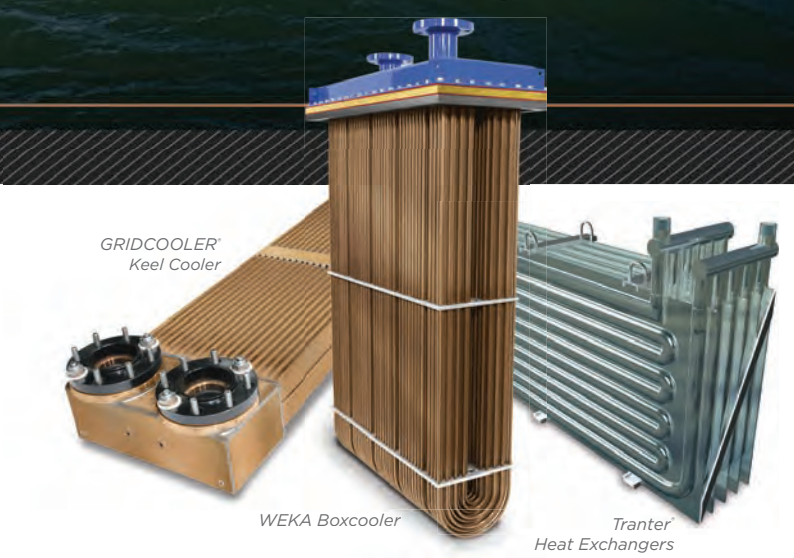

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