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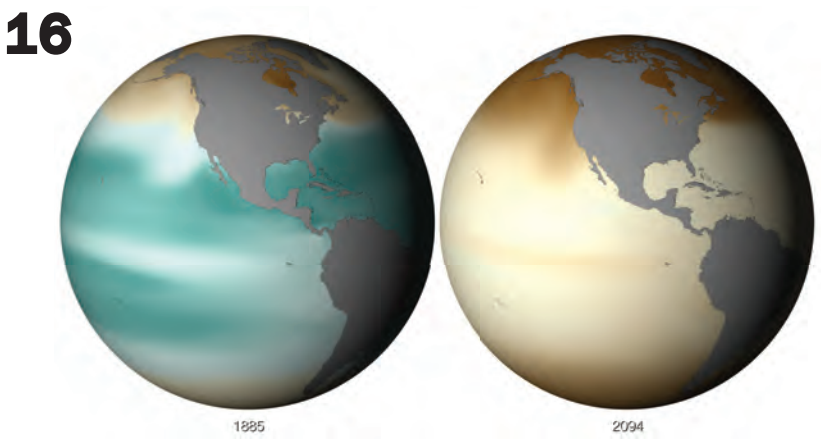

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(Photo: Astican & Astander shipyards)

Astican & Astander

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Shipbuilding solid ... for now ...

GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

As we traverse the dog days of summer, there is a palpable caution in the air as much of the industry – with its fortunes and future tightly tethered to the price of oil and gas – wait patiently for any sign that there is stabilization, or dare we say rebound in the market. The maritime and energy markets are certainly no stranger to wild fluctuations, but despite the luxury of 20/20 hindsight these market swoons always seem to bring varying layers of surprise, shock or anger.

While this precipitous drop in oil price (Brent is hovering at $50 per barrel currently) has some industry watcher harkening the collapse of the 1980s and early 90s, even adjusting for inflation the current price is a far cry away from the $14 per barrel seen as recent as 1994. (adjusted for inflation, that $14 in 1994 equals just more than $24 today).

It is times like these when I recall the advice of industry leader's I've interviewed over the years, with the words of **Joseph H. Pyne**, Chairman of the Board of Kirby Corp., and interviewed in 2013, leaping to mind first:

"I've always been somewhat of a contrarian: when business gets really good I get nervous and when it gets really bad I get excited."

In short, quality, long-term players in the maritime sector are well-versed and prepared for the inevitable downturns, while companies in it for a quick hit that suffer first and most. While companies may downsize to ride out the storm, resulting in a loss of valuable human resource assets that can take years to recover, many view turmoil as an opportunity to prune dead branches, and also a chance to pick up a product, capability or company on the cheap.

This is perfect timing for our shipyard edition, as shipyards are the heartbeat of this industry. A sincere thanks to Germán Carlos Suárez Calvo, CEO, Astican & Astander Shipyards, for sharing his valuable time and insight regarding business, investment and prospects at these pair of storied Spanish ship repair and conversion facilities. Spain in particular has endured a particularly rough economic stretch, but the management team at Astican & Astander Shipyards has embarked on an ambitious plan of investment and growth that is designed to keep it strong for the coming generation. This story starts on page 42.

The other big topic in this edition is Ballast Water Technology, starting on page 30. There are multiple stories attacking this highly controversial issue, but I think the pull quote from the USCG Commandant on page 34 is one that anyone with a stake in the game will be interested to see.

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Meaningful Cadet Training Means Funding Modern Ships

State Maritime Academies scramble to replace aging training platforms

Joseph Keefe is the lead commentator of MaritimeProfessional.com.

As the state maritime academies plead for "new, modern training platforms for the mariners the critical cargoes to our ports and to our servicemen and women overseas," the concept of a fit-for-purpose training vessel has once again gained a small head of steam. It'll need more than that to run the labyrinth of obstacles in today's minefield of budget realities.

The academies need modern tonnage on which to train cadets to ensure that sea time is meaningful, and achieves the goal of graduating deck or engine mariners that can qualify on any number of increasingly diverse commercial or military vessels that ply the oceans and inland waterways. Stakeholders also need to carefully consider what the training vessel of the future will look like, what it will be designed to do, and why. It will not be an easy task.

RADM Richard Gurnon, the outgoing President of the Massachusetts Maritime Academy, recently opined, "Since our inception, the State Maritime Academies have used old merchant ships or surplus Navy ships, converted for use as training ships." He's right. That comment got me to waxing nostalgic about my own experiences on the Mass. Maritime training ship during the late 1970's. Join me on a trip down memory lane.

Yesterday & Today

The current MMA academy vessel, the T/S Kennedy may well be 47 years old, and they can complain about it all they want, but it is a palace compared to the old T/S Bay State, which served as the academy's training platform from 1974 through 1979. Then, as now, maintenance on the training ships was largely provided by the cadets themselves.

My first introduction to this was on the business end of a pneumatic needle gun on the fantail of the old bucket. Along with five other unfortunate souls, we created a deafening racket (no, we didn't get hearing protection in those days) and I remember punching through the deck on one occasion in a particularly decayed part of the deck as we stripped the old coating off in preparation for the new. I asked the Bosun what I should about the hole and he replied, "Don't worry about it; that's what epoxy is for." **** Oh ****

I loved maintenance. Like an ingrown toenail. But, there was no way around it when dealing with a 40 year old hull and equipment. The Bay State was especially vulnerable to casualties and far more expensive to keep up, especially alongside a pier for three months in the dead of winter. Eventually, the school changed the cruise schedule from a summer voyage to one which took the training ship away from the New England winters. Some of that decision was rooted in maintenance issues. Ultimately and over time, the decision saved the academy hundreds of thousands of dollars.

Doing More with Less

These vessels weren't exactly built-for-purpose, and the training aids and equipment had to be made up as you went along. A sea lab on the old Bay State had a seamanship and marline spike area where you could practice knots and splicing. And, the Chief Mate once in a while would set up a 'yard and stay' boom arrangement on the stern and let us practice moving a pallet from the deck to the pier and back again. On the pallet was a light bulb; if it rolled off, you hadn't done a good job. We broke a lot of light bulbs. I finally got it (somewhat) right one day and this made me very happy, until the Bosun deadpanned, "Look, that was nothing to write home about. Do it again." It was simple stuff; good enough in those days, but woefully inadequate in today's increasingly sophisticated working environments.

Going to sea on the aging vessels, in our case an old troop carrier, was truly an adventure. I can remember drifting for hours in the Atlantic Ocean as the engineers scratched their heads and tried to get the boilers lit off. Or, limping along in the Mediterranean Sea with a marked 5 degree port list for hours at a time for no apparent reason. If you were particularly unlucky, you got to sleep in a converted cargo hold with 75 other freshman cadets, with canvas racks stacked four high. God forbid someone would get seasick. Unfortunately, someone usually did.

Looking Ahead, Not Behind

The old Bay State was four decades old, and looked it. It has since been replaced by a parade of similar, equally awkward and aging platforms, each used to train the next generation of mariners without much of the equipment that would have made that training more valid. Richard Gurnon wants all of that to change. I happen to think he's right. He also has a long row to hoe before he gets even a whiff of the Promised Land of a brand spanking new, built-for-purpose training vessel – never mind five of them.

The effort starts with just $5 million for this year's budget, which would be used to fund a design and feasibility study. It is this part – the least expensive part of the effort – that will also be the most important. According to Gurnon, the money is Marad's number one budget priority this year. He adds, "We expect it to pass in September." Let's hope he is right.

At a time when Congress can't or won't fund a desperately needed icebreaker (price tag estimated to be as much as $1 billion) and a Government Accounting Office (GAO) report has painted the Coast Guard's nascent Offshore Patrol Cutter (OPC) program as "unaffordable," maritime academy advocates are embarking on a journey to raise as much as $1 billion to outfit the schools with modern, series-built training platforms. That the vessels – dubbed National Security Multi-Mission Vessels or NSMV's – would still be retained by the maritime administration and outfitted to perform national security and humanitarian duties in times of natural disasters may be of passing concern to those who allocate the money for such requests. That said; it is a great idea whose time has come.

The changing make-up of the U.S. merchant fleet makes the design study particularly challenging, especially for academies that must put 500 or more cadets at sea at the same time each year. That's because the vessel will then necessarily entail a deep draft, blue water hull, at a time when the U.S. merchant fleet's 40,000 hulls are largely comprised of brown water, inland, workboat type vessels. Designing such a vessel that can incorporate the training needs of ***all*** vessels and the skills necessary in today's world of waterborne commerce will be a tricky task. I'm not sure it can be done. It is, however, worth a try.

Sure, we could continue along the road of plucking a tired old hull out of the U.S. Maritime Administration's 'ghost fleet' every ten years or so, but eventually, we'll run out of suitable candidates. At that point, the need for training platforms and berths for cadets will become critical. The time to take care of that problem is now. The first step involves funding the feasibility study. We owe at least that much to our future mariners, the ocean (and inland) commerce that feeds this island nation and to those who provide for our security on the high seas. ***– MarPro***

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Durban's 90-year-old Dry Dock Set for Repair

(Photo: Transnet National Ports Authority)

The 35-meter-long, 900 ton outer caisson at the Prince Edward Graving dock in Durban will be undergo a $2.4 million refurbishment project over the next four months.

The 90-yer-old Prince Edward Graving Dry Dock in Durban, which is owned and operated by Transnet National Ports Authority (TNPA), will undergo a $2.4 million repair project on its outer caisson over the next four months, marking the third and final phase of a repair program on the structure, which was deemed unsafe and in need of repair due to the dry dock's age and general need for maintenance.

TNPA appointed Durban-based engineering firm Channel Construction as the successful bidder after a competitive tender process in which the company satisfied all technical, BBBEE and price evaluation criteria. Channel Construction will work closely with managing contractor, Sebata Group, which is overseeing the project, with technical expertise and quality assurance provided by a team including KwaZulu-Natal's only naval architecture firm, Naval Africa.

LNG Cruise Ships Ordered

(Photo: Meyer Werft)

Carnival Corp., ever the innovator on the global cruise ship market, last month announced that its Costa Cruises Italian brand placed orders for two new cruise ships with Germany's Meyer Werft to build four next-generation cruise ships with the largest guest capacity in the world. The announcement follows one from Carnival in June indicating that the other two ships included in this multibillion dollar contract are destined for its German AIDA Cruise brand. The four-ship contract with Meyer Werft is part of a larger previously announced strategic MOU with Meyer Werft and Fincantieri S.p.A for nine new ship orders between 2019 and 2022. Construction of the two new ships for AIDA Cruises will take place at Meyer Werft's shipbuilding facility in Papenburg, Germany, while the two new ships for Costa Cruises will be built at **Meyer Werft's shipyard in Turku, Finland (pictured above)**, with deliveries expected in 2019 and 2020.

Perhaps more significant is the fact these four newbuilds will be the first in the industry to be powered at sea by liquefied natural gas (LNG). These new vessels will use LNG to generate 100 percent of the ship's power both in port and on the open sea, an industry-first innovation to reduce exhaust emissions.

Each new cruise ship will exceed 180,000 gross tons, offering more than 2,600 passenger cabins and 5,200 lower berths to comfortably accommodate a total capacity of 6,600 guests. According to Carnival, a major part of its new ship design involves making more efficient use of the ship's spaces, which includes multifunctional common areas and plans for more personal space.

Horizon Delivers Towboat to FMT

Horizon Shipbuilding delivered an 80-ft. inland river towboat, the M/V Michael Akiu #86, to Florida Marine Transporters. Inc. (FMT) of Mandeville, La. The 2,100 hp M/V Michael Akiu #86 is the final vessel for FMT as part of a order for three 80' X 33' X 10.5-ft. twin propeller towboats awarded to the a Bayou La Batre, Ala. shipyard in 2013. The Project Manager for the construction of the M/V Michael Akiu #86, Mike Sims, has delivered the three 80-foot vessels on-time. The shipyard has also delivered several 140-footand 120-foot inland river towboats over its eight-year relationship with FMT.

(Photo: Horizon Shipbuilding)

M/V Michael Akiu #86

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Sea Machines

Helping to usher in the age of the Autonomous Workboat

While the topic of unmanned vessels has sparked vigorous debate and grown vociferous skeptics in all four corners of the world, Michael Gordon Johnson and his team at Sea Machines are intent on bringing an Autonomous Workboat to full-scale real-world trials by the end of the year.

By Greg Trauthwein

Michael Gordon Johnson is and entrepreneur, founding two companies and serving in various roles – offshore, heavy lift ocean transport and marine salvage – since graduating from Texas A&M University with a BA in Marine Engineering. Most recently he was a VP of Business at Titan Salvage and a VP of Projects at Crowley.

His new venture is Sea Machines, a company created to design and provide unmanned work boats and autonomous control systems for the commercial marine and offshore markets. "The idea was conceived like a puzzle over the last five years, piece by piece as I managed and executed various marine projects," said Johnson. "Once the concept came together, I quickly realized that this is the future of marine operations and the 20-year transition towards full adoption of unmanned vessels for certain markets is just about to commence."

Today, Sea Machines is nearing completion of its 24 ft. prototype steel work boat, with the intent of having it on the water in the Autumn of 2015.

The Age of Autonomy

"The traditionally crewed boat has certain limitations and a Sea Machine combines a sound hull form with modern sensors and control systems and can perform long duration, repetitive, or dangerous work boat tasks more efficiently and more safely than a manned vessel," summarized Johnson.

Version 1 (V1) Sea Machine will be a 20 ft. aluminum offshore unmanned work boat that will be ready to perform collaborative operations such as dual towing with a manned boat as found in oil boom skimming or fish seining, marine mammal escort monitoring or supervised domain grid-line operations for bathymetric surveying.

Sea Machine V1 is a small work boat with 500 gallon (or LNG equivalent) of diesel tankage. It will feature a diesel hybrid system to provide a duration of up to 7-21 days continuous operation depending on the required effort and loading.

"The Sea Machine will also be ready to be used as direct remote control operation for unique tasks such as marine fire-fighting."

While the target markets for an autonomous vessel that can work efficiently are many – think surveying, dredging, and oil spill skimming, to name just three – Johnson said "any market that utilizes small work boats in performing repetitive tasks where care of the crew actually reduces efficiency and adds liability"

While the concept of autonomy has its fair share of skeptics, Johnson and his team believe the time is now, as technology has emerged to make the Sea Machine a reality on the working waterfront.

"It's the combination of smaller more powerful and reliable computers and sensors combined with the advances in control theory and growth of the field."

"The 20-year transition towards **full adoption of unmanned vessels** for certain markets is just about to commence."

Michael Gordon Johnson,
Founder, Sea Machines

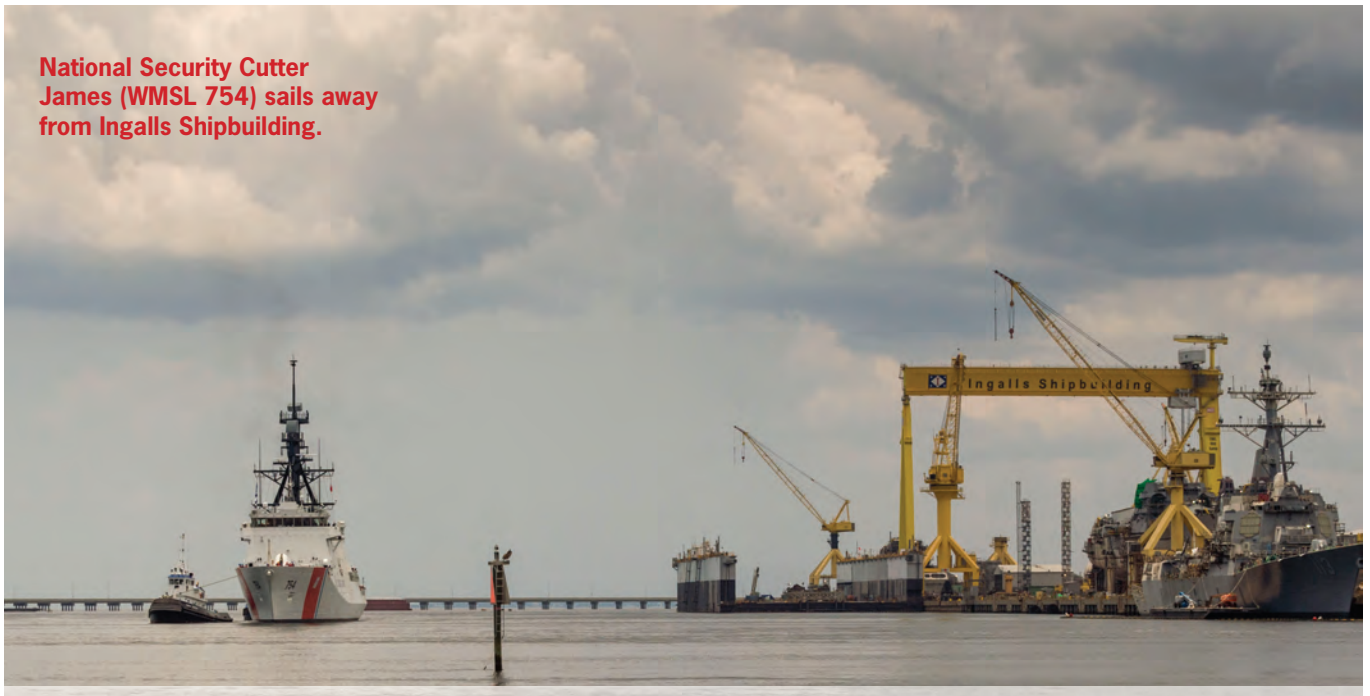
Bouchard Christens ATB

Photo: Bouchard Transportation Co.

Oceangoing petroleum barge company Bouchard Transportation Co. celebrated the christening of two new vessels, M/V Kim M. Bouchard and B. No. 270, in New Orleans. The B. No. 270 was launched at VT Halter Shipyard Operations in Pascagoula, Miss., earlier this year, and the tug Kim M. Bouchard was launched at the Moss Point Marine facility in Escatawpa, Mississippi. It is named after the older sister of Morton S. Bouchard III, President/CEO of Bouchard Transportation. Constructed independently of each other, and now paired, the M/V Kim M. Bouchard and B. No. 270 are the largest vessels to date in Bouchard's ongoing fleet expansion program.

The B. No. 270 measures 628 x 91 x 47 ft., has a 260,000-barrel capacity, and is ABS and USCG certified for Jones Act service. The B.No.270 is a fully manned and equipped with a crude oil washing system, inert gas system; clean water ballast system, four cargo pumps, two ballast pumps and two anchors. The Kim M. Bouchard is a 10,000hp twin screw, single wheel house Tug and is classed by ABS as +A1 Towing Vessel, Dual Mode ATB, USCG Subchapter M, and is equipped with an Intercon Coupler System. Paired with Barge B. No. 270, the unit will be used to transport liquid petroleum for Bouchard Transportation Co., Inc. The sister unit, M/V Donna J. Bouchard and B. No. 272 are also currently under construction at VTHM, will be delivered later this year.

New USCG Cutter Sets Sail



National Security Cutter James (WMSL 754) sails away from Ingalls Shipbuilding.

(Photo: Lance Davis/HII)

The National Security Cutter James (WMSL 754) sailed away from Huntington Ingalls Industries' (HII) Ingalls Shipbuilding division on Sunday, July 12, one month after being delivered to the U.S. Coast Guard, HII announced. The newbuild vessel James is to be commissioned on August 8 in Boston before heading to Charleston, S.C., where it will be stationed alongside Ingalls' fourth NSC, Hamilton (WMSL 753). The shipbuilder has delivered five NSCs so far, with two more under construction. An additional construction contract for an eighth NSC was awarded to Ingalls earlier this year. NSC 5 is named to honor Capt. Joshua James, one of the world's most celebrated lifesavers. His lifesaving experience began at age 15 when he joined the Massachusetts Humane Society. Over the next 60 years, he was credited with saving more than 600 lives. When he died at age 75, he was still on duty with the U.S. Life-Saving Service, which later merged into the U.S. Coast Guard. NSCs are 418 feet long with a 54-foot beam and displace 4,500 tons with a full load. They have a top speed of 28 knots and a range of 12,000 miles.

CMA CGM Takes Historic Containership

Image: CMA CGM

Shipping group CMA CGM has taken delivery of the newbuild box ship CMA CGM Vasco de Gama on July 27. Built by China State Shipbuilding Corporation (CSSC), the 18,000 TEUs vessel is, with its 399 meters length and 54 meters width, the largest ship in the CMA CGM fleet and the largest containership ever built in a Chinese shipyard.

The CMA CGM Vasco de Gama is equipped with an engine of the latest generation, a twisted leading edge rudder with bulb and an optimized hull design, together decreasing the ship's CO2 emissions by 10 percent compared to the previous vessel generation, CMA CGM said. With an estimated emission of 37g of CO2/km for each container, the CMA CGM Vasco de Gama is touted for its environmental signature. The CMA CGM Vasco de Gama is the first 18,000 TEUs containership ever built by a Chinese shipyard. The CMA CGM Zheng He and CMA CGM Benjamin Franklin, two other vessels of the 18,000 TEUs series from the CSSC shipyards, will be delivered on September and November.

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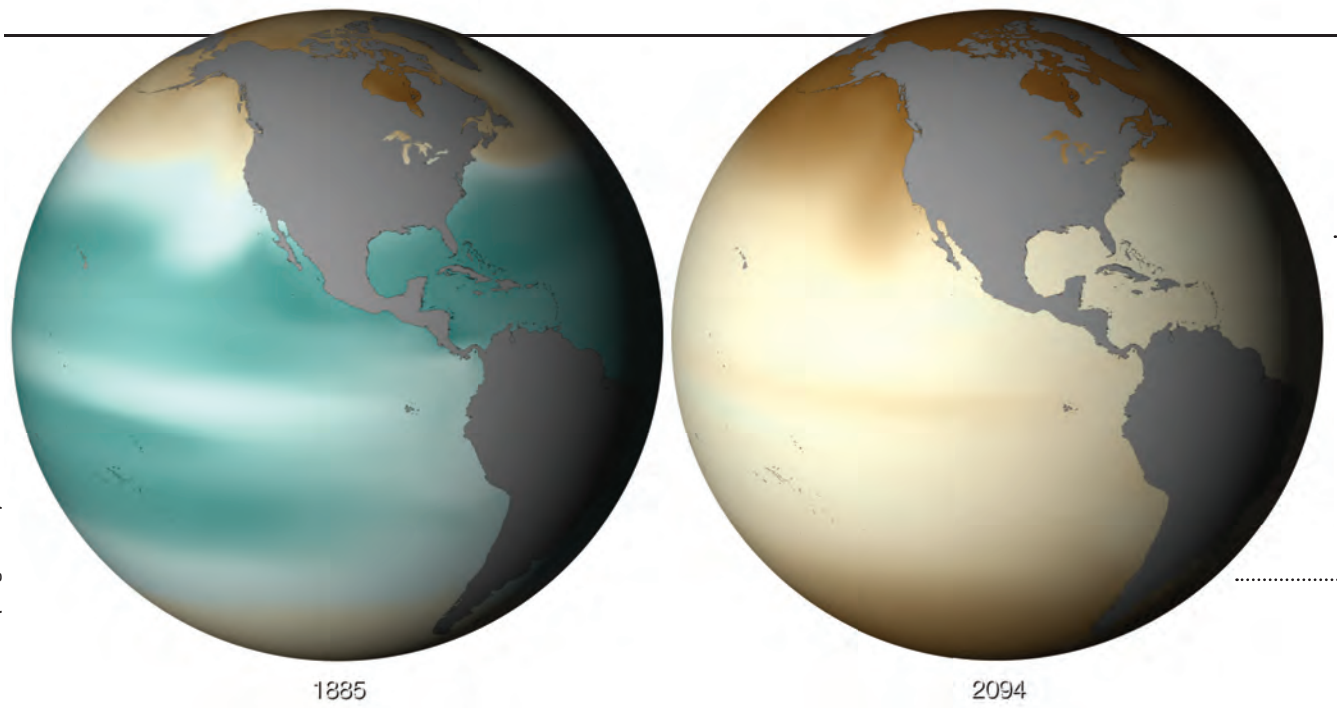
Ocean Acidification

BY DENNIS BRYANT



(Image: NOAA)

1885 2094

The two globes illustrate the changes in ocean acidification that are expected as the ocean continually absorbs carbon dioxide from the atmosphere. Green areas are sufficiently saturated with aragonite to support shell formation; areas colored yellowish-brown are under-saturated, and shell dissolution occurs. The climate model shows the change in ocean aragonite saturation from 1885 to what is expected in 2094.

Scientists say that the world's oceans are acidifying. This term is correct, but somewhat misleading. Until recently, the oceans have had (so far as can be determined) a pH level of about 8.4 for millennia. A pH of 7.0 is neutral. Thus, the oceans are alkaline, not acidific. But, since the beginning of the industrial age when emissions of carbon dioxide started to rise, the oceans' pH level has dropped to 8.3 and the waters have become less alkaline. Some argue that that is not a big change in 200 years. But it is the largest change known to have occurred in 20 million years. In addition, most of that change has occurred during the past 50 years and the rate of change is accelerating, keeping pace with the increase in carbon dioxide emissions. It has been estimated that the average pH of the oceans will fall to 7.8 by the end of the 21st century if the carbon dioxide emissions trend continues.

Why do we care? We don't live in the ocean and we don't drink seawater.

We care because there is only one Earth and one biosphere. Oceans cover about 70% of the Earth's surface and constitute more than 90% of the biosphere (that portion of the Earth capable of supporting life). Many chemical reactions, including those essential to life, are sensitive to even small changes in the pH level. A small change in the pH of seawater can have harmful effects on marine life, impacting chemical communication, reproduction, and growth.

Ocean carbonate chemistry is a natural buffering system, but this buffering capacity is being compromised as a direct result of carbon dioxide absorption by the oceans. The dissolved forms of carbon dioxide – carbonic acid, bicarbonate, and carbonate – have a significant impact on seawater pH levels because their concentrations are rapidly absorbed and distributed compared to other seawater constituents.

As the oceans uptake the increased amounts of carbon dioxide from the atmosphere, a portion converts into carbonic acid, thereby reducing the alkaline level of the water. Higher acidity of the oceans can reduce the ability of some marine species to mature and form shells and it can alter their physiology or behavior, affecting growth, fertilization, embryonic/larval development, and survival. It impacts marine ecosystems by such means as disrupting predator and prey relationships in food chains and altering habitats, including by degrading barrier reefs that protect coastal areas. Over time, lowering of pH levels can damage local economies by disrupting fishing and tourism.

Higher levels of carbon dioxide in seawater cause chemical reactions that reduce the saturation state of calcium carbonate minerals such as aragonite and calcite. Many marine organisms, including oysters, clams, starfish, and zooplankton, as well as some plants and algae, construct their shells and other structures from these minerals. As the saturation state approaches, these minerals are leached out of the shells and other structures, having potentially fatal consequences. Even if the organism survives, it must devote more energy to shell/structure grow and maintenance, leaving less energy available for reproduction and other activities. Disrupting the calcium carbonate cycle not only impacts these animals, it has adverse effects on the entire marine ecosystem.

The pH level of the blood in marine animals is lower than the pH level of the seawater. Ocean acidification reduces the difference between those two pH levels, with adverse consequences. Respiratory proteins in the blood, such as hemoglobin, bind oxygen at high pH and release oxygen at low pH. This allows oxygen uptake at the gills or similar structures and oxygen release at the cells, where metabolically-produced carbon dioxide has decreased the pH. If the pH levels at the gills and at the cells are similar, a condition called respiratory acidosis results and death can occur.

Most, but not all, marine plants and algae will probably suffer few adverse consequences from a moderate lowering of the pH level of seawater, but further research is required. What is known is that ocean acidification reduces biodiversity, ultimately causing adverse impacts throughout the biome.

In 2009, Congress adopted the Federal Ocean Acidification Monitoring and Research Act (FOAMRA). This statute established an ocean acidification program within the National Oceanic and Atmospheric Administration (NOAA) and directed comprehensive research on the processes and consequences of ocean acidification on marine organisms and ecosystems. As the statute's name indicates, it only authorizes increased and coordinated monitoring and research relating to ocean acidification. Active measures to reduce or ameliorate ocean acidification must be undertaken under separate pre-existing or subsequently adopted statutory authority.

The problems posed by ocean acidification are not local or even regional. They are worldwide. Halting or reversing this process requires global action, principally involving the reduction of carbon dioxide emissions. Needless to say, this will be a heavy lift.

The Author

Dennis L. Bryant is with Maritime Regulatory Consulting, and a regular contributor to Maritime Reporter & Engineering News as well as online at MaritimeProfessional.com.

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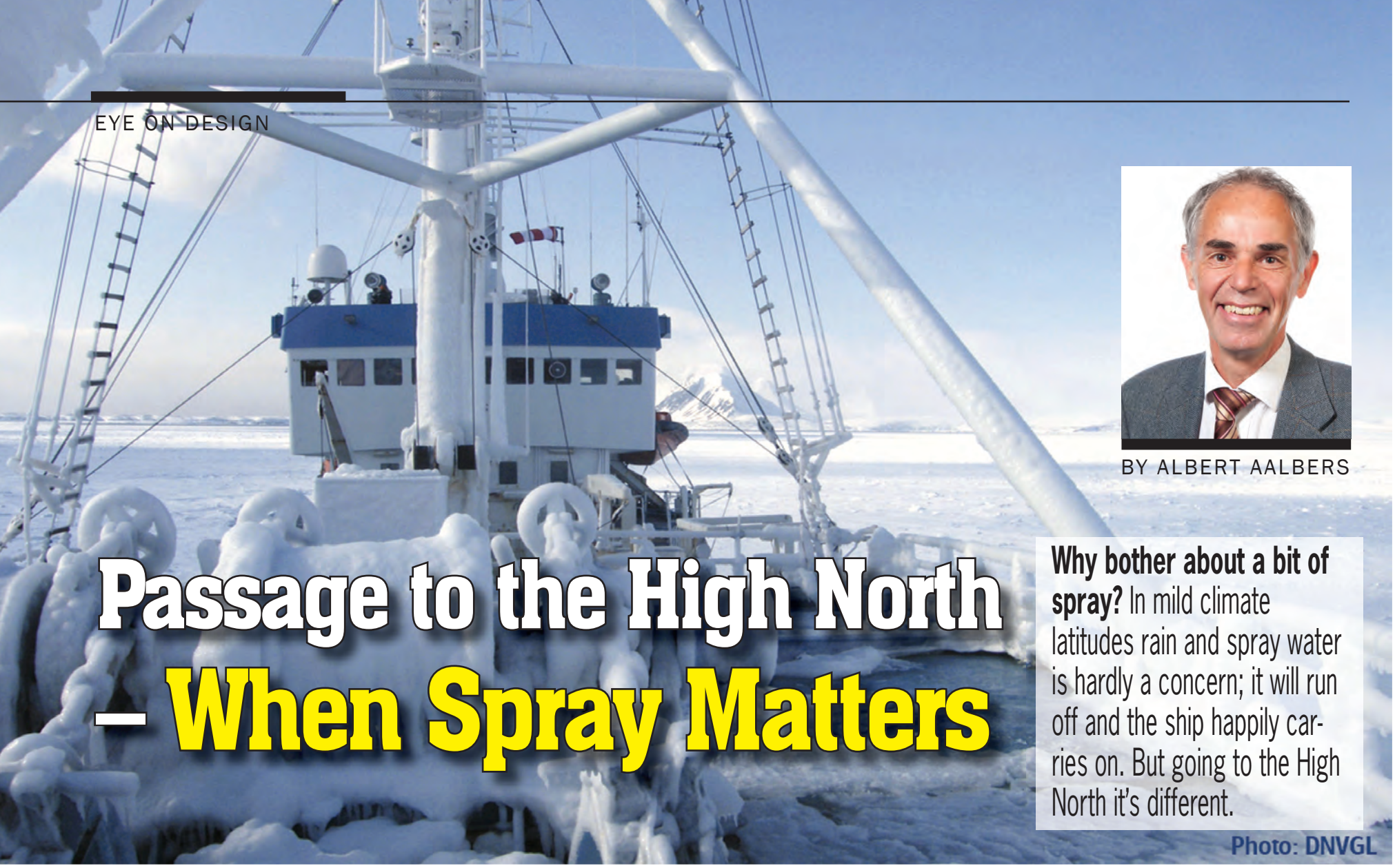


BY ALBERT AALBERS

Passage to the High North – When Spray Matters

Why bother about a bit of spray? In mild climate latitudes rain and spray water is hardly a concern; it will run off and the ship happily carries on. But going to the High North it's different.

Photo: DNVGL

With the economic development of the High North and Arctic areas, partly driven by the reduced ice conditions and partly by opportunities to develop oil & gas and scarce mineral resources, maritime operations in these areas are booming. But safety of the environment, crew and their ships is of prime concern. In the Arctic, global warming doesn't mean milder conditions.

One of the operational aspects to be considered is icing, formed by precipitation and through seawater spraying onto the ship in cold weather. A major hazard leading to intense icing is a so-called 'Polar Low,' which are small, low-pressure systems developing into storms with sharp temperature rises – typically from -20 to -1 ˚C – and this is combined with precipitation. A ship in these conditions will be cold, plus the seawater is cold and spray and precipitation will stick.

Time Domain Simulation

In the SALTO JIP icing is one of the parameters considered in the time domain simulation for operations in Arctic conditions. In the metocean modelling, provided by the Danish Meteorological Institute, precipitation icing is computed, while MARIN has formed a co-operation with Delft University to develop a computational model for seawater spray. This will predict spray volumes and drop sizes and then the thermodynamic and ballistic process in which the spray water will develop an ice cover on the ship.

The generation of spray on a ship in waves is a hydrodynamic No Man's Land. In the past year a probabilistic model was developed, taking into account the prime elements of spray generation comprising:

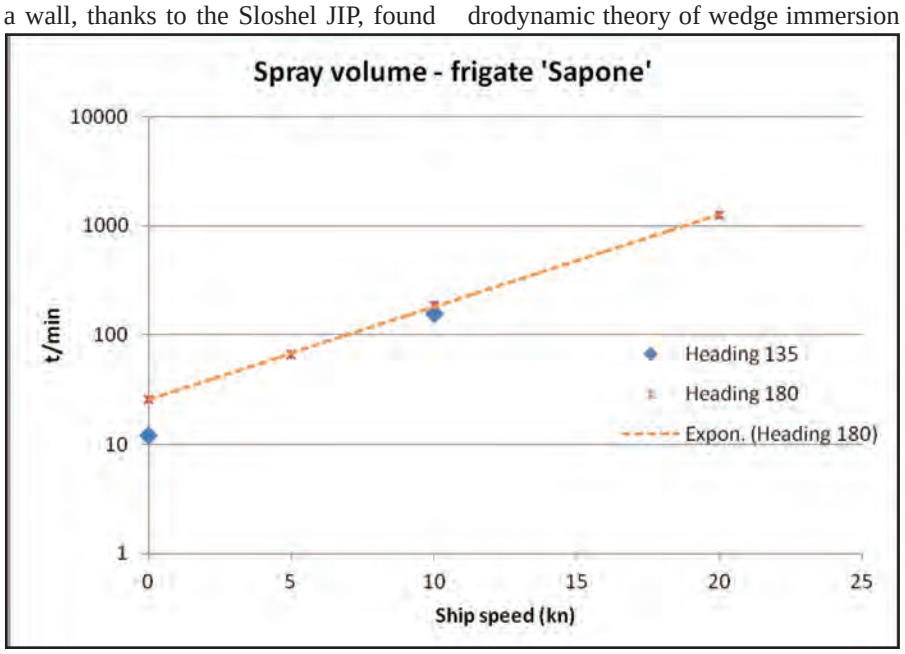
- Ship motions
- Above water hull shape
- Bow wave (at speed)
- Wave non-linearity

A thorough examination of high-speed video of large scale waves impacting on a wall, thanks to the Sloshel JIP, found that two mechanisms have to be considered: jet forming due to rapid immersion of a bow section and jet forming due to impacts.

Rapid immersion spray leads to a jet breaking up due to vorticity formed by friction along the hull, according to the well-known Kelvin- Helmholz instability process. The break-up in droplets after an impact event is much quicker and has a close resemblance to the Richtmyer-Meshkov instability process from a shock wave.

The main step in the modelling process is matching the ship motions in waves to a jet generating process. For this, the hydrodynamic theory of wedge immersion was used. The jet thickness and velocity exceeding the bow height are then computed. Hourly volumes of spray water over the bow can be computed by applying this method to a ship transiting in an irregular sea. There is unfortunately scarce validation material available, although what we have matches satisfactorily. Results were published at the Arctic Technology Conference in Copenhagen in March 2014, thereby inviting the industry and other interested parties to provide further validation material.

The development of a realistic prediction method for bow spray has shown that the effect of bow shape, speed and wave direction are very strong. Previous models could hardly distinguish between ship size and they used only speed and wind parameters to predict spray formation at the bow. MARIN believes that for this reason it is fair to say that a major step forward has been made in the ability to better predict sea spray induced icing.



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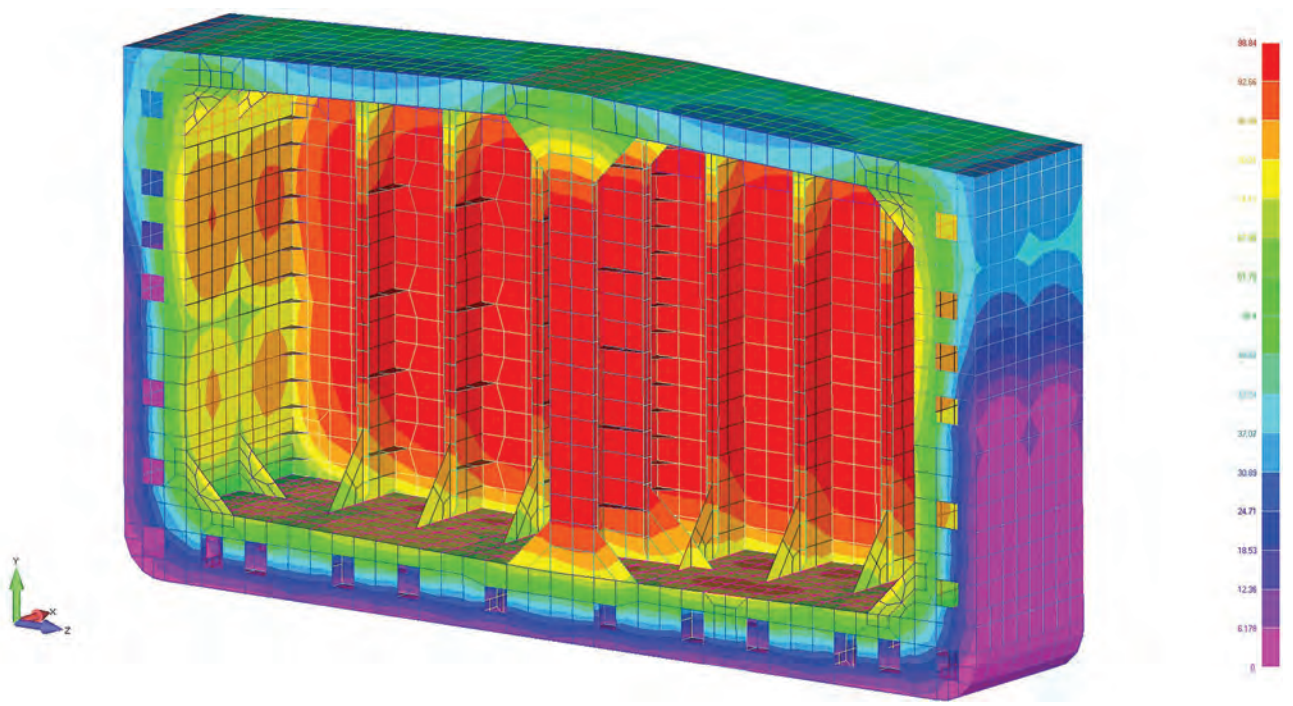

BY FRITZ WALDORF

With the publication of the 2015 Rules for Building and Classing Steel Barges, ABS has amended the rules to require the submittal of a steady state temperature distribution for Oil Tank Barges that carry heated cargos at temperatures greater than 50°C (122°F) and a structural assessment to determine the resulting thermal stresses in barges where the steel temperature is expected to exceeds 50°C (122°F). While similar requirements have been in place for sev-

With the increase in the classification requirements for oil tank barges comes the need for additional guidance on the use of advanced analysis tools to satisfy the ABS requirements.

eral years for chemical tank barges, the expansion of the requirement to include oil tank barges (which includes asphalt barges) is expected to significantly increase the demand for advanced analysis to evaluate the steady state temperature distributions in integrated double hull tank barge structures, and the thermal stress resulting from the large thermal gradients generated between the heated cargos and significantly cooler external sea water.

With the increase in the classification requirements for oil tank barges comes the need for additional guidance on the use of advanced analysis tools to satisfy the ABS requirements. While ABS does not currently have published guidance on the use of Finite Element Analysis (FEA) for the calculation of temperature distributions or thermal stresses, they are currently working to develop a guidance note for thermal analysis. At a February 2015 FEA Seminar and Workshop presentation in New Orleans, ABS presented their ongoing work to develop guidance for the use of advanced analysis in thermal stress assessment, and provided several examples of the successful work performed by naval architecture and marine engineering firm, Viking Systems International, Inc. The examples provided by ABS showcased the process developed by Viking over the past 15 years to leverage existing advanced analysis tools along with in-house developed SAGA software to load and evaluate the structure for the combined effects of the thermal loads with traditional hydrostatic and seaway loads. (Image: steady state temperature distribution plot)

Viking Systems International Inc has worked with shipyards, designers, and owners of heated cargo barges and tankers over the past 15 years to develop a methodology for the prediction of the steady state temperature distribution through the double hull structure. Viking has worked with thermal measurements from several barges in service to correlate with the numerical predictions, and validate the methodology. The advanced analysis method incorporates solid elements into a global finite element model to represent the boundary layer of the heated cargo and the external seawater and air, as well as the stagnant air within the empty ballast tanks and above the cargo level in full tanks. The finite element model is then used to solve for the accurate thermal gradients between the project specific cargo core temperature, and the ABS required external air temperature of 5°C (41°F) and a sea temperature of 0°C (32°F).

Hydrostatic and hydrodynamic seaway loads are calculated with a full hydrodynamic analysis for the barge in a realistic extreme sea state and combined with the thermal loads for a series of critical load cases developed to maximum global and local design loads on the structure. The finite element model is solved, and the resulting stresses are evaluated against the appropriate acceptance criteria from the classification society. To optimize the design and verification efforts, SAGA is paired with other industry leading software and can account for various regulation standards throughout the industry (ABS, DNV-GL, or BV for example). For the majority of these projects in the US, the acceptance for both yielding and buckling are evaluated in global FEA models with the ABS Dynamic Loading Approach (DLA) Guide and ABS Steel Vessel Rules (SVR), respectively.

As these rules begin to develop, the finite element analysis will be an integral part of solving the complex interaction between thermal loads and tradition barge hydrostatic and dynamic seaway loads. Methods have shown the ability to accurately predict the thermal distribution of real world operating barges. The development of custom analysis tools put in place has efficiently streamlined this complex process to generate a more efficient approach while satisfying the increase class requirements, compared to previous traditional methods.

The Author

Fritz Waldorf is Director of Sales and Marketing for Viking Systems International, Inc. Viking Systems has been assisting shipyards and ship designers worldwide with the efficient implementation of advanced analysis tools in the floating vessel design process.

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Higman Barges by Capt. Darren Istre

BY JENNIFER A. CARPENTER

AWO Working Hard for the Domestic Workboat Market

The year 2015 has been a busy year for The American Waterways Operators, the national trade association for the tugboat, towboat and barge industry, and for the industry AWO is privileged to represent. It's a dynamic time for a vital industry that constitutes the largest segment of the U.S. domestic fleet, as companies throughout the industry are investing heavily to meet evolving customer needs; the industry stands on the verge of historic regulatory change; and AWO pursues an active public policy agenda to support members' needs for predictable and practicable government policy.

Investing for the Future

The tugboat, towboat and barge industry is a critical part of our nation's transportation system. Each year, the industry's 5,000 tugboats and towboats and 23,000 barges move more than 800 million tons of critical commodities that are the building blocks of the U.S. economy, including petroleum, coal, chemicals, stone, sand, gravel, cement, steel and lumber. The industry employs more than 33,000 Americans as vessel crew members and nearly half a million Americans work in industries that rely upon water transportation.

AWO members are investing heavily to meet the demands of their customers and our country for safe, reliable, cost-effective transportation. In 2014, there were a record 344 new tank barges delivered with a total capacity of 7.74 million barrels. Investment in dry cargo capacity is occurring as well, with 561 inland hopper barges delivered last year, a five percent increase from the 2013 levels. Some 117 new tugboats and towboats were constructed in 2014, and 10 state-of-the-art articulated tug-barge units (ATBs) will be delivered within the next two years.

A New Safety Paradigm: Towing Vessel Inspection

This year, the tugboat, towboat and barge industry is on the verge of an historic regulatory advancement, anticipating the publication of new U.S. Coast Guard regulations that will bring towing vessels under an innovative inspection regime that will improve safety, security and environmental stewardship throughout the industry. Securing the publication of and preparing AWO's members to comply with the new regulations—known as Subchapter M—are AWO's highest advocacy and safety priorities.

For more than a decade, AWO and its members have worked closely with the Coast Guard to develop Subchapter M, which is currently undergoing final review by the Department of Homeland Security. The Coast Guard, with the strong support of AWO, was directed by Congress to establish a towing vessel inspection regime in the Coast Guard and Maritime Transportation Act of 2004. Since that time, the Coast Guard has engaged stakeholders in an inclusive and thoughtful process to develop the rule via the Congressionally authorized Towing Safety Advisory Committee. The result is overwhelming support from the tugboat, towboat and barge industry, the public, and bipartisan members of Congress for finalizing the regulations.

When published, Subchapter M will build on the safeguards that responsible companies have already put in place and ensure that all towing vessels meet a minimum threshold of safety to protect life, the environment, and property. There will be two ways in which companies can comply with Subchapter M. The first is to submit to annual vessel inspections conducted by the Coast Guard. The second is to implement a Towing Safety Management System, or TSMS, that is accepted by the Coast Guard and audited by a Coast Guard-approved third party organization.

Since the start of the regulatory development process, AWO and TSAC have strongly supported making compliance with a safety management system a requirement of the new towing vessel inspection regulations. Safety management systems promote continuous regulatory compliance, provide early warnings of problems or deficiencies that could lead to accidents, and prevent accidents caused by equipment failure by ensuring continuous attention to routine vessel maintenance. Choosing to comply with Subchapter M by implementing a TSMS will also provide towing vessel operators with much greater flexibility, and will be a more efficient utilization of Coast Guard resources than annual Coast Guard inspections.

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AWO has high expectations that **Subchapter M** will have a transformative effect on industry safety by raising standards of safety and environmental stewardship throughout the tugboat, towboat and barge industry.

Michael G. Morris Posed @ Paducah, KY.

AWO members are already required to comply with a third-party-audited safety management system as a condition of membership in the association. In 1994, AWO became the first transportation trade association to adopt a code of safe practice and environmental stewardship for its member companies. Today, the AWO Responsible Carrier Program is the most widely used safety management system in the tugboat, towboat and barge industry. AWO members use the RCP to develop company-specific safety and environmental policies and programs tailored to the industry's unique operational environments. The RCP incorporates best industry practices in company management policies, vessel equipment and human factors.

Earlier this year, the U.S. Coast Guard confirmed that it intends to accept the AWO Responsible Carrier Program as a TSMS once the towing vessel inspection regulations are finalized, concluding that the RCP is substantively equivalent to the International Safety Management Code.

AWO has high expectations that Subchapter M will have a transformative effect on industry safety by raising standards of safety and environmental stewardship throughout the tugboat, towboat and barge industry. That will be good for our industry, good for the environment, and good for the American public.

Moving Closer: Uniform Standards for Vessel Discharges

Another of AWO's long-term advocacy priorities is moving closer to reality this year. For the last seven years, AWO and a broad coalition of over 60 national and regional maritime and business organizations have been pushing for legislative reform that would establish a uniform national framework for the regulation of ballast water and other vessel discharges. Through the bipartisan efforts of Sens. Marco Rubio (R-FL), John Thune (R-SD), and Bill Nelson (D-FL) S.373, the Vessel Incidental Discharge Act (VIDA), is poised to make its way to the Senate floor sometime after the August recess. The bill, which currently has 26 bipartisan cosponsors, was attached to the Coast Guard reauthorization bill (S. 1611) that was approved by the Senate Commerce Committee in June.

VIDA would end an untenable situation in which vessel operators must comply with both Coast Guard and Environmental Protection Agency regulations, as well as more than 150 state-specific requirements set by more than two dozen states. As AWO Vice Chairman James Farley, President of Kirby Offshore Marine, explained at a Senate Commerce Committee hearing in February, "The problem is not that vessel discharges are regulated; it is how they are regulated. The current unclear and inconsistent regulatory system makes compliance confusing and investment decisions uncertain." VIDA will ensure the highest standard of protection for the waterways and provide the regulatory certainty vessel owners need to make investments in state-of-the-art ballast water treatment systems.

Companion legislation—H.R. 980—was introduced in the House by Representatives Duncan Hunter (R-CA), Elijah Cummings (D-MD) and Frank LoBiondo (R-NJ) and has 20 bipartisan cosponsors.

Building Support for the Jones Act

The tugboat, towboat and barge industry brings vital commodities to communities throughout the U.S. mainland, Alaska, Hawaii, and Puerto Rico. The industry also provides jobs for American citizens and supports U.S. economic, national and homeland security objectives, serving as the "eyes and ears" for the Coast Guard on the coastal and inland waterways. The statutory foundation of the domestic maritime industry is the Jones Act, which requires that vessels moving goods between U.S. ports be owned, crewed, and built by Americans.

The Jones Act provides a level playing field and a stable investment climate that gives American vessel owners the confidence to make long-term investments in vessels, equipment and shoreside infrastructure. With the Jones Act as its foundation, the domestic maritime industry supports nearly half a million American jobs and drives almost $100 billion in economic benefit to the United States.

Working closely with the American Maritime Partnership, a broad-based coalition of maritime and national defense organizations, AWO continually works

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U.S. Coast Guard Commandant ADM Paul Zukunft **questioned the effects of weakening the Jones Act on maritime safety and environmental protection** on U.S. waterways, saying, "If we have foreign-flag vessels doing [coastal] trade, what are the safety standards, what are the maritime pollution standards? How are they in compliance with the same standards that we apply to our U.S. fleet?"

to educate policymakers on the benefits the Jones Act provides brings to the country, working families, and communities that depend upon goods delivered safely, securely and efficiently. AWO and AMP also work to combat misinformation about the Jones Act and defeat attempts to weaken the law.

One such attempt arose just after the 114th Congress convened in January, when Sen. John McCain (R-AZ) filed an amendment to the Keystone XL Pipeline bill to repeal the U.S.-build requirement of the Jones Act. AWO joined AMP in an intensive lobbying effort to build opposition to the amendment, which was ultimately not offered during floor debate.

Significantly, senior U.S. military officials spoke out strongly in favor of the Jones Act and in opposition to the McCain amendment.

U.S. Coast Guard Commandant ADM Paul Zukunft questioned the effects of weakening the Jones Act on maritime safety and environmental protection on U.S. waterways, saying, "If we have foreign-flag vessels doing [coastal] trade, what are the safety standards, what are the maritime pollution standards? How are they in compliance with the same standards that we apply to our U.S. fleet?" General Paul Selva, then Commander of the U.S. Transportation Command and now Vice Chairman of the Joint Chiefs of Staff, told the Senate Armed Services Committee that "The Jones Act contributes to a robust domestic maritime industry that helps to maintain the U.S. industrial shipyard base and infrastructure to build, repair, and overhaul U.S. vessels. The Jones Act requirement for U.S.-crewed and built vessels provides additional capacity and trained U.S. merchant mariners that can crew RRF vessels in times of war or national emergency."

Maintaining Waterways Reliability and Invasive Species Management

The introduction of invasive species such as Asian carp into the interdependent inland waterways system has created tension between the dual imperatives of controlling the movement of harmful fish and maintain the uninterrupted flow of commercial navigation. Unfortunately, efforts to control invasive species include proposals that would shut down segments of the waterways system.

This issue is particularly acute in Illinois, where the Chicago Area Waterways System (CAWS) is the sole link between the Mississippi River and the Great Lakes. Every year, barges safely and efficiently carry almost 20 million tons of cargo through the CAWS, including critical commodities such as grain and petroleum. However, initiatives to stop the spread of invasive species, including Asian carp, have the potential to disrupt vital transportation links. AWO is committed to working with government and private sector stakeholders to develop solutions that keep the waterways open for safe and efficient navigation while protecting against the spread of invasive species.

Conclusion

This is a dynamic time for the tugboat, towboat and barge industry, a vital industry pursuing an ambitious public policy agenda aimed at safeguarding and expanding its ability to provide safe, efficient, cost-effective transportation for the benefit of its customers and our country. AWO is committed to leading the industry in securing informed public policy that supports its members in moving vital cargoes, making investments in new vessels and equipment, and leading the transportation industry in safety and environmental stewardship.

The Author

Jennifer A. Carpenter serves as Executive Vice President of the American Waterways Operators (AWO), the national trade association representing the U.S. tugboat, towboat, and barge industry.
Ms. Carpenter joined AWO in August 1990. She served as Government Affairs Assistant, Manager-Regulatory Issues, Director-Government Affairs, Vice President-Government Affairs, Senior Vice President-Government Affairs and Policy Analysis, and Senior Vice President-National Advocacy before assuming her current position in December 2013. From 1994 to 2007, she was a member of the congressionally authorized Towing Safety Advisory Committee (TSAC). Ms. Carpenter has also served on the Committee on Inland Water Transportation of the National Research Council's Transportation Research Board. She has received two Meritorious Public Service Awards and a Public Service Commendation from the U.S. Coast Guard for her contributions to the Towing Safety Advisory Committee and the Coast Guard-AWO Safety Partnership.

Cyber Security

& the challenge to Maritime Networks

BY ADRIAN HARTMAN

BY PAUL REMICK

"Look at me: I am the Captain now."

In the film "Captain Phillips," a boarding Somali pirate's statement represents a maritime operator's worst fear: losing control of his vessel, cargo and crew.

This same loss of control can result from cyber criminals and hackers. In the last year, there have been multiple prominent cyber attacks causing serious economic harm to companies and their partners with Sony Pictures being just the latest high profile victim.

The maritime industry is particularly susceptible to cyber attack. Ships transfer millions of dollars of cargo and often utilize antiquated communications and network hardware. The frequent rotation of ships' crews also magnifies the risk of an insider providing malicious access to the network for financial gain. In situations where ships can connect their network from sea, cyber criminals can gain access remotely without an insider on board. Once cyber criminals have access to systems controlling navigation, propulsion, fire suppression, fresh water or electric—it can be just like the situation encountered in Captain Phillips.

Modern Network Architecture

For years, increasing bandwidth has been central to maritime communication. There is still a need for big pipes, but what may be more important now are smarter pipes, or in other words, more modern hardware. Fleet owners typically plan their network equipment to have long lifespans for ships that can run 30 years or longer, but in the process they are opening themselves up to risk and inefficiency. Network hardware and software updates provide needed security protocols against known vulnerabilities as well as more robust functionality.

For example, two-factor authentication, biometric authentication and frequently rotated robust passwords offer additional protection. Identity management and role-based authentication protocols can also neutralize the insider threat, as on-board operators can have a lower level of authority than shore-based network administrators who can efficiently oversee multiple ships in the fleet. Network management technology has also advanced significantly in the last few years, helping operators review logs and create alarms for any unusual network activity.

Hardware updates can also reduce costs over time through improved efficiencies. For example, many outdated network architectures we see today can often have six or more separate systems running at 10 percent capacity rather than a single integrated network running at 50 percent or greater capacity.

If your ship is at sea with communication equipment that is more than 10 years old, consider how a modern network architecture and security posture can mitigate the growing risk of cyber crime and improve operations.

The Author

Adrian Hartman, Ph.D. is the Director of Sales and Solutions Engineering at LGS Innovations, a provider of networking and communication solutions

Paul Remick is the Navy Account Director at LGS Innovations. Contact him about maritime communications or networking at remick@lgsinnovations.com.

Damen Delivers Twin 'Axe Bow'

Damen Shipyards Group operates 32 shipbuilding and repair yards, employing 9,000 people worldwide. This ubiquitous name in global shipbuilding has delivered more than 5,000 vessels in more than 100 countries and delivers some 160 vessels annually.

Jan-Wim Dekker, is Damen's Chief Products Officer (CPO), and the executive who is ultimately responsible for the efficient operation of the Damen shipyards. With such a diversity – both in geographic locale and vessel built – Dekker said that consistency of quality is central to any Damen operation. "First of all we build the same vessel with the same quality at various shipyards around the world," said Dekker. "So at the outset, in the design and engineering phase, we take into account the different requirements that each yard may have. One of the most important things for us is quality, and to deliver to the customer a good working vessel. Proven quality and reliable delivery times are the two most important factors. In Damen's case, another advantage is our worldwide presence."

Innovation in design and outfit is the expectation not the exception, and Damen has driven many innovations in its history.

"Innovation is important too, particularly looking at development such as our Axe Bow, a development which allows our customers to operate the vessel in a larger window compared to competitors," said Dekker. "The Axe Bow is a game changer."

Damen Maaskant Shipyards Stellendam have had a long relationship with Groen Offshore, Guard & Support, and recently delivered the first Twin Axe Fast Crew Supplier, dubbed Merel-G.

Named after the 10-year old granddaughter of Groen's Managing Director, the official handover of the Merel-G took place in late July after which the vessel was deployed on long-term charter for a major E&P operator in the Danish part of the North Sea.

Groen Offshore, Guard & Support has more than 40 years of experience in the offshore industry. Founded in 1973, with three vessels for the sport fishing and recreation business in the North Sea, Groen transitioned to the offshore industry in 1980 and is now specialised in guard and seismic support vessels – five of which were built at Maaskant.

Ballast Water Treatment:

Are You on Course for Compliance?

BY GEOFF TAYLOR PSM
INSTRUMENTATION

KATIE DAVAGE CHELSEA
TECHNOLOGIES GROUP

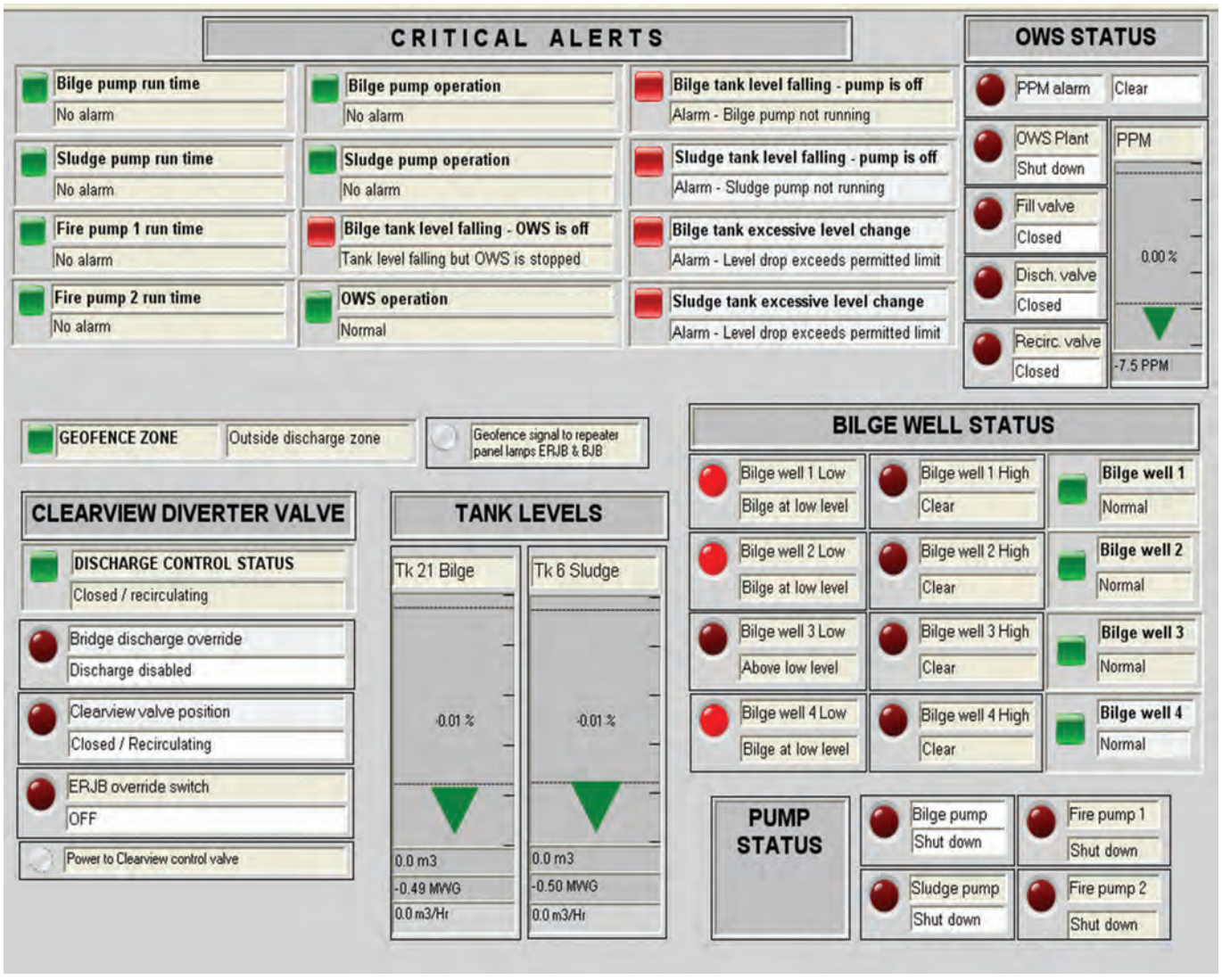
Joined up thinking from two marine technology suppliers addresses impending legislation for Ballast Water Treatment and offers a practical solution for monitoring and recording the correct discharge of ballast water, in real-time.

The International Maritime Organizations 2004 Ballast Water Management Convention lays down strict guidelines for the treatment and discharge of ballast water. Already in force as of January 1, 2015 in U.S. waters, universal ratification is expected to occur during the next six months. The new legislation, which will require tens of thousands of ships to be retrofitted with new systems for Ballast Water Treatment, has caused much debate within the marine industry.

To date, discussion has largely centered around which type of treatment technology is most suited to the task. However, this has overshadowed two very important aspects of the new regulations which must form part of the overall treatment regime in order to be effective in ensuring environmental compliance: point of discharge measurement and recording and reporting of treatment activities.

The new rules are governed by strict liability laws, meaning that operators or owners can be considered guilty without finding of fault. The authorities need only prove that the event occurred, with vessel owners being held responsible for the discharge. Consequently there is a very real need for a measurement and recording system that quickly and reliably reports on the efficacy of the ballast water treatment plant.

A new joint development between PSM Instrumentation and Chelsea Technologies Group aims to address these important issues and to provide clear evidence of compliance when required to do so.



Name of vessel		M/V Example		
Number		IMO 1234567		
Date	Function	Activity	Operation	Signature
22/11/2012	3.2	BW treated		
		3.2.1	Start 18:00 Stop 18:00	
		3.2.2	500 m3	
		3.3.3	Yes	
		3.2.4		Mark Jones

Pictured above: **A ClearView onboard display of the real-time BWT activity, an example of the BWT Record Book printed for Port State inspection and historic BWT activity report transmitted onshore for management reporting.**

Point of Discharge Measurement

A key requirement for any treatment system installed is to provide analysis of the ballast water at the point of discharge to prove correct treatment. Using the inherent high sensitivity of the FastBallast Compliance Monitor, the variable fluorescence of live viable phytoplankton cells in moving ballast water can be monitored to the levels required by the IMO D2 standard (10 to 50um category).

Developed by Chelsea Technologies Group and based on established marine technology, the FastBallast Compliance Monitor has been specifically developed for working with phytoplankton within the aqueous phase at low optical density, exactly the conditions encountered in ballast water. FastBallast interrogates the photosynthesis process taking place within phytoplankton to distinguish between which cells are alive or dead. Using complex algorithms, FastBallast can rapidly determine if your ballast water discharge is compliant.

To ensure that all phytoplankton present within the 10 to 50um range are detected, FastBallast uses multiple LED excitation channels. A highly sensitive photon multiplier tube is used to detect the variable fluorescence of live phytoplankton. Each measurement takes only 200 µs, which means that data can be collected from fast moving water (up to two metres of linear flow per second), typically encountered within ballast tanks or water treatment system piping.

FastBallast is available as a portable or integrated system. Capable of operating in flow through and static sampling mode, the portable version of FastBallast is designed for carrying out spot check measurements, reassuring port state control and shipboard engineers that their BWTS is operating as it should. The touch screen displays a RAG (red-amber-green) system used to indicate whether the ballast water discharge is compliant with regards to current regulations. Data can be downloaded via USB or ethernet for a more detailed assessment of the treated ballast water..

The integrated variant of FastBallast is designed for permanent installation within a BWTS, where it will operate in flow through mode providing a continuous update on discharge compliance. This version of FastBallast can interface with PSM Instrumentation's BallastView, a system for logging compliance data onboard a vessel which can also transmit data ashore, if required.

Using FastBallast will improve the ballast water management regime of vessels in time for ratification and will

assure the end user whether that be a ship operator, BWTS manufacturer or port state control officer that a given Ballast Water Treatment System is discharging ballast water in.

Recording and Reporting of Treatment Activities

An equally critical stipulation of the new regulations is Requirement B-2, which calls for vessels to hold data in a ballast water record book. This can be in an electronic format, either standalone or integrated into another system. The recorded data must include the following key information to prove correct operation:

- ***When ballast is taken onboard, volume, date, time and geographical location***
- ***Movement of ballast water for onboard ballast water management purposes***
- ***When ballast is discharged to sea, volume, date, time and geographical location***
- ***When ballast is discharged to a reception facility, volume, date, time and location***
- ***Accidental or other exceptional uptake or discharges of ballast water***

Entries into the ballast water record book must be maintained onboard for a period of two years after the date of entry and thereafter kept in the company's control for a further three years.

Marine systems specialists PSM Instrumentation undertake continuous research and development aimed at providing operators with improved control and visibility onboard vessels. The latest BallastView system from PSM Instrumentation, for example, is a modular solution comprising a suite of onboard and shoreside hardware and software elements, developed to ensure vessels are operated efficiently, safely and in an environmentally responsible manner. Integral to the system's functionality are secure data recording capabilities which more than meet the stipulations set out for the new reporting requirements.

The system's Ballast Water Treatment module allows shipping vessel operators and onshore personnel to monitor the operation of ballast water treatment equipment continuously without the need for intervention by the ships crew. An encrypted recording capability electronically captures all key data and provides secure archive storage onboard or onshore, offering proof of correct operation and legal compliance during the three year period required.

The Authors

Geoff Taylor has spent a large part of his career in marine engineering and is the founder of PSM, as a company dedicated to developing innovative technological solutions to improve operations and safety on board merchant and navy ships.

Katie Davage is the Sales Manager at CTG responsible for developing and promoting Chelsea's ballast water monitoring capabilities. Katie is a member of the Ballast Water Expert Group and IMarEST.

(Photo: William Stoichevski)

"We're working with four independent labs right now to validate (technology) submittals **... I'm pretty optimistic we will have Coast Guard approved ballast water standards by the IMO conference in November."**

Admiral Paul Zukunft, Commandant of the USCG, discussing the ballast water issue at NorShipping

Nor-Shipping Notebook:

Ballast Water Treatment

Modular and Just in Time

By William Stoichevski

A pair of market entries — one a business of powerful Japanese technology players, the other a newbie with some pedigree — reveal how bold, modular design could pay dividends in a competitive market. Their increments of innovation add up to timely ways to comply with changes, including extra U.S. Coast Guard strictures due out on the eve of an International Maritime Organization meeting in November 2015. The record numbers of vendors at Norway's Nor-Shipping show offer paths to compliance, as countries add rules or ratify IMO Section B edicts aimed at stifling foreign species incursions by ballast water.

The IMO's mandatory Section B ballast water strictures come into force for all vessels on Jan. 1st, 2016, but that's not why we slide ourselves into a seat at Ecomarine's booth and absorb a video on how the company's filter-first, UV and electrolysis neutralizing technology kills stowaway sea life.

Through the presentation we come to understand that Nor-Shipping is Ecomarine's first foray into a sizeable market of Norwegian owners and operators. We ask how their technology compares to that of dominant Norwegian player, Optimarin, and a sales representative says, "The same." We take it he means "also an ultraviolet-light system" for killing invasive organisms in ballast water. The trademark Ecomarine is a brand and joint venture of Hitachi Zosen and Sumitomo Electric, so its presence is significant at Nor-Shipping. Optimarin dominates Norway market share via sales to offshore service vessels with ballast pump capacities of from 80 cubic meters per hour to 250 m3ph (and other vessels up to 2,000 m3ph). So, Ecomarine is competitive with its "IMO and AMS approved" UV system for up to 600 m3ph. Its 600 m3ph Electrolysis system is understood to be waiting for "type approval" later in 2015, around the time the IMO meets.

The dates are a reminder of what Optimarin CEO Tore Andersen once told this writer: "No one is type-approved," a shake of the head at ongoing class and country changes for ballast systems that seek to eradicate some 200 plankton and bacteria measured by the C.M.F.D.A and USCG.

"It seems no one has been able to meet (total eradication levels)," Andersen said.

Modular magic

Unlike metal mesh systems, the Ecomarine system starts by circulating ballast water through a "non-woven" filter system that feels like a strong, papery fabric in the hand. An image of the filtered water at 50 micrometers appears to show no sign of zoo- or phytoplankton.

By January 2016, ships have to manage the aquatic life in that water to the strict standard described in the IMO's rule No. D-2. Retrofits and new-builds offer a steady flow of business for shipyards, but once installed, ballast water system vendors promise minimal maintenance.

As we watch the Ecomarine man remove the filter cartridges (sections, really) from the one-third-scale Sumitomo Electric RC filter, we realize the system is tiny yet robust, light and easily installed and maintained. It could spell cost-savings. The sight of these "portable" systems at the world's shipping fairs might be one reason India recently lost its fear of retrofits for older vessels and ratified Section B of the Ballast Water Convention.

Satellite treatment

As we walk around, it's clear not all filter systems are created equal. Some percolate. Some boil. Some poison. Some zap. One newcomer to the Norwegian

show uses satellite communication to relay to and pinpoint for owners, operators and port authorities which vessels need ballast treatment or treatment help ahead of entering port.

KraftPowercon offers portable power for electrostatic ballast systems, where a small portion of ballast water is sent to an electrolysis cell to generate sodium hypochlorite. In these systems, that portion of water is mixed with seawater and sent to the ballast tank during ballasting or to a neutralizer to lower sodium hypochlorite concentrations during deballasting.

"The consumption of power has been the problem in the end," echo Mr. Andersen's words. When we last spoke, Optimarine was waiting for type approval of a cable intended to make the installation and powering of its system easier.

One of KraftPowercon's cards in the Ballast Water Championships are its references, which include coast guard vessels and navy submarines. And like Ecomarine's filters, its rectifiers are modular and small.

Like Ecomarine, KraftPowercon appears to be venturing into a new market: any vessel using an electrolysis system, especially those waiting to enter Shanghai harbor. KrafPowercon produces its solution in Sweden, India and China, yet the ace up KraftPowercon's sleave is a satellite signal from its kit that tells its service people and clients when a section needs to be lifted out and changed, a process any crew can do without special training.

Tense market

All this is sweet news for fleet owners contemplating compliance and its costs ahead of "enforcement" in January 2016. Rules extras the Coast Guard appears to be compiling seem to add even more insecurity.

"The IMO would mean fewer acronyms," Andersen said. "The USCG might recognize that the IMO is the only way to go. Why wait while we pollute as much as we can."

Yet, it is understood DNV GL, the German-Norwegian class society, has been contributing to the USCG's growing list of ballast water rules. In an interview with Maritime Reporter on the central stage of a Nor-Shipping conference, Commandant of the USCG Admiral Paul Zukunft tells us even stricter standards are sought on ballast water and securing consensus and compliance "is one of the biggest challenges right now."

"Many states in the U.S., for example, want very stringent standards where the technology doesn't exist. So, we're also promoting the advancement of technology through the use of independent labs that validate (new) systems for worldwide use, not just for domestic use in the United States. It's very global. It's very collaborative."

Asked when ballast-water strictures might become universal, he says the USCG can only work with its four independent labs to validate technology.

"We're working with four independent labs right now to validate (technology) submittals. There are three submittals right now in the final stage. Eight others are in the initial stage of review. I'm pretty optimistic we will have Coast Guard approved ballast water standards by the IMO conference in November."

Five minutes with

Roy S. Strand, COO, Goltens Worldwide

As Goltens celebrates 75 years serving the maritime industry, Roy Strand discusses the iconic company's historic market strengths and its big push into the Ballast Water Treatment sector.

By Greg Trauthwein

Your company is celebrating its 75th anniversary this year. For readers who may not be familiar with the details of the company, can you provide a brief on its founding?

The company was founded by Sigurd Golten in 1940. Golten was born in Western Norway and sailed as a merchant engineer from the age of 14. While sailing, he saw first-hand the importance of top-quality machine shops and repair providers. He wanted to be able to service customers wherever they may be and had a vision to create a global company known for high quality and responsive service. Golten landed in New York and started a marine repair workshop in Brooklyn, NY. The company secured a good amount of work related to the war effort in the years that followed and he expanded his shop with other qualified engineers and machinists. After World War II ended he established Goltens Oslo with his brothers Konrad and Knut. This expansion was the beginning of Goltens becoming a brand with a global recognition and presence.

So how does Goltens contribute to the maritime industry today?

For 75 years Goltens has been a preferred alternative, and oftentimes partner, to many of the original equipment manufacturers. Goltens is a global service organization employing more than 1,200 highly capable resources operating in more than 25 locations in 15 countries. We operate in three core service lines, all focused on helping ship owners and power plant operators minimize asset downtime:

- **Diesel Engine Services,**
- **In-Situ Machining, and**
- **Green Technologies**

As an engine specialist we service and repair a wide range of diesel engines and related equipment providing routine and emergency field and workshop repair and reconditioning services on all major 2 and 4 stroke main and auxiliary engines.

In our In-Situ machining business we provide a full range of highly specialized in-place machining inclusive of crankshaft machining, crankshaft annealing, engine line boring, metal stitching of damaged blocks and bedplates as well as surface machining of upper and lower landing surfaces. Beyond that, we provide a full range of larger scale boring and surface milling and machining in support of new build and repair activities in shipyards all over the world.

Our newest business line, Goltens Green Technologies, was started in 2011 to provide vessel owners with a cost efficient and non-invasive process to comply with pending environmental ballast water and emission control legislation.

Looking back, what do you count as your company's biggest contribution to this market?

Goltens' in-situ crankshaft grinding tooling and repair process are really what drove the global brand recognition and early growth of the company and is still one of the factors that differentiates us from other engine repair companies and makes us a "go to" partner for major engine casualties.

Goltens was the first company to grind a diesel engine crankshaft in-situ in the early 1950's. This revolutionized the repair of crankshaft casualties dramatically increasing the speed of repair and reducing the expense of crankshaft failures. The repair averted the enormous costs of full disassembly, crankshaft purchase or repair ashore, transportation and significant loss of hire for that extended period.

Since the 50's, we have made major improvements on our tooling and process in terms of efficiency and accuracy and have moved away from grinding to machining the crankshafts. We have also invested heavily in other ways to limit cost and downtime for vessels like our class approved crankshaft annealing process which has resulted in Goltens salvaging a large number of otherwise condemned shafts.

Looking at the past year in maritime, do you see positive or negative, and why?

The merchant sector is still in a depressed state. Overcapacity, low hire rates and a volatile global economy continue to plague operators and challenge

Golten In-Situ specialist checking journal hardness on a Pielstick 10PC2.4V main engine during crankshaft machining prior to annealing.

all players in the industry. The dramatic and sudden drop in oil prices also sent an unneeded shock through the offshore marine market. That said, we are fortunate to operate globally and we have seen some uptick in activity levels in certain regions but the maritime markets remain volatile and we see them staying this way for the foreseeable future.

Looking ahead to 2016, what do you see?

Diesel Services and In-Situ Machining will always be a core part of our business but we see the legislation related to ballast water treatment and sulfur emissions driving significant growth in the coming years. We started Goltens Green Technology as a business line to offer services to retrofit vessels for compliance. We recognized that these projects were almost completely non-payback and we developed process to assist owners comply in the most efficient and least operationally intrusive manner.

We have invested heavily in capital and technical resources to support this and are now fully capable in six locations spanning all regions. We leverage a proven process to minimize costs and time using 3D laser scanning as the

Goltens 10,000 sq.-m. purpose built facility in Dubai Maritime City opened in May 2013.

foundation for modeling and design and then, due to the accuracy of the scans, can prefabricate all of the parts required for a full turnkey retrofit. We now have more than 150 ballast water and emissions compliance projects completed or in process and feel that we are positioned extremely well in the market.

Are there any new products or services the market will see from Goltens in the coming year?

Our focus is on continuing to expand our specialized services range in addition to continued investments in growing our Green Technologies business. We plan to roll out our next generation of in-situ crankshaft machining tooling to enable us to cut a broader range of journals, expand our specialized laser alignment capabilities and work with some of our key principals to push dual fuel engine and common rail retrofits to market.

Briefly describe the overall importance of the maritime industry to the whole of your company.

Goltens was created to service the maritime markets and this has always been the backbone of our client base. The maritime community is the ideal customer base for Goltens as we are focused on responding to casualties and repairs in an immediate fashion. The maritime sector demands fast response, high quality and a fair price. Given the continued financial pressure in the market, owners and operators simply cannot afford any avoidable downtime for their vessels.

As the business world grows increasingly complex and competitive, what do you count as the primary strengths of your company that make it stand out?

It really boils down to our capability to respond to major casualties anywhere in the world with highly capable technical resources with a full range of services. We are the largest global independent repair company in our space and we have located ourselves strategically around the globe to serve our customers. There are many local companies in the market that do pieces of what we do but there are very few, if any, that offer the full range of specialized services we offer on a global basis. That said, the market is competitive and we need to constantly earn our customers' trust and business. We will continue to focus on advancing our service capabilities to minimize downtime and keep our customers sailing.

Lastly, and perhaps most importantly, what's the plan to celebrate '75'?

Given our global footprint, having a large party is not really economical for us so we are being fairly low key with our plans. We had a small celebration at Norshipping in Oslo in June with employees, ownership, customers and partners and we will be marking the anniversary with smaller celebrations with our employees at the stations around the world.

Ballast Water Technology Business

Gearing for the Surge in '16

While the trek to see the ballast water technology market 'really take off' has stretched more than a decade longer than he anticipated, Ecochlor's president Tom Perlich has maintained course and is ready to grow in rapid step with the market.

By Greg Trauthwein

"What you want ... is something that is **highly effective on the inside of the tank to kill the most tenacious organisms**, but you don't want to disrupt the most sensitive organism on the outside of the tank. Chlorine Dioxide is perfect for that."

Tom Perlich, President, Ecochlor

When Tom Perlich left Corporate America in 2001 to start Ecochlor, he left behind the security of a major corporation and all of its benefits, just one month after the birth of his fourth child. Why? He saw the vast potential of the global Ballast Water Technology (BWT) market, which at the time he assessed it would really take off in just six months.

"I missed that," he deadpanned during a visit to his office earlier in the summer.

While Perlich may have been off in his timing, he shares a literal shipload of companions in this regard, as the BWT issue slowly but surely inches toward resolution both at the international and domestic U.S. level.

Perlich has made a career in water treatment technology, and he found out about the BWT issue about 15 years ago in a paper written about the Chesapeake Bay.

"We looked at the different technologies that people were exploring, and I simply didn't think (that many of them) were going to work effectively. I was surprised to find that no one had looked at chlorine dioxide, which I felt was hands-down the best technology for two reasons: it is highly effective, and the chlorine dioxide by itself will decay quickly in water," said Perlich.

"What you want for ballast water is something that is highly effective that will kill the most tenacious organisms under a wide variety of water conditions; chlorine dioxide is perfect for that."

So began a journey of nearly 14 years. Perlich was encouraged to see his first system sold within two years. To date eight Ecochlor systems are in ships and on the water with an additional 32 systems on order. He sees 2016, with the finalization of BWT rules and the begrudging acceptance by shipowners to accept the BWT reality, as the true turning point for his company and the industry as a whole.

"We have been seeing a lot of activity in the last six months, and I expect Q4 2015, in preparation for 2016 to be very busy. We're starting to see shipowners begin to take this issue much more seriously than two years ago. The people on the shipowner side that are calling meetings are the senior decision makers who have done their research and are asking more targeted questions on ease of installation, long-term effectiveness as well as true life-cycle costs."

Today, Ecochlor has the ability to build 150 to 180 systems per year, but is standardizing processes and procedures that will make it easy to ramp up production as needed," Perlich contends. "I don't see a bottleneck; it's a simple system, with many standard components."

The System

Ecochlor Ballast Water Treatment Systems use chlorine dioxide technology, which has been used in water treatment and industrial applications in over 50 countries world-wide for over 60 years.

"Chlorine dioxide is preferred over chlorine in dirty water applications, because chlorine will chlorinate organics and create chlorinated by-products," said Perlich. "In many industries, chlorine is being replaced by technologies that don't chlorinate, because it doesn't chlorinate, it oxidizes." Perlich said one of the advantages of the Ecochlor system lies in its flexibility. He has targeted the refit market as a prime one for the Ecochlor solution, and notes that the components that make up the system can be re-arranged liberally per ship type and size. The system, with the exception of the filters, can be placed almost anywhere on the vessel and can be custom designed to meet existing space limitations.

"Right now, we're concentrating on the retrofit because the newbuild market has

really slowed down," Perlich said.

The Ecochlor® BWTS is a simple two-step process: A filtration stage (of all ballast water coming in) with a 40 micron self-cleaning filter.

Then a dose of chlorine dioxide is generated on demand with a set dosage as required for the measured ballast water flowrate.

When it comes to the Ecochlor solution, Perlich said the bigger the ship, the higher the ballast water flow, the better his system stacks up.

"The bigger the system the better," said Perlich. "The system is easily scalable: it can handle 10x the ballast water flow, but the size of the physical unit may grow only 30%. With a lower ballast flow rate, we can't make our system that much smaller and we can't make it that much cheaper. But there are great advantages when we get on bigger ships, because the cost and the physical footprint do not get that much bigger."

At the time of our meeting Perlich was preparing to personally relocate to Cyprus to open Ecochlor's new Global Sales office and to be more present in the well-established maritime center of both Cyprus and Greece.

A Lifetime Decision

"Shipowners need to be familiar with what they are buying, and what they are going to have to live with for the next 20 years. They don't want to have to replace a BWTS because of more demanding procedures in the future. "

To this end Perlich and his team are focused to make the replenishment of chemicals onboard the ship as seamless as possible. Each system is designed with an eye on replacing the chemicals every 6 to 12 months.

When a shipowner signs on with Ecochlor, it agrees to buy the chemicals from Ecochlor and will also work with personnel that are trained to safely complete the resupply with no ship crew involvement or need to evacuate the vessel. To make the cost predictable, Perlich said that the cost of the chemicals will stay exactly the same – except for a pre-agreed inflation escalator – for the life of the system.

"We try to make it as easy as possible for the shipowner on a cost basis, because they have to buy the chemicals from us. On a practical basis, we know where the vessels are and we know how much chemicals are onboard – the shipowner gives us the information to see where the ship is, how much it's ballasting, etc. … which allows us to put additional chemicals onboard at their convenience."

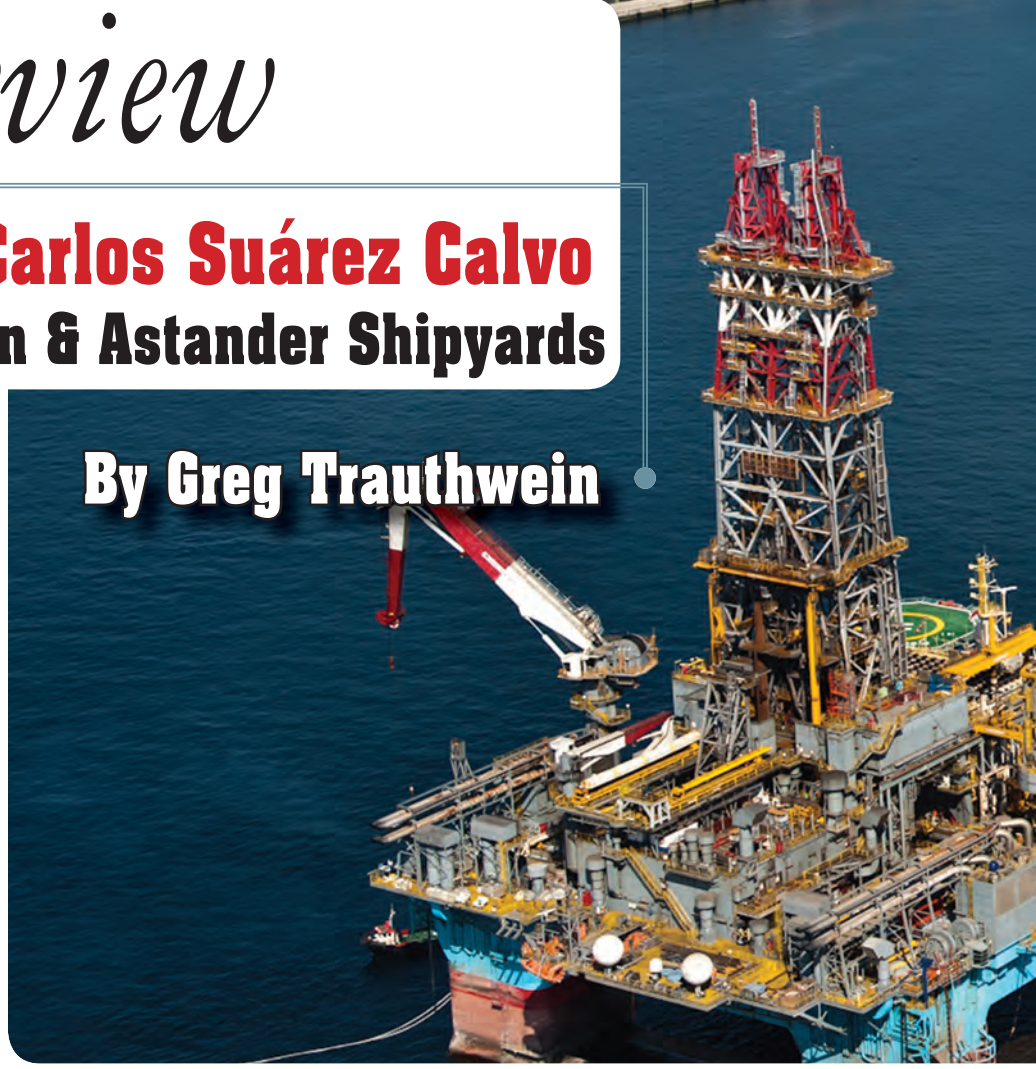
In reading tea leaves on the mercurial BWT market, Perlich sees more positives than negatives today. "You are starting to see a more knowledgeable customer base: ship owners are asking a lot of tough questions, and that excites me, because if they're asking us, they're asking everyone and it just gives us more opportunity to expand upon the real benefits on using the Ecochlor system on their vessel."

Interview

Germán Carlos Suárez Calvo

CEO, Astican & Astander Shipyards

By Greg Trauthwein



How did you find a career in the maritime industry?

As a consequence of my father´s dedication to the industry, as founder of a shipping agency in the early eighties as well as partner in a large shipping company and shipyard´s ownership, I grew up in this atmosphere and orientated my academic training towards being able to continuing what he and his business partners created and developed . Although I did start my professional career dealing with other type of businesses within my family, the core root of our family wealth has always been in the Maritime Industry.

For our readers not familiar, please provide a brief overview of your company?

Astican is a ship repairing and conversion yard plus a heavy offshore project management company who belongs to a billion dollar shipping group. This group is active in the business of owning, chartering and operating refrigerated cargo vessels, bulk carriers, product tankers and fish factory vessels, the supply of bunkers at high seas, the trade of pelagic frozen fish, the ownership and operation of shipyards, the development and operation of bulk terminals/port facilities and the provision of ship agency services.

In Astican & Astander shipyards we are capable to perform any type of repair and / or conversion in any type of ship or rig . The shipyard is part of the group since 1989 as before it was run by the Spanish Government. Also in 1999 our Group took over Astander shipyard in Northern Spain. Both were part of a Public entity called “Astilleros Españoles” Group until then.

The two shipyards, one in the Canary Islands and the other in Northern Spain´s mainland, offer a full range of repairs, upgrading and conversions services to first class customers based worldwide.

Astican is equipped with a lifting platform capable for ships up to 36,000 dwt and has seven ample docking lines and a 900 linear meter repairing pier with up to 25 m of water depth. This happens to be an alternative facility, logistically, to provide excellent service to drilling units that may require specialized works such as thrusters removals.

The shipyards are fully equipped with their own steel, mechanical and piping workshops plus Wärtsilä propeller’s repairs workshop within the premises.

Also coming in November 2015, Astican will have Rolls-Royce Service workshop at the yard fully equipped to service thrusters and other equipment belonging to RR’s marine services. This brand new facility in Las Palmas is one of only three overhauling facilities of its kind in the world which are located in North Sea, Gulf of Mexico (Galveston) and Río de Janeiro.

Astander has two graving docks – 160m and 230m long – and also own repair berths. Astander in particular is a very well experienced shipyard in doing large conversion projects with tight scheduled. We have converted either fish trawlers or cable layer vessels into seismic vessels, PSVs into seafood factory vessels, for example.

“One specific action I am doing is to move to make Astican the One-Stop-Shop location for the deepwater offshore industry in western Africa.”

Germán Carlos Suárez Calvo , CEO, Astican & Astander Shipyards

Looking at your time at the helm, how is the company most the same, and how is the company most different?

Astican has already a long history servicing the Port of Las Palmas and ship owners passing by as we are located geographically at the crossroads of main trading routes in the Atlantic. Therefore

the skill of our personnel has been fully proved throughout the years prior to my times. The shipyard already had a reputation in the market and a business structure well dimensioned and established to allow fulfilling first class customer´s demands. It is our first aim to keep the level of quality and reliability of the projects we deal with, as part of our success is based in the number of customers that repeatedly trust us for the works on their fleets.

Nevertheless, facing the challenged times we are going through, our team has established a clear pattern of moving another step forward to achieving the demand of new services in our region, mainly related to Oil & Gas Industry. Consequently, we are now improving our business offer developing a new range of services we can provide in our area of influence.

One specific action I am doing is to move foward to make Astican the One-Stop-Shop location for the deepwater offshore industry in western Africa in order to offer to rig owners as much cost savings as we are able to get due to synergies with the OEMs such as Rolls-Royce, and more to come. The industry is facing challenging times and we are here to help them.

Related to the above, earlier this year we have partnered up with Rainmaker and Offshore Inland in Houston in order to give a closer and better service to the industry.

If you had to pick one or two major areas, how would you best characterize your "bread and butter" business?

We can say the range of services and capabilities is common but the market we provide them can be considered as "Oil & Gas" and "Marine" Divisions. No doubt about the common needs of repairs and upgrade projects in terms of basic characteristics of them: steel renewals, surfaces treatments, piping works, machinery, etc. but the approach may vary and so we have adapted our working methods accordingly.

The Ship Repair and Conversion business, as you know better than I, is ultra competitive: What makes ASTICAN and ASTANDER stand out?

Obviously our geographical locations assists, giving us the opportunity to offer our services to a wide range of customers. But should we fail to give adequate would have grown as we have.

It has been our aim to maintain a fair and honest approach to each of our projects. Our prices cannot be comparable to those of other cheaper regions but we always try to assure the mutual beneficial result assuring best possible personal approach and service, skill of our workers, reliability of our works program, and honorability of the approach and avoiding hidden surprises for our customers. We think this is the only way to assure a future in our business.

On top of that, we always meet the planned schedule of the projects, avoiding delays to owners.

Looking ahead to 2016, what statistics do you monitor and how do you see your business shaping up?

The main one is the oil prices. We understand that, once the prices recover, the operators will start awarding contracts again so all drilling contractors will begin a race to reshape their units and we have to be ready to assist them and ensure good delivery times and prices.

On this regard, we have recently signed a cooperation agreement with HHI to support them to accomplish their warranty, commissioning and finishing works in the new build units coming from Far East to any of the E&P areas in the Atlantic Ocean, Mediterranean or North Sea. This good collaboration is already working through one drillship project in July 2015 and we expect that it continues growing through 2016 and the future, giving good advantages to our common customers.

Concerning the rest of the fleets, we foresee also a slight recovery also affected by the oil prices and consequently the freight rates.

How has the recent (prolonged) drop in oil pricing affected your business?

It is obvious that mainly the Oil & Gas industry is experiencing a lot of changes due to the low oil prices, some of them are related to the periodic maintenance and repairs of the drilling units, that of course directly affects us.

There are many units out of contract and suffering cancellations in their drilling programs and, apart from that, due to the oversupply in drilling units as a consequence of the big amount of new builds coming to the market, most of companies have decided to retire their old units for scrapping instead of invest in long shipyard periods for life extension, postponing their SPS and new build deliveries and warm/cold stacking the rigs without contract with minimum capex in overhauling.

We, at Astican, perfectly understand this situation and are supporting our customers by assisting them to reduce their costs.

By market sector please discuss "what is hot" … "what is not" … and why?

- ***Offshore:*** *We are detecting slight decrease in the scope of repairs for the offshore market as a consequence of the low oil prices.*
- ***Reefer:*** *Decrease through the years due to containerization of the cargos.*
- ***Tankers:*** *Increase in recent years of the repairs at ours of this type of vessel as a result of the increase of their activity in Western Africa Region.*
- ***Military:*** *Stable market that could even increase due to the renewal of the Spanish fleet assigned to the Canaries.*
- ***Bulker:*** *Very low amount of repairs being carried out in our region mainly due to nature of repairs required, for example extensive steel repairs. In these cases owners' tend to take vessels to China.*
- ***Gas tankers:*** *It is not our core business, but for the sizes we can handle it remains stable .*
- ***Fishing fleet:*** *More than 30 years ago, it used to be our main repair activity thanks to the Ex- Soviet Union and Korean fleets. Nowadays we keep repairing around 50 fishing ships a year.*

Regulation is a big driver for ship outfit and refit. Looking at the coming years, what regulation(s) do you see as driving business?

We are focusing some of our efforts in the scrubbers' installation and its different systems, as a consequence of the need to comply with the NOx and SOx reductions imposed by IMO. On this regard, our other shipyard located in Santander, in the North of Spain, has successfully fit a few of these systems onboard a fleet of ferry boats, with some other prospective projects ahead.

The other focal point is the ballast water management as per IMO and USCG regulations. Astican's geographical position is, in addition to our flexibility and quick dry-docking system, is advantageous, being at the crossroads of the Atlantic.

How are you investing now to prepare for this surge in business?

Our investing policy is mostly focused in developing new areas, training and having strategic alliances with key players. For instance, we are studying needs in the O&G industry that can be implemented in the Canaries as to add value to our services in these challenging times for the owners.

Every business has its challenges. What do you consider your biggest challenge today?

Since Astican was built, we have noticed how changeable this business is. Initially, our core business was the fishing fleets in the Atlantic, mostly the big factory vessels from the Soviet Union. When the fall of the Wall was a fact and the Soviet Union dismantled, we saw our business endangered so we had no other option but to adapt to the circumstances and be flexible. Our challenge is always to be ready to adapt to new needs, new markets and new regulations. For instance, in 2000 we came across with the first oil rig. We adapted our procedures as per the owner's requirements and nowadays, after 15 years, it represents one of our main market niches.

At the end of the day, the big challenge is to be able to survive to a non predictable market year by year. This is why we took the decision many years ago to have very good in-house project managers and key technicians ready to handle up to a thousand of skilled blue collar workers when we need it from well trained subcontractors. Having the lowest fixed costs possible allows us to offer better quotations and to keep a strong financial position.

Please describe, in as much detail as possible, the most challenging repair/conversion job you have encountered in the past year, with insight on how the challenge was met.

We have had a few of them. In Astander we have been very busy with the lengthening and conversion of a Canadian scallop factory vessel and the conversion of a platform supply vessel into a clam harvesting and processing factory ship from the same Canadian owner. In this last one, the conversion included the removal of the bulk cargo systems and the fabrication and installation of two factory decks, sponsons and new accommodation. A new ammonia refrigeration plant was installed, as well as a freezer tunnel and plate freezers. New hydraulics systems were mounted to provide service to the winches, fishing equipment and Factory systems. A new

accommodation meant new cabins, rooms, A/C system, piping, electricity. The propellers were replaced and the gearboxes reconditioned. New systems were installed: two gensets, a new dredger system, high capacity and pressure dredging pumps, new steam boiler to give service to the fish processing plant, installation of a new incinerator, a new lift, etc.

Between 2014 and 2015 we had the big conversion jobs on three French ferries, comprising the removal of the existing exhaust systems and replacement of the silencers by the new scrubbers. Installation of the new seven scrubbers (four for the M/E and three for the A/E). Rerouting of the existing pipe network in the casing. Installation of new pump rooms. Installation of the new exhausts and water system piping. Fabrication and mounting of new enlarged funnel. Installation of new electrical systems, control systems, insulation, structural modifications and other auxiliary jobs. Due to the limited space available in the casings, and the important interference of piping and structural systems, the tight delivery time was achieved by means of a correct planning and strategy of removal/mounting process. Apart of the specific works related to the new plant, the vessel was extensively upgraded and major repairs were carried out.

On the other hand, the most challenging projects accomplished by ASTICAN last year, which have continued in 2015, were a block booking of six heavy Norwegian Anchor handlers coming from Brazil and four other offshore vessels from another Norwegian company, all the while attentioning the different projects on 13 rigs, too.

To sum up, the most important challenge was to carry out this outstanding level of work keeping customer's satisfaction. I guess we are doing it with the support of our project management team since those owners keep coming to quote new projects. This shows the confidence these owners have in our shipyards.

The FPSO Cost Discussion

At first, the oil-price and project-cancellation forecasts had hushed the audience at FPSO Europe Congress 2015. Speaker No. 1 had delegates looking at each other for signs of fear. Then, rival contractors — veterans of many a bitter tender — piled on the logic of their own methods for cost-cutting in floating production storage and offloading projects. Rather than stamp out competing arguments, a relentless costs discussion had another, unexpected effect. It lifted the gloom and crystallized the opportunity at hand to engineer FPSO demand.

By William Stoichevski

By the third coffee break, successive speakers had inadvertently spelled out why floating production storage and offloading vessels, or FPSOs, have a competitive advantage over platform designs. Nervous smiles formed across the room, as delegates that started on-edge saw that they alone might hold the key to making oilfields competitive at 60-dollar oil.

A consensus of contractors, lawyers, oil company technical directors and hopeful suppliers agreed by halftime that the "meddling" of oil companies or the desire of operator engineers to engineer the perfect, custom-made FPSO was the No. 1 cost inflator. This excessively "prescriptive" approach to building FPSOs, it was agreed, was not the "functional," "trust-the-vendor" spec-making that saved countless engineering man hours and time to first oil.

SBM Offshore Group Technology Director, Michael Wyllie, says trends in floating production design have long driven costs and they still are, along with the demands of "deeper, harsher, frontier, arctic, older and extending design life." In response to escalating costs, there were "three challenges" to bring costs down. Standardizing where possible to make "easier" hulls and housings was easier when done for a specific region, rather than globally, where reservoirs, geography, geology and local practices might offer a chance to economize on excessive design.

"You can create blocks of standardized components," says Wyllie. Topsides, he says, are less easy, and moorings and risers are "the other challenge" when standardizing, a nod to the power of design-engineering over final outcomes and decision-making.

"When it comes to the marine environment (subsea), forget it. None of (wires and umbilical) is standardized. Every project is different."

But water-separation modules and power generation are two more equipment sets that can be standardized. Elements aimed at well stream that is variable appear to be the only hindrance.

"There are lots of opportunities (to standardize)," he says. The ratio of things that can be standardized on an FPSO design are "70:30, but about 30 percent of it will always need to be project-specific or customized to a certain extent," Wyllie says, adding that to standardize can mean to "sub-optimize."

"(Industry) engineers are very good at optimizing the hell out of every project," he adds, saying hulls, water injection modules and oil-water separation modules "all present an opportunity to standardize."

No. 2 was FPSO *simplification*, as was successfully applied with 50 percent more oil capacity and 100 percent gas capacity using a gas-phase membrane in two SBM FPSOs in Brazil.

"What we need is a way to find options and components that we can use to try to achieve the *complete specs required by the reservoir and yet simplify and sub-*

Packed with "optimized technology": The ENI FPSO at tow-out from its Korean yard.

Credit: Courtesy Eni Norge

optimize. We need the vendors' to help. We have a lot of (technology) but not all of it is qualified for offshore." He says qualifying programs — "Someone has to take the risk" — are needed to get newly standardized equipment offshore, especially since, "New technology exists that could really drive down costs."

He pointed to a collaboration with Shell on the BC-10 FPSO offshore Brazil where standard steel risers given buoyancy sufficed to cut weight and connect wells for "a complex project." At the Gulf of Mexico Stones FPSO, a first "disconnectible" unit for the area, specs came from the oil company to qualify riser technology to help with a difficult reservoir, 2,900-meter water depths and project profitability.

New model: the N'Goma FPSO has local infrastructure and oil-company support.

Credit: Courtesy SBM Offshore

A lot of playing

Avoiding excessive design, driving simplification and assembling vendors is best done at the yards, most, if not all, agree.

Thyl Kint, BW Offshore's chief technical officer, is a proponent of finding savings at the yard, presumably during the engineering procurement and construction, or EPC, stage of a contract.

Like Wyllie, Kint agrees, there's value to be had for clients in the familiar, especially for the international oil companies.

Operators' strategic desire to own an FPSO can cost them "a quarter billion (dollars) more," Kint says.

He points to today's contentious two models for engineering an FPSO, the FPSO contractor way or the "FEED plus Asian yard turnkey." Base costs rise for oil companies while they wait on that front-end engineering. There's also the 40 percent of EPC to be found in equipment and materials, where uncertainty can be high.

Instead of working with the yards and their suppliers, engineering through a contractor offers some advantage.

"We have a lower cost structure than our clients," says Kint. Indeed, he says, of 28 FPSO contractors most are "heading for bankruptcy." Part of the reason is oil companies caught in the trap of overdesigning.

"It's playing. That's why (they want to design vessels themselves)," he offers in partial jest.

BW Offshore handles an annual capital expenditure and operating cost burden of $1 billion across 17 units. One of those, the Catcher FPSO, will produce 60,000 barrels per day and 60 million cubic feet of gas per day in the central North Sea when its newbuild hull, built in Japan, and its Singapore-made topsides begin production in mid-2017. In sum, a management burden not many contractors or oil companies can hope to successfully oversee.

Prescribed and functional

While the "lease" versus "own" models are well known, less common is the creeping cost discussion we hear in London, and the pitting of "functional" specs versus an oil company "prescription."

Despite the risks of overdesign and of a prolonged FEED, the "prescribed" or operator-led design and cost model does offer some advantages. Sevan chief business development officer, Fredrik Major says one key advantage is technology development akin to SBM's. "There's the potential to optimize (technology)," Major says.

Oil companies can help qualify designs, much like Statoil qualifies offshore vessels. Some operators have "20 guys" developing new technology for their vessels, although the results can be "a nine-month" FEED. Work with a yard's designer and EPC program can mean "34 months to first oil."

"We can save about a year by going the functional spec route," says Wyllie of using a contractor like SBM and letting

them provide a vessel based on the oilfield's well stream. Kint agrees: "Come to us," he says, "especially if you have a marginal field." An oil company decision to go it alone with a yard can cost $500 million, says Kint, adding, "Do we need to be so prescriptive?"

Country savings

Unlike the more seasoned international oil majors, the national oil companies are also a driving force in driving down costs. They're of necessity "less prescriptive" and bring other advantages like local workforces and finance. They're also less likely to be the ones requesting new software to operate or monitor turbines and pumps, "another $10 million to $15 million saved."

To lure FPSO opportunity for their local content and national wealth needs, West African yards — like Paenal at Porto Amboim, Angola with its 2,500-metric-ton crane and 500-meter quay — offer VLCC berths and space for topsides modules. SBM and Synergy have entered into a JV to extend engineering possibilities near these productive hydrocarbon basins.

"Big projects are going to be finished by (national) infrastructure funds," says Basma Hassan, the former CEO of Bumi Armada. He sees a new finance regime for FPSOs, as oil still offers nation-building wealth creation and yards keep economies robust.

"East Asian yards are offering fantastic financial packages," Hassan asserts, adding, "That can swing (the market)."

New for new-builds

Chinese national construction banks? "You can get 90 percent financing," a delegate says. China's yards went into expansion mode between 2002 and 2005, but contractors say the growth has dispersed engineering skills locally. While "just one yard" might be everyone's favorite for building FPSO topsides in Asia, there's a consensus, it seems, that the "FEED-plus-Asian yard" isn't the only model that works for oil companies building floating producers in Asia.

The new-build is still seen as a viable "cost-cutter," even if it costs "a billion dollars." Though BW reports short-term demand for leased FPSOs is uncertain, with 50 percent of marginal oilfields in danger of being cancelled, the new-build FPSO offers an unexpected attraction, especially in Brazil, where "most projects at $50 dollar are still profitable," given an FPSO is used. While no repeat of the dozen vessels ordered in 2014 is foreseen this year, the uncertainty is total given the value in FPSOs, including new-builds, as scalable oilfield development options.

"If yards are hungry, new-builds can be cheaper than conversion," says Hassan, although some recent deals have seen conversion hulls fetch $50 million to $100 million. One contractor points out that new-builds remove uncertainty in projects and can offer "a geographical aspect to decisions," giving any given unit an identity and a region in which to operate. They can be made redeployable with the same plant to meet different well stream and thus save future modifications costs. Yet, this is exactly the type of standardized engineering solution that still seems to escape designers.

IOC involvement

Despite their ability to turn a profit at a marginal oilfield, vessels leased from contractors aren't, perhaps, as numerous as they could be. It took a lawyer at an FPSO conference dominated by engineers to explain why some of the heavy involvement of oil companies in floating production contracts can result in fewer vessels, despite all of the advantages of finance and local content they bring.

Apart from being "too prescriptive" in their dimensional demands, especially for new-builds, "Oil companies involve themselves to share the performance risk in order to then justify less in day rate," one delegate lawyer was heard saying. For their part, "FPSO contractors want parent company guarantees, but (oil company) home offices are reluctant, so there are fewer FPSOs," the lawyer says.

Despite the many ways FPSO leasing and operating contractors offer to place a production unit, complex oil company conversions of VLCCs will likely continue, however costly, slowed only by rising VLCC carrier rates and hull prices.

Developing model

Beyond the backlog playing itself out in Asia's yards in 2015 is capacity that seems likely to grow even with EPC contracts from FPSO contractors and more direct oil company involvement.

Now contractor FEEDs, like Yinson Production's January 2014 Eni Ghana FPSO win, signals the new wave of engineering, where oil company and contractor use an oil-province yard, in this case for Ghana's Offshore Cape Three Point project.

Yinson FPSO boss, Eirik Barclay, looks confident as he relays the news of the company's 11th FPSO project, part of the spoils of picking up Fred Olsen Production, but also a sign that deepwater projects thought too expensive at 80-dollar oil are doable with FPSOs. Barclay points to four projects in West Africa and one in Vietnam as proof of the new operator-contractor success model. The conference would yield more confirmation that African governments will do what they can to bring down FPSO costs.

"There's been a lot of escalation, but costs are coming down," says Kint, adding, "We don't know how much more they will come down. We don't know how, but they're coming down."

Kint's advice to oil companies waiting for prices to fall is to get engineers to spend less time defining "what's out there."

"Don't focus on 'the what.' (Price) depends on who does the job. Focus on who's going to do it."

After the technical work, there's money to save by "going where the competence is."

Complex designs: The FPSO Cidade de Ilhabela

Credit: Courtesy SBM Offshore

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Shipyards rising

Competitive Stirrings

Shanghai:
Plans for a new "Shanghai Maritime City" might need more ship orders

A mini order boom fueled by gas, "green-tech", tankers and new rules is underway in shipbuilding. It won't fill all yards, but changes like the July 2015 cap on sulfur emissions garner retrofit and rush orders. Even China's Directive 55 obliges its mixed bag of yards to comply. Threatening to plug this trickle of business is the potential for backlash against rule makers, when Class is observed "engaging" some yards on designs while others must merely learn the new requirements. Environmental gains, too, might one day be lost, if rule makers are seen to be hindering and competing against the world's shipyards rather than enabling them.

By William Stoichevski

According to Yard Intel, deliveries of vessels of all types have outpaced orders so far in 2015, but the world order book has only declined seven percent to 6,579 vessels. The erosion slowed in May, and then continued in June, when 296 deliveries were made and 166 orders placed. June mostly saw the arrival of bulk vessels and the ordering of tankers, and that trend continues in the second-half of 2015.

That's the mini order-boom: 166 orders. It's a lifeline, and the shipyards of some countries feel it more acutely than others. In China, 480 yards face strikes, upheaval, dwindling orders and a backlog of just 402 (62 offshore vessels, 64 tankers, 102 bulk carriers and 79 containerships).

Similarly, Indonesia, with 195 yards and deliveries over five years of 1,764 vessels has just 76 vessels still on its yard's books.

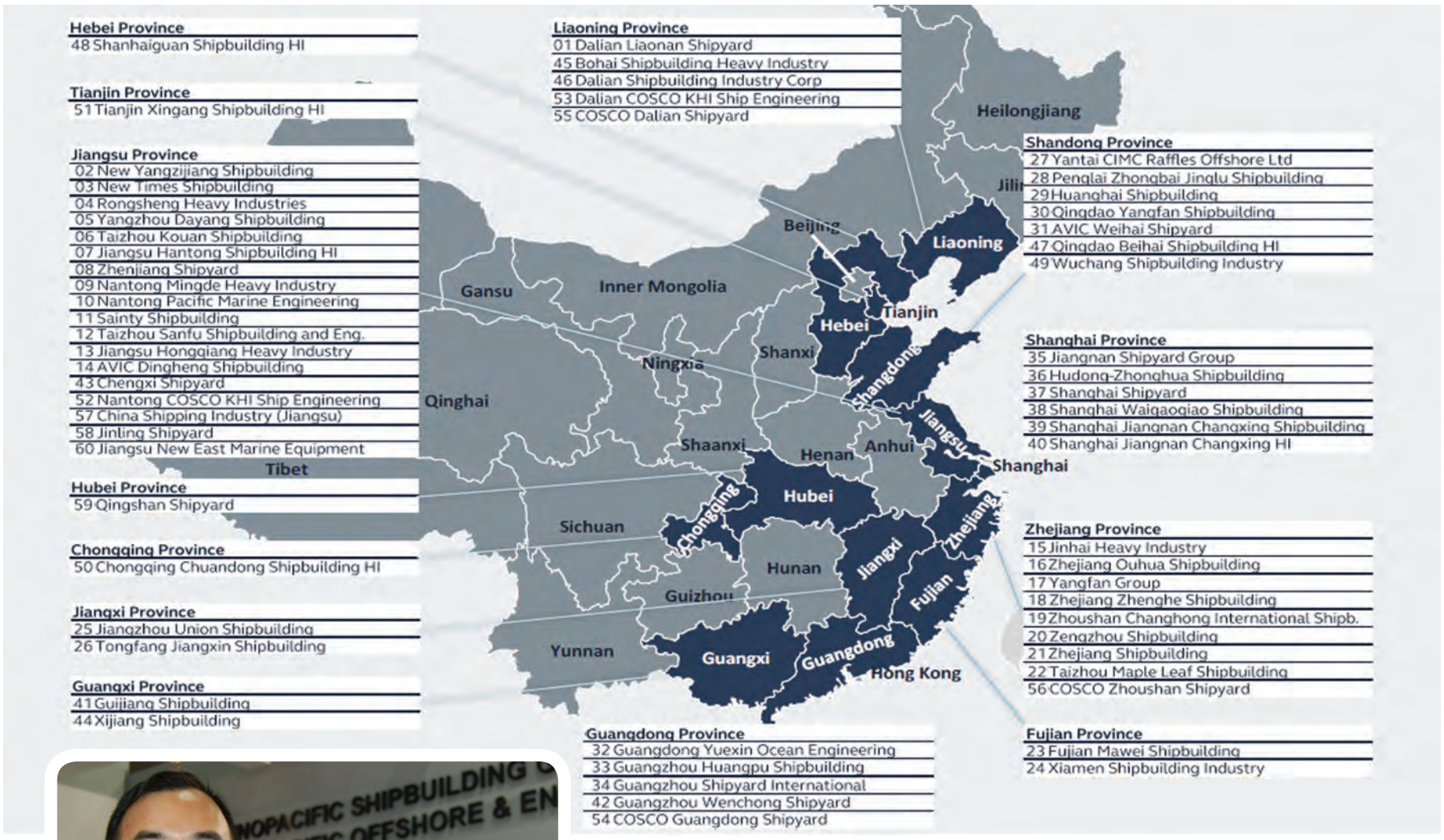
Across the East China Sea in Japan, 126 yards churn out superior vessels, and 31 one of these fabrication centers — half of the gas-capable yards in the world — are advanced enough to handle gas technology in shipbuilding. It makes Japan an ally worth having for a Continent and a country keen to get the world's oceangoing vessels onto natural gas. So, when a Nor-Shipping media event plays out with DNV GL announcing it has fostered a liquefied natural gas vessel design "in collaboration" with Oshima Shipbuilding Co., it raises some eyebrows, coming as it does during a deluge of Class announcements, including another joint design, and the coming promulgation in 2016 of new hull rules.

"We shouldn't be doing design," a Class expert from another society says, hinting that he believes the enabler role of Class is its stated and accepted mission.

The Class man in the presentation proclaims the Oshima LNG-fuelled Kamsarmax Bulk Carrier "a design that's ready to order". Although he had drawn "a simpler drawing" of the vessel, he said that Oshima was asked to come up with a robust design that didn't use the hold. While the role reversal was noticed, a design now exists for cross-Atlantic voyages using LNG, heavy fuel oil and marine diesel.

Steadfast supply chain

For other yards coming to grips with sulfur in fuel, arranging retrofits for carbon dioxide scrubbers or ordering new-builds,



The 60 yards
China has deemed worthy of state support.
Courtesy Yard Intel

Quiet Pride:
Sinopacific has successfully partnered with Western ship designers.

it strictly business as usual: Class abidance.

"It's impossible to deliver a new set of rules without also supplying the tools to implement them," a Class man in another room tells a mixed audience of ship builders, lawyers and journalists.

New strictures for hull structures "regardless of type and other rules" and for the material requirements of metals used will be subject to "future proof" stress models. Meanwhile, the real "tools" of change — hybrid and dual-fuel engines, batteries, scrubbers, antifouling — will need global supplier assistance. Jotun, for one, is understood to have struck a deal to help Chinese yards apply emissions-cutting antifouling.

Sembcorp Marine, though re-branding and moving to new facilities, has anticipated the new clean-shipping rules. It has found a Norwegian partner to market modular LNG plant and has readied scrubber installation facilities. Though famous for its drillship designs, "It'll probably be a multi-year period," according to RBC's Robert Pinkard, before any large-scale order activity resumes. Right now, drill ships are mostly under construction elsewhere in Asia and in Brazil.

Ship power heavyweight ABB is understood to be offering the tools of change in the form of gas-handling equipment and services, but "the yard will have to take the risk", the cost of environmental enforcement. The power providers expects "more involvement at the yard from the charterer" and Class, although a process of training yard personnel and service contractors is understood to be underway. There's a lot to learn, and most yards aren't equipped to install a 1,200 kilogram 1 MW battery for hybrid power aboard a tug or coastal ferry, the hybrid market for now. The ship designs aren't ready, and Class would need to move fast to clear extra hull supports.

Yard help

Alexandre Eykerman, Wartsila's director of sales for ship power, is acutely aware of the peculiarities of the many class and International Maritime Organization rules, especially U.S.-applicable Tier III.

"We create sea areas with different requirements," he says in mock exasperation. "In the U.S., you have to burn (heavy fuel oil) to be compliant," he jests. While NOx and particulate emissions were Tier II requirements of 2011, Tier III has tightened up SOx.

"In '95 it was dual-fuel. In 2015 it's multi-fuel technology, heavy fuel oil and marine gas oil," he says. Eventually it becomes known that Wartsila's new No. 31 engine for offshore and oceangoing vessels is multi-fuel and low maintenance, precluding the need for separate catalytic reduction — understood to be high-maintenance process — that could find its way into many a clean-burning retrofit or new-build in need of emissions of less than 0.1 percent sulfur.

Despite these costly burdens for yards, ship owners and charterers, the maritime supply chain — including Class — looks ready to supply the tools of compliance. Able shipyards can expect extra business. Many, a source confides, don't have the materials knowledge to produce the strong, lightweight (aluminum) hulls needed for, say, battery power.

To be sure, the yards' abilities will be challenged by the mini order-boom of LNG and compliance-related work. Even among the very capable South Korean yards, just nine can carry out gas-related work, judging by data provided by Yard Intel. As the yards struggle to survive amid the changeover to cleaner technology, it might serve the cause of competition if they were not also competing with Class and its partner yards.

ASRY 2015 Strategy Combats Challenging Market

Up to May 2015, ASRY (Arab Shipbuilding & Repair Yard), was seeing encouraging results from it's 2015 strategy to combat the widespread challenges facing the maritime repair market, particularly shipowners reduced repair budgets. In terms of revenue, the ship repair side of ASRY's business has been solid in 2015, with almost identical revenues to the same period in 2014, with the number of ships showing a slight increase for the same period last year. Up until the end of April, 65 ships were repaired at ASRY, showing evidence that the commercial team have been able to compensate for lower budgets with larger number of projects. These projects are split between the Arab markets and International markets in similar proportions to ASRY's usual client mix, with the Arab market being slightly dominant.

This solid performance has included a variety of noteworthy projects in H1 that includes two of Kuwait Oil Tanker Company's tankers – Wafrah and Al Jabriyah II – docking as part of the exclusive fleet agreement signed in early 2015 which will see almost its entire tanker fleet dock at ASRY in the next two years. Another interesting project was the Rimthan II, an OSV from Saudi Aramco, which had a new installation of a 75-tonne Liebherr deck crane, including all engineering calculations, design analysis, inclining experiment upon completion to verify vessel reliability and reissue of new stability booklet. All this work was carried out in-house by the ASRY New Construction & Engineering Division, which has been growing its engineering portfolio throughout 2015. A third interesting repair was a widening of a Derrick pipe-laying barge from 31.7 to 40.3 m, by adding sponsons on the port and starboard side. The whole project – again completed entirely in-house – was completed in a 45-day time window, by pre-fabricating the sponsons before the vessel arrived.

Project Jupiter

A probable cause for ASRY's ability to weather the ship repair market conditions is Project Jupiter - ASRY's initiative to build the leading cluster of specialist services in the Arabian Gulf. The project has been gaining regional praise for its approach to yard-contractor partnerships and made another important addition recently, this time with the signing of a specialized Services Agreement with Relay Engineering Limited, the specialist engineering company based in the UK, to offer its expertise in electrical, mechanical and constructive engineering directly to ASRY's customers from a dedicated service point in the yard.

With Relay Engineering, the number of onsite specialist subcontractors now numbers 35, with more due in 2015, making ASRY the most convenient hub for maritime repairs.

Adding Newbuild Capacity

Diversification is another of ASRY's strategies that is paying dividends, with the important new move by the yard to kickstart its newbuilding program. The New Construction & Engineering division recently signed a $2.8m agreement with the Bahrain Coast Guard to design and construct a new Landing Craft for the transport of vehicles, potable water and fuel.

The craft, potentially the first of two, will be delivered in 2016 and will be approximately 34.5m in overall length, with two 600 hp engines, having a top speed of 10 knots and cargo deck capacity of 40 tons. ASRY created a New Construction & Engineering Division in 2014, which has increasingly been developing its portfolio of engineering packages, and now signed this first newbuild deal. ASRY already has past experience in the new construction sector having built a fleet of four ASD tugs, power barge hulls, and a 35m Offshore Support Vessel for Kuwait Oil Tanker Company.

The New Construction & engineering division is able to attract these kind of newbuild projects due to its advanced engineering capabilities such as its FARO 3D scanner, a team of hand-picked experts, and decades worth of combined engineering expertise.

Austal delivers for USN

USS Jackson (LCS 6).

Austal Photo/Phil Carter

Austal's U.S. operation consists of more than 4,000 employees supporting the design, construction and sustainment of two U.S. Navy programs, the 127-meter, trimaran Independence-variant Littoral Combat Ship (LCS) and the 103-meter, catamaran high-speed troop and equipment transport known as the Joint High Speed Vessel (JHSV). Austal has block-buy contracts in place for both programs totaling over $5 billion. In the past year, it has delivered the Jackson (LCS 6), USNS Fall River (JHSV 4) and USNS Trenton (JHSV 5).

Construction began on two LCS and two JHSV and Austal christened and launched two ships from each program as well. Delivery for USNS Brunswick (JHSV 6) and the future USS Montgomery (LCS 8) is scheduled for late 2015.

Five of 10 JHSVs have been delivered and three more are currently under construction. Three of 12 LCS have been delivered and six LCS, part of the 10-ship block-buy contract, are under construction at Austal's Mobile, Ala. manufacturing facility. According to Austal USA President Craig Perciavalle, "We're pleased with how well our ships are performing once delivered, how well these programs are maturing, and how well our performance continues to improve ship to ship."

Regarding the future outlook for Austal, Perciavalle said, "The Navy shipbuilding plan has us delivering LCS's into 2025. In addition we're excited about the potential growth of the JHSV program given the feedback we've received from the fleet so far and the fact that two additional JHSVs have been appropriated and about growing our sustainment business to support our ships as they are delivered and enter the fleet to serve our country."

Austal's latest facility expansion project is its Vessel Completion Yard (VCY), a 36-acre facility at the northern tip of Pinto Island on the eastern bank of the Mobile River. When fully constructed, the completion yard will boast a protected 1,000 x 300 x 1,400-ft. u-shaped slip with four wet berths, two on each side of the slip. The berths will provide services for the ships during completion, sea trials and delivery, and post-delivery activities through sail away. Austal plans to invest $73 million into the VCY with much of that going back into the local economy. The first of three phases required to complete the project - 800 feet of berth with services - is scheduled to be completed mid-2016.

This past spring, Austal honored 48 employees who graduated from our four-year employee apprenticeship program which is certified by the U.S. Department of Labor, Alabama Department of Postsecondary Education, and the Alabama Department of Veterans Affairs. It is governed by the Department of Labor Standards of Apprenticeship for the respective trades of pipefitter, marine electrician, fabricator, and fitout. The Alabama Department of Postsecondary Education has approved Austal's four trade programs for the Department of Veterans Affairs which means that all eligible veterans may receive GI Bill benefits earned during military service. Austal is proud to say that the retention numbers for these apprenticeship classes were above regional averages for other apprenticeship programs in our area. A new class of 85 apprentices began their four-year journey in June.

N-KOM
New VLCC Size Floating Dock

Donnelly Tankers vessel inside new VLCC size floating dock

N-KOM CEO Chandru Rajwani

Nakilat-Keppel Offshore & Marine (N-KOM), the joint-venture shipyard of Keppel Offshore & Marine and Nakilat, continues to see strong interest for its ship repair services in 2015, having already delivered more than 450 projects for shipping and oil and gas companies over the past four years. Among the shipyard's list of customers are Odfjell, Maran Gas Maritime, Diamond Shipping, Springfield Shipping, Maran Tankers, Donnelly Tankers, Synergy Maritime, Euronav, Dynacom Tankers, Jan de Nul, V Ships, Synergy Maritime, NYK Shipmanagement and many others. N-KOM has completed what is reportedly the world's first main engine gas injection (MEGI) retrofit for a STASCo-operated LNG carrier to run on LNG as an alternative fuel. Integration and completion works was carried out at the shipyard, with modifications made using MAN Diesel & Turbo's proprietary ME-GI (M-Type Electronically Controlled – Gas Injection) system. The shipyard has also undertaken its second Ballast Water Management System (BWMS) installation. Installation of Samsung's electrolysis-type PURIMAR BWMS as well as the mechanical and electrical scope of work was executed during the Q-MAX LNG carrier's drydocking period at the shipyard. This entailed extensive piping work, involving the installation of about 300 spools of varying diameters and lengths and equipments along with the installation of power and control cables termination and breaker with switchboard modifications.

N-KOM has completed a number of Schneekluth and MEWIS duct installations for VLCCs, Suezmaxes, Aframaxes and LPG carriers. Other repairs that have been carried out for tankers include the overhauling of main and auxiliary engines , turbochargers, overhauling of cargo pump systems, electrical and instrumentation works, HFO to MDO bunker system and fuel oil system modifications, steel renewal, cargo tank coating works and the servicing of shaft generator motor systems. The shipyard has also recently completed drydocking and repairs for one of the world's largest suction hopper dredger, Jan de Nul's 78,000dwt Leiv Eiriksson. This includes repairs to the dredging valves, overflow and CPP propulsion systems as well as extensive piping work.

The shipyard has commenced operations of its brand new VLCC-size floating dock - the world's largest floating dock - measuring 405m x 66m and with a lifting capacity of 120,000T. This is in addition to the already operational two VLCC-size graving docks (400m x 80m and 360m x 66m), berthing capacity of 3150m, mobile boat hoists (300T and 1,100T) and comprehensive workshops and facilities, thus increasing its docking capacity by another 50% and enabling both the shipyard and its clients greater flexibility in scheduling dockings.

N-KOM entered into an agreement with Wärtsilä to provide a wide range of services on-site at the shipyard such as main engine piston crown reconditioning and chrome plating. Wärtsilä is now a resident sub-contractor at the facility, along with other resident service providers such as MAN Diesel & Turbo, Wilhelmsen, Turbo Technik and Cargotec to name a few. The yard also has an in-house team of GTT-certified welders to carry out welding works for GTT Mark KIII and No.96 containment systems.

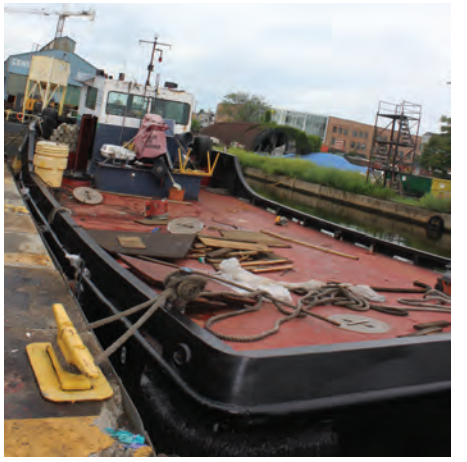
Drydocks World

World's Largest Turret

Drydocks World marked a milestone in completing the world's largest turret mooring system. At almost 100 meters high, weighing over 11,000 tons and with a diameter of 26 meters, the turret is designed to ensure the Prelude floating liquefied natural gas (FLNG) facility can operate safely in the most extreme weather conditions. This innovative FLNG storage and production facility will be stationed by Shell at its Prelude gas field off the northwest coast of Australia, unlocking new essential energy resources offshore to meet growing demand.

A Family Affair

A Lynch Legacy
From L to R: Michael Lynch, Ryan Lynch, Charles "Chaz" Lynch, Charles F. "Derick" Lynch & Cary B. Lynch.



The General Ship Repair Corporation, a fixture on the Baltimore water front for nearly a century continues to build a strong business while preparing for fourth generation ownership.

By Greg Trauthwein

General Ship Repair Corporation is as ubiquitous of a presence on the Baltimore waterfront as Under Armour, Domino Sugar and "Natty Boh." General Ship Repair has stood strong for nearly a century since its founding by Charles "Buck" Lynch in 1924, evolving today into the de facto 'go to' for workboat repair in the Baltimore area. Today it is in the midst of a strong year, and per its history it invests in its people and facilities with an eye on the future, a future which is planned to include a fourth generation of Lynch leadership.

In its time the company has serviced schooners and steamships, paddle wheelers and super tankers, as well as everything in between. Today though, providing repair and maintenance service to the regional workboat market with its pair of 1000 ton floating docks is the heart and soul of its business.

Today the company is owned and operated by a trio of Lynch brothers: Charles F. "Derick" Lynch, Cary B. Lynch and Michael Lynch, who took over from their father Charles "Jack" Lynch in the early 1990s. In the management wings are two of Derick's sons, Charles (Chaz) Lynch and Ryan Lynch. Chaz Lynch served in the U.S. Coast Guard for four years before deciding his fate lie in the waterfront shop his great grandfather pioneered. Mid-stream in his USCG stint he switched to the mechanical side of the operation. "He called me two year in and said that he really wanted to come back and work at the shipyard," said Derick Lynch. "And I told him 'you're a deckie … I don't need a deckie, I need a machinist." Today Chaz serves the company as a foreman and machinist.

Ryan Lynch graduated from the United States Merchant Marine Academy, and today works in the yard as a project manager, working part-time for the moment in between his sailing at sea obligations.

'Self-Sufficient' is perhaps the best term to describe the yard, its management and its team of 45, a focused group available 24/7/365 to its workboat clients that depend on it to keep its equipment functional and in the water earning money.

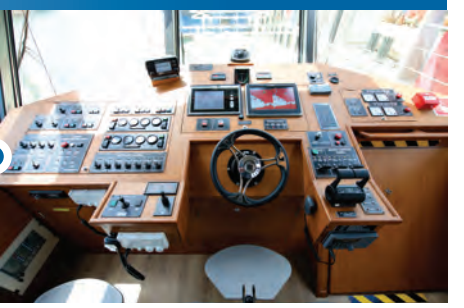
"We're having a very good year," said Derick Lynch. "We're doing a lot of tug and barge work, we're doing some work for Kirby as well, and we're booked a month and a half in advance, which is a long look ahead for us. We're working with all of the major players, from Vane, to Kirby to McAllister to Wilmington Towing."

Serving as the tug and barge repair facility in the Port of Baltimore, its experience with the maintenance and repairs of tugboats and barges is extensive. General Ship Repair operates its own floating equipment, trucks and portable equipment, and is able to service a vessel during cargo operations, at anchorage or at its own facility. Central to its success today is its pair of 1000-ton floating drydocks, the second added in 2012 replacing a smaller 350-ton unit. The addition of the second 1000-ton unit was truly the key toward making the yard more efficient, according to Derick Lynch.

"We were always struggling with that one-horse town drydock," putting one boat up there and having the various work crews doing what was needed one step at a time, he said. "It's so much more efficient having both drydocks."

Another big investment was in the yard's water blasting system, replacing the more labor intensive but cheaper sand blasting. "We're not sandblasting anymore," said Derick Lynch. "Even though the UHP (water blasting system) is more expensive to use and maintain, in the long run it is much cleaner and it helps us in productivity as it eliminates sand getting into every crack and crevice."

While the company has a long history of investing in facilities and equipment to ensure it meets vessel fix needs, Derick Lynch maintains that investment in its people is central to its long-term (and continued) success. "We put money back into the yard when we can put it back. At the end of the year the first priority is giving back to our employees in the form of bonuses, and setting aside some money for some major projects."



Three More for Jordan

Sanmar Shipyards delivered three more vessels to the Aqaba Port Marine Services Company (APMSCO) for the Sheikh Subah Al Ahmad Al Subah LNG terminal at Aqaba, Jordan. The overall contract comprises four 80-tonne bollard pull specially modified Terminal RAstar 2800 ASD tugs, two conventional twin screw Rascal 1500 line-handling tugs, all designed by Robert Allan Ltd of Canada, and a pilot boat designed by Camarc Ltd in the UK. This latest delivery comprises the second RAstar, Petra 3, a RAscal 1500 line-handling tug, Aldaem,and a 16.7m Pilot boat called Al Sanad. The first RAstar of the contract, Hashim 3 has been operating at the Port since late May.

Petra 3 and her sisters are all suitable for use in a Zone 2 LNG environment and are equipped with a gas detection system and a ventilation gastight damper control system to isolate the ship from gas leakage throughout the vessel.

Al Sanad is a 16.7m, 20 knot twin-screw pilot boat designed by Camarc Limited, a specialist in the genre. Powered by two 500kW Caterpillar C18 diesels, the vessel has suspension seating for the helmsman and five others plus settee seating for three, on main deck. There are berths for four, galley, mess area and sanitary space on the lower deck.

NASSCO

Investments in Facilities, Equipment and People

General Dynamics NASSCO has invested several hundred million in capital projects as part of its efforts to increase efficiencies via modular shipbuilding, including: two 300-ton cranes allowing shipbuilders the ability to increase the size of the erectable blocks; a block assembly line to optimize construction of commercial ship blocks; inverted block and grand block outfit areas to more fully install components and equipment on blocks; and a state-of the-art, environmentally-friendly blast and paint facility to paint blocks indoors with high capacity equipment. .

General Dynamics NASSCO is also committed to environmental stewardship.

The company recently unveiled one of the largest controlled lighting systems for a manufacturing site at its shipyard in San Diego, California.

Designed specifically for industrial use, the new $630,000 state-of-the-art system is part of a three-phase lighting enhancement project that will significantly reduce energy consumption. Energy reduction reduces NASSCO's carbon footprint and improves sustainability. By switching to controlled lighting, the company is projected to save more than 1.3 million kilowatt hours (kWh), per year.

Additionally, a commitment to training and workforce development for employees and new hires is embedded in the company's culture. General Dynamics NASSCO offers year-round employee and supervisor professional development programs and extensive training. Since last year, more than 580 shipfitters, welders, outside machinists, and others have completed new hire training and joined the workforce.

The company is committed to continuous improvement to reduce the cost of shipbuilding, resulting, in part, to the largest backlog in NASSCO's history. NASSCO is competing for several new government and commercial shipbuilding opportunities including the Navy's T-AO(X), LHA-8 and LX(R) programs.

NASSCO's extensive repair operation spans both coasts, including 16 different locations in four major U.S. Navy ports. In 2013, the repair operation made substantial capital investments to its pipe shop facility to allow for much needed space and crucial crane services. The upgrades allowed repair employees the opportunity to work safer, and more efficiently.

Recent Deliveries

In the second quarter of 2015, General Dynamics NASSCO delivered the USNS Lewis B. Puller. The ship is named in honor of the late U.S. Marine Corps Lieutenant General Lewis "Chesty" Puller, the most decorated Marine and the only one to be awarded five Navy Crosses. NASSCO shipbuilders began construction on the ship in 2013.

The mobile landing platform, configured as an afloat forward staging base, is the first of its kind. Designed exclusively by NASSCO, elements of the ship include a 52,000 square-foot flight deck, berthing, fuel storage, equipment storage, repair spaces, and accommodations for up to 250 personnel.

The ship is capable of supporting multiple missions including Air Mine Counter Measures (AMCM), counter-piracy operations, maritime security operations, humanitarian aid and disaster relief missions and Marine Corps crisis response. The ship is designed to support MH-53 and MH-60 helicopters, and will be upgraded to support MV-22 tilt rotor aircraft.

The U.S. Navy awarded General Dynamics NASSCO a contract for the detail design and construction of a fourth mobile landing platform, to be configured as an afloat forward staging base. Construction is scheduled to begin in the fourth quarter of 2015.

In the past decade, NASSCO has delivered 16 ships to the U.S. Navy.

In the fourth quarter of 2015, General Dynamics NASSCO will deliver the world's first LNG-powered containership. Built for TOTE Maritime, the 764-foot long Marlin Class containership will be the largest ship powered by LNG, in the world.

The Marlin-Class containership reduces particulate and gaseous emissions by more than 98 percent, making these ships the greenest ships of their kind anywhere in the world.

NASSCO has delivered 11 commercial ships in the past decade, and currently has ten commercial ships under contract, including two Marlin Class containerships for TOTE.

Oman Drydock Company Expands Rapidly

Oman Drydock Company (ODC) is growing fast. In January, the yard hit an important milestone - its 300th drydocking. Harnessing the power of its new $1.8 billion, 1.3 million sq. m. shipyard it aims to become a leading shipyard in the Gulf over the next five years. A key selling point for ODC is its geographical position. ODC is in poll-position for the Asia – Europe shipping routes and critically, saving ship owners time, and potential disruption, as ships can come straight to us without deviating through the Strait of Hormuz.

In terms of investment, ODC plans to spend around $80 million this year. As a result of the falling crude oil price, ODC is concentrating effort on conversion projects as demand for carrying and storing crude increases. It recently began two massive new OBO to VLCC conversions for the Greek owned Springfield Shipping Company. These follow the successful multimillion dollar OBO to VLCC conversion of the Olympic Luck it undertook for Springfield in January. The two new vessels Olympic Leopard and Olympic Lion are due to complete in the autumn. In addition to conversion contracts, ODC will carry out repairs on a royal yacht and several navy ships. Moreover, it has many repair works pre-booked for the second half of 2015, allowing ODC to achieve its revenue target which has doubled since 2014.

Dr. Al Abri Takes the Helm

ODC has a new Deputy CEO in Dr. Ahmed Al Abri, one of Oman's most experienced maritime professionals. Dr. Al Abri, draws on 17 years experience working as a naval architect overseeing major projects in shipyards around the world. "It is fantastic to have the opportunity to put years of experience into practice here at the main shipyard in Oman," he said. "We are tackling big issues that have slowed operations in the past such as visa and customs bureaucracy as well as complex environmental obstacles. In addition, we are expanding our supply chain building strong alliances with a broad cross section of companies including welders, painters, blasters and engine suppliers. Moreover, we are improving the truck, rail and logistics access to Duqm. All these factors make us much more desirable to customers who want to ride a commercial wave and see real passion, real commitment and real hunger from a new keen shipyard that wants to impress by delivering the best service."

The DP2 multi-purpose service and ROV vessel, the Siem Spearfish, operates globally.

Harkand:

Expanding the Fleet, Growing a Global Business

International inspection, repair and maintenance (IRM) company Harkand aims to be a $1 billion company. MR's Tom Mulligan recently met with John Reed, the company's CEO, to discuss his vision for the future and how Harkand aims to achieve its goal of being the leading subsea IRM and light construction contractor globally.

By Tom Mulligan

Established in 2012 and headquartered in London with operations bases in Aberdeen, Houston, Mexico, and Ghana, global subsea IRM group Harkand has been expanding its business operations rapidly throughout North America, Africa, the Asia Pacific and Europe, having won major contracts for its services and increasing its infrastructure supporting the oil, gas and renewable energy industries.

Harkand's expertise is in subsea inspection, repair and maintenance as well as light construction, construction support and survey services, using high-specification assets. The company is constantly looking to expand its business to offer new capabilities and create new business opportunities.

Growing Business, Expanding Infrastructure

John Reed, Harkand's CEO, said the dominant economic factor affecting the industry is the energy demand/supply imbalance: "While major oil producers such as Saudi Arabia generally regard such an oversupply as an existential threat to their business, there are new factors affecting the economic situation such as the high growth in shale oil and gas production, which has become a surprisingly large contributor to the supply side."

"Harkand's whole premise is to be a significant part of the global IRM and light construction industry. We aim to grow the business based on the continuing expansion of the infrastructure and the need to maintain the aging infrastructure. This provides the baseline for our growth, which is cyclically enhanced by development project timing. The IRM sector is not immune to the downturn in the market, however our activities support the production of our client's cheapest barrels.

"Over the next 2-3 years, fleet-wise Harkand will operate more or less the same number of vessels as at present, although this will, of course, depend on how long the downturn lasts. We will look to expand the business through acquisitions of companies and/or assets. At present we have one new-build on order, the Harkand Haldane, but I don't envisage us placing any other new orders in the coming 2-3 year period. We may, however, acquire companies with particular types of assets, either DSVs or multipurpose vessels.

"Currently, our main geographic areas of operation are the North Sea and the Gulf of Mexico, as well as in West Africa, specifically off the coasts of Ghana and Nigeria, though we are also looking at working in Angola, which is a more resilient market with continuing activity. We aim to become a sustainable player in the West African region.

"Our goal is to expand our footprint even during the downturn. We believe this is doable."

First Mexico Campaign

A recent example of such an expansion is the signing by Harkand of a joint venture with Arena Servicios de Mexico and the commencement in April of the company's first campaign in Mexico as

Meet John Reed, CEO of Harkand

John Reed is the CEO of Harkand and has been with the company since October 2013. He has more than 30 years of experience in the offshore engineering and construction sector, developing and delivering large-scale capital intensive projects and managing major complex organizations.

Previous to Harkand, he served on the Board of Directors of Cal Dive International Inc.c from May 2012 to August 2013. Prior to that he was CEO of Global Industries Ltd. from March 2010 until its acquisition by Technip SA. He is also a former CEO of Heerema Marine Contractors.

He has previously served as a member of the Board of Directors of the National Ocean Industries Association, is a past President of the International Pipeline and Marine Contractors Association and past Chairman of the International Marine Contractors Association, America's Deepwater Division. He holds a Bachelors' Degree in Engineering from the University of Mississippi and an MBA from Delta State University.

Harkand Arena after winning a $5 million contract with offshore construction company Swiber Offshore Mexico S.A de C.V. The work will include the installation of risers and expansion spools to the Ayatsil Field located in the waters of Campeche Sound. All onshore support including the project management and engineering will be performed by Harkand Arena personnel from its new office in Ciudad del Carmen, Mexico. The project will be performed utilising a portable saturation diving system to be provided by Harkand on board the client's vessel. The project includes an option to use Harkand's DSV Swordfish.

Also this year, Harkand secured a multimillion dollar contract with Maersk Oil North Sea Ltd. for the provision of dive support vessel services in the North Sea region. The 12-month contract will be serviced by Harkand's two DSVs, the Harkand Da Vinci and Harkand Atlantis, supported by project management and engineering from Harkand's Aberdeen office. The contract covers well tie-ins, structure installation, piling, flexible flowline lay, flexible riser installation, pre-commissioning, riser recovery, decommissioning and general inspection, repair and maintenance (IRM) work. The Harkand DaVinci and Harkand Atlantis are both equipped with state-of-the-art saturation diving systems, 140-metric-ton active heave compensated cranes and Super Mohawk ROV spreads.

In an extension to its work with Maersk Oil in the North Sea region, in June Harkand commenced decommissioning work in the U.K. Continental Shelf supporting Maersk's work in the Leadon field. This new contract will see Harkand deliver project management and engineering services to the Danish-owned oil and gas company around its drill rig program for subsea well plug and abandonment. With an estimated 500-690 facilities reaching the end of their operational life over the next three decades, North Sea asset decommissioning projects are expected to play a large part in Harkand's future.

"It comes back to the basis that the IRM sector always has some level of activity regardless of the price of oil as our clients try to operate efficiently and maintain current production. Our company is built around that feature of the industry. However, it's vitally important to reduce costs in these circumstances and it's essential to be as 'lean and mean' as you can," says Reed. "Of course current market conditions can delay your investment decisions, but Harkand has a unique perspective because the company is backed by private equity. We can identify business opportunities, make the case for funding to our owner, and if approved, make suitable acquisitions."

Strategic Initiatives & Acquisitions

Reed said there are two parts to continued growth of the company's business: "First, there is the drive to continue our strategic initiatives and expand our footprint, as I've already described; and second, the acquisition of more vessels or of companies - we will continue evaluating opportunities and make conscious decisions on whether to make offers or not. Mexico, for example, potentially has some very good opportunities and has a massive shallow-water infrastructure. However, it also needs deepwater technology, infrastructure and investment. This is mostly achieved through licensing rounds and foreign investment, the IOCs likely being the major source of funding. Harkand is very well established on the service side, we have the fleet to meet both diving and deepwater requirements, and so we are very well prepared to take advantage of the opportunities in Mexico."

To support its new activities, Harkand has awarded a contract to global shipbuilders Vard Holdings Limited (VARD) for one diving support and construction vessel (DSV), with options for a second. Delivery of the first vessel, the Harkand

Haldane, is scheduled for Q2 2016. The deal represents an investment of $200 million per vessel, including additional plant and equipment, and is the latest in a series of investments in the growth of the company's global vessel and ROV fleet, including the long-term charter of the Siem Spearfish for its U.S. operations.

Meeting Diving Services Needs

"Diving services are at the core of our IRM services. Following the very successful deployment of the Harkand Atlantis in the North Sea and Harkand Da Vinci in Africa after their delivery in 2011, we aim at further expanding our capacity in the high-end DSV market, especially the North Sea," said Reed. "The Haldane takes on the proven characteristics of Atlantis and Da Vinci, and adds a number of improvements. The investment we are making in our business both in terms of our people and our assets underlines our commitment to create a modern, safe and efficient fleet that meets the highest standards of our customers on a global basis."

The contract brings Harkand's investment in its global operations since its formation to more than $300 million, boosting its vessel fleet to eight and its ROV fleet to 32.

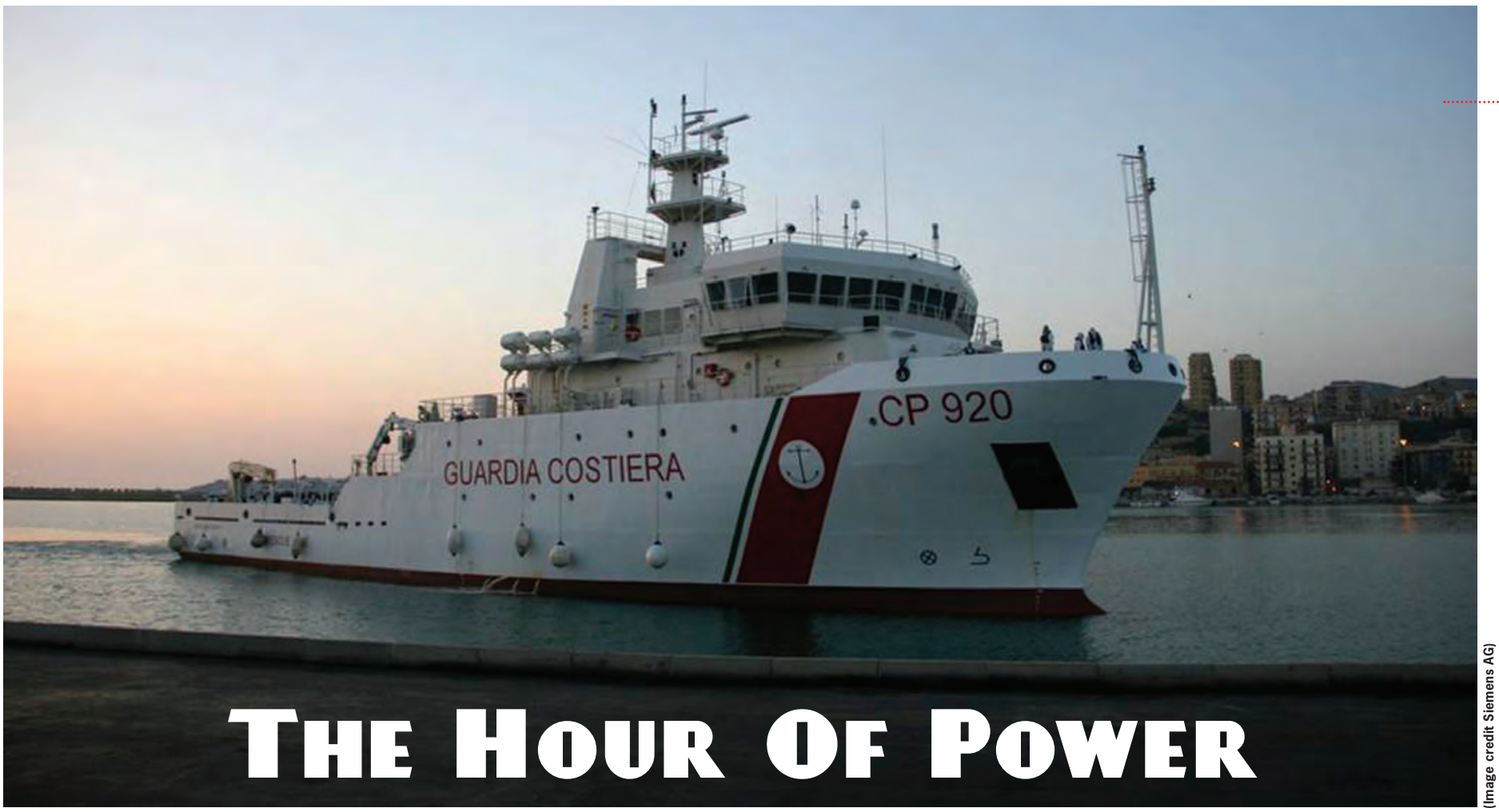
"This latest dedicated vessel will not only be instrumental in responding to our growing number of projects in the North Sea and globally, it will address the shortcomings of DSV supply, both in quantity and quality, that exist in the current market," Reed said." This will allow us to continue to offer the latest innovations in subsea technology through a state-of-the-art fleet both now and in the future."

The vessel is of VARD 3 03 design, specially designed and equipped for diving and subsea operation duties with a high focus on good sea-keeping abilities, excellent station keeping performance and low fuel consumption. It will be fitted with a 250-metric-ton offshore crane, an ROV hangar and a Twin Bell 18 Man Saturation Diving System capable of supporting split level diving operations to a maximum diving depth of 300 meters. In addition to diving support, the vessel also has deepwater capability with the 250-metric-ton crane having 3,000 meters of wire, meaning it can perform work both in shallow water as well as deepwater ROV-related tasks.

"The Harkand Haldane is a very high-spec DSV which will likely operate in the North Sea," said Reed, "but there will be demand for its use in other regional areas due to its high flexibility, a key consideration in a downturned market.

Multiregional Ops, Regionally Focused

"Our vision since the very beginnings of the company has been to make Harkand a $1 billion business, and to do that means we have to be multiregional. IRM is a regionally focused business, so we need to be front-facing in each region, and we achieve this through the operation of local regional offices supplying customized services and operating customized vessels to meet local needs. We are a full-service IRM company providing integrated solutions to clients in the oil, gas and renewable energy sectors – there is the space available for a worldwide player serving all regions in a full-service way, and this has been our vision since our founding in 2012."



(Image credit Siemens AG)

THE HOUR OF POWER

Hybrid Marine Technology and Green Ports

By John Haynes

In 2015 two significant developments are going to make many operators, owners and builders of professional vessels consider hybrid marine power. First, the new emissions laws in ports and second, there is now an incentive for high technology manufacturers to invest in developing highly efficient batteries.

Hybrid is 'here and now' technology that is being utilized by many industries around the world. The marine industry is now recognizng the potential of utilizing hybrid power and innovative propulsion systems for vessels in the sub IMO / sub 24 meter (80 feet) professional sector.

'The Hour Of Power' has been well received by the marine industry worldwide. This simple concept enables vessels to run in and out of port for an hour on electric with battery power - then carry out their open sea work on diesel power. The aim of this innovative hybrid solution is to enhance conventional power and propulsion systems. Vessels can reduce emissions and improve fuel consumption whilst extending engine maintenance periods and engine life.

Green Energy plus a Viable Business Case

This is not just green energy for the sake of it. 'The Hour Of Power' focuses on hybrid solutions linked to viable business cases. For commercial and professional organizations the concept of running vessels with zero emissions at up to 10 knots for one hour will shape decisions that lead to improvements of in-service systems and procurement of next generation vessels. The overall objective is fuel saving and improved efficiency by all means.

For the marine industry to move forward it needs to utilize expertise from aviation and other sectors to drive this innovation and support relevant safety standards. Automotive manufacturers in Europe, the Far East and the U.S. have recognized that hybrid technologies such as PHEV (Plug-in Hybrid Electric Vehicle) utilizing lithium ion batteries will be dominant for the next decade. Reducing emissions from busses and trucks in the world's major cities has been a major driver for lithium ion battery power storage. The need for self sufficient land based grid applications has further extended the capabilities of next generation battery and hybrid technology.

Serial and Parallel Hybrid Power Systems

Diesel / electric systems have been used in large ships and submarines for many years but these are not hybrid systems. The diesel / electric vessel uses its engines to connect directly to an electrical generator. The power in the system is then transferred electrically to the propeller shaft via a motor controller and electric motor. The system may have multiple generators and multiple motors. By strict definition this is not a hybrid as there is no storage of electric energy.

There are currently two main types of hybrid system. Firstly a serial hybrid, where the engine in the system only powers a generator and is not mechanically connected to the propeller shaft. Secondly a parallel hybrid, where the engine is mechanically connected along with an electric 'machine' that can operate as both a propulsion motor and a generator. The reduced electric propulsion, generator and battery demands of a parallel system substantially reduce the cost compared to a serial system. Parallel systems are more likely to win initial market acceptance because of a perceived greater reliability, as the 'trusted' diesel engine is still connected to the propeller shaft with the electric propulsion adding a redundant system.

Until recently it has not been possible to transfer such systems successfully to

65 meter Offshore Supply Vessel with hybrid propulsion system for the Italian Coastguard.

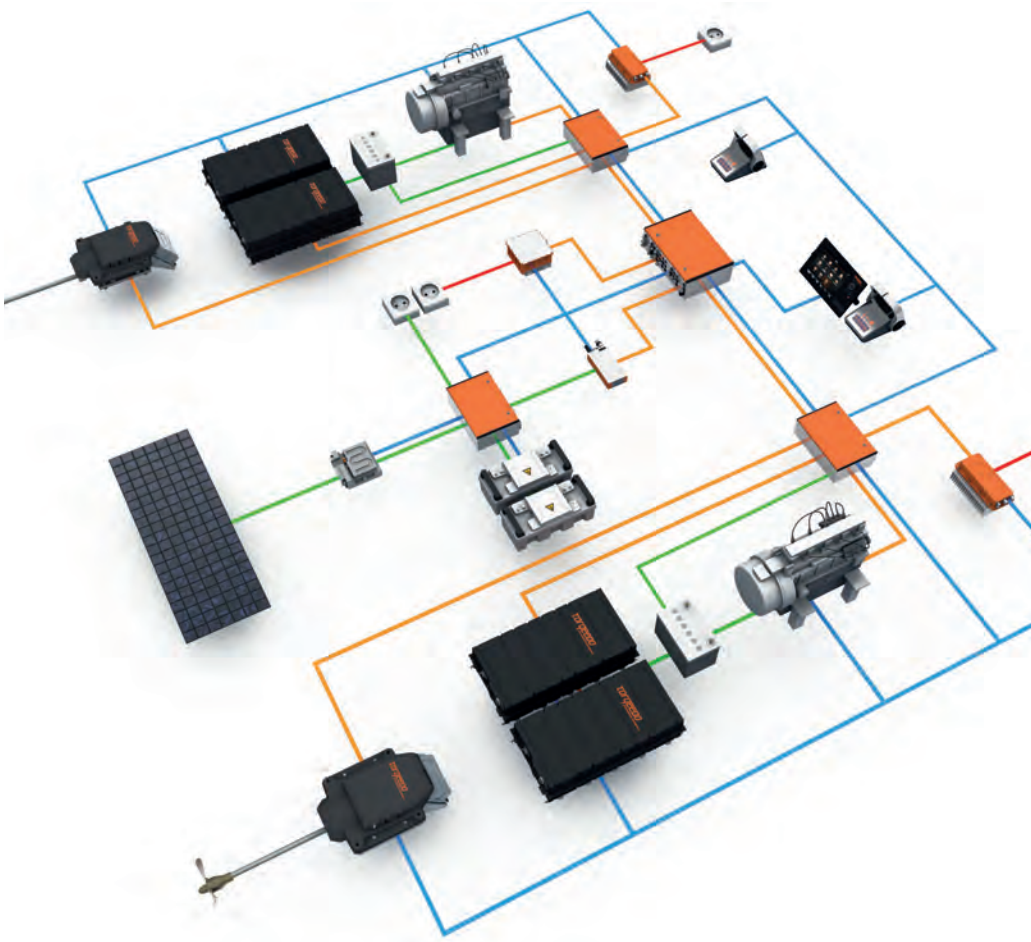
smaller craft. A European Union funded project called HYMAR (High efficiency hybrid drive trains for small and medium sized marine craft) set out to develop an optimized hybrid system. HYMAR developed a parallel hybrid system that has been installed, tested and validated on marine craft. The optimized hybrid system developed during the project offers three major advantages - no detectable emissions, no discernible noise and a substantial reduction in fuel consumption.

Hybrid Power & Propulsion Systems Increase Efficiency

We are entering a period of rapid change and commercial opportunity in the hybrid marine market. Boat builders, engine manufacturers, designers and naval architects are now developing systems for survey vessels, superyacht tenders, patrol vessels and unmanned craft. Benefits include improvements in energy reliability, increased fuel efficiency, life-cycle cost reductions and reduced emissions. DNV-GL USA recently stated that, 'energy storage is an exciting new technology, but the offshore E&P sector of the oil and gas industry has yet to truly take advantage of it. Tugboats, workboats and OSVs are particularly suitable for hybridization.'

When studying work cycles of vessels it is relatively straightforward to make a decision for new builds on whether to go for all electric or a diesel / electric hybrid system. For example a ferry operating over a short route with a long stopover each end could offer the perfect work cycle for 'electric only' with a land based charging system. Other issues, such as the cost of downtime and structural alterations affect viability calculations for retrofit of in-service craft.

BAE Systems is a provider of hybrid propulsion systems with technical ex-



Deep Blue Hybrid by Torqeedo is a fully integrated scalabe system offerring hybrid power & propulsion.

The Maritime Aquarium at Norwalk research vessel 'Spirit of the Sound' is equipped with BAE Systems HybriGen technology.

perience in hybrid technology for land-based applications. David Adamiak, Senior Manager Business Development at BAE Systems HybriDrive said, 'From over 10 years experience supplying hybrid technology to bus and transport sectors we know that cost-benefit calculations start with the initial purchase of the system. Payback periods can be based on the life cycle of the vessel and life cycle of the hybrid power system. Once a system is defined projections of savings can be based on engine management data linked to work cycles.' Hybrid systems are infinitely scalable which enables owners to specify what they are trying to achieve over a period of time or an entire fleet. David Adamiak added, 'We supplied a HybriDrive system to the 19 m (62 ft.) research vessel Spirit Of The Sound. She runs virtually silently on battery electric power for two hour study cruises on Long Island Sound.'

Hybrid Systems and 'The Hour Of Power'

Certain maritime sectors are potentially well suited to 'hybrid' diesel / electric systems. These include wind farm support vessels (WFSV) and pilot boats that have relatively consistent duty cycles, often running seven days a week to drop off or collect technicians and pilots. Focus is now on the sub IMO / sub 24 meter (80 ft.) workboat, pilot boat and patrol craft sectors to investigate the engineering and systems integration required to bring together viable and sustainable solutions. With vessel life cycles of over 20 years, naval architects and builders of new craft will offer designs that have space and access routes to enable retrofit of hybrid installations. Speed limits in harbors and channel approaches at beginning and end of daily transits may mean that 'The Hour Of Power' is all that is required for the electric part of the cycle.

Next Generation Cells & Batteries

The next generation of cells and batteries are key technology developments that are making marine hybrid systems potentially viable. Battery chemistry such as Lithium-ion offer impressive power solutions and the business case is starting to fit for commercial operators. Since there is no single system that fits every application it is important to work with manufacturers that have flexibility in cell manufacturing and offer scalable solutions. New factories with fully automated processes are designed to ensure consistently high quality cells and quality control of the entire battery management system.

The marine sector can learn from battery advances in aviation and land transport sectors. Michigan based XALT Energy offer several variants of High Energy, High Power, and Ultra Hi-Power cells. Robert Young, Technical Lead for Marine Applications at XALT Energy, said, 'our team of engineers have worked to the highest standards developing electric and hybrid energy solutions for the automotive sector. XALT Energy not only has the necessary knowledge, but also the experience of taking high voltage battery projects from concept through production into the finished system.'

Hybrid Marine Power & Propulsion Workshop

In May 2015 the Hybrid Marine Power & Propulsion Workshop brought together a group of experts in Southampton, U.K., to explore the possibilities of utilizing hybrid power and propulsion systems in the professional marine sector. Focussing on sub IMO / sub 24 m (80 ft.) vessels, the group highlighted the potential of the Hour Of Power concept for wind farm support vessels, pilot boats, patrol craft and harbor service vessels.

At the hybrid marine workshop Christoph Ballin, co-founder & CEO of German manufacturer Torqeedo, explained the development of high-power integrated propulsion systems for serial production, 'Torqeedo Deep Blue hybrid power and propulsion for the professional marine sector is based around components of the proven and multiple innovation award-winning system for electric hybrid yachts. The hybrid system can provide drive systems and supply the power required onboard. The use of renewable sources of energy has also been integrated into the energy management system. Professional users of the hybrid system can travel silently and use environmentally friendly sources of energy in port and at lower operating speeds.'

Following the hybrid marine workshop Robert Young added, 'We are now working with boat builders, naval architects and marine operators to analyse different workboat duty cycles. Engine management data can be matched to battery characteristics to develop the most efficient solutions. XALT Energy onboard energy management systems are designed to ensure that battery systems operate at optimum performance. The objective is hybridizing and electrifying marine vessels to produce financial benefits and reduced emissions.'

Wind Farm Service Vessels and The Hour Of Power

Multi role Wind Farm Service Vessels (WFSV) enable fast personnel transfer with the capability for utility work such as moving equipment and delivery of spares. As the demand for wind farm support has intensified, vessels have

been specifically developed for transiting to wind farms in a wide range of conditions then delivering technicians onto wind farm turbines.

If wind, wave and tidal energy installations want genuine 'green' credentials it is logical to reduce consumption of fossil fuels wherever possible. The Hour Of Power concept lends itself to WFSV operating in the ongoing wind farm maintenance phase. A conventional diesel powered vessel with a bank of batteries onboard the vessel can be specified to run at hull speed, usually around 10 knots, for an hour at a time on battery electric power.

A typical working day starts with the WFSV captain and crew preparing the vessel, then passengers arrive. The vessel would first be disconnected from shore power which has been used for overnight battery charging. The vessel can leave the dock and harbor on battery electric power, which also means zero emissions. At the outer sea buoys diesel power takes over for the high speed transit out to the wind farm and to deliver the technicians onto the wind turbines, during this time the batteries are re-charging. Many vessels then have hours of waiting in the wind farms, as they are on standby they cannot anchor. Loitering at low speed and low revs is not an efficient load cycle for diesel engines, plus it leads to increased maintenance and reduced engine life. This loitering period could be on battery power. Later in the day diesel power is used for the high speed transit back to port, the batteries are re-charging. At the outer sea buoys battery electric power takes over to enter the harbor, with zero emissions. At the dock shore power is then re-connected for overnight charging.

Indentifying the viability of hybrid diesel / electric power for offshore wind farm support vessels (WFSV) is an interesting project that links green energy onboard with renewable energy from the environment. Hooking up to offshore wind farm turbines may even provide charging options. Many wind farms are 'overplanted,' this means there is more energy generated by wind than is required for the grid on land. This surplus allows for downtime and maintenance of turbines. For offshore wind farms in sea areas such as the Dogger Bank in the North Sea which is over 125 km (80 miles) from land, wind generated electricity could be utilised at source from the local offshore grid.

Looking To The Hybrid Future

For naval architects working in the commercial marine sector class rules, safety, performance and cost are relevant when considering innovative battery power and diesel electric propulsion systems. The challenge for designers is to engineer solutions utilizing hybrid technology which are affordable plus manageable in terms of physical size, weight and maintenance.

As new sources of energy become available it is important to identify which energy source best fits the vessel, duty cycle and environment to give efficient power when it is needed. Since no two vessels, routes or captains are alike, decisions can be improved with data logging and analysis. Commercial Off The Shelf (COTS) power management systems will bring together diesel, electric and battery data to create optimised whole vessel hybrid systems.

As ocean going shipping, automotive, transport and aviation move rapidly towards hybrid solutions it will be interesting to see how the marine industry decides to utilize the numerous opportunities.

The Author

John Haynes is an Associate Fellow of the Nautical Institute, a Yachtmaster Ocean and Advanced Powerboat Instructor. Subject matter expertise includes high speed craft consultancy, product development and specialist training. He is Operations Director of Shock Mitigation www.shockmitigation.com and founder of the RIB & High Speed Craft Directory that brings together specialist boats and equipment for the sub IMO / sub 24 m professional sector worldwide www.ribandhsc.com

Hybrid Marine Power & Propulsion Conference
Lifeboat College Poole UK – October 6-8, 2015

This unique event brings together an international group of experts, to identify the potential of utilising hybrid power and propulsion systems for vessels in the sub IMO / sub 24 m sector. Attendees will include professional, commercial and military end-users, boat operators, boat builders, engine manufacturers, mechanical & electrical engineers and naval architects.

Hybrid Conference Website:
http://shockmitigation.com/inner-page/hybrid-marine-conference/40/6/

Hybrid Conference Organiser:
Julie Arthur +44 (0)7449 000228 directory@shockmitigation.com

ZF Turns *100*

Count Ferdinand von Zeppelin
Military officer, visionary, tinkerer.

Left: Daniel Härter, VP Industrial Technology, Head of Business Unit Marine Propulsion Systems, ZF Marine

(Photo: ZF)

In 2015, ZF Friedrichshafen AG will be celebrating its centennial. Founded in the city of Friedrichshafen at Lake Constance in 1915 as "Zahnradfabrik GmbH," the company developed from an aviation specialist with regional roots to an international technology company active on the global mobility markets, including maritime. MR recently visited with Daniel Härter, Vice President Industrial Technology, Head of Business Unit Marine Propulsion Systems, who took over responsibility for ZF Marine as of September 1, 2014.

By Greg Trauthwein

ZF is obviously large and diverse across many markets. Please specifically the Marine Propulsion Systems Business Unit, its products & services and its contribution to the maritime industry.

The Business Unit "Marine Propulsion Systems" is a leader in the marine market. Coordinated through its headquarters at the location ZF Padova, Italy, ZF Marine is present worldwide with approximately 1,000 employees and sales of $279 in 2014. ZF Marine supplies propulsion systems and components for all types of vessels - motor yachts, defense craft, high-speed ferries, workboats and commercial vessels, in a power range from 10 to 14,000 kW - to customers including major shipyards and engine manufacturers worldwide.

The product portfolio includes a range of transmissions (reversing, non-reversing and hybrid), propellers, steering systems and CANbus-compatible, electronic control systems, azimuth thrusters, tunnel thrusters and sail drives.

Looking back, what do you count as your company's biggest introduction to this market?

This is difficult to say in a 100 years history of ZF. Development of products to meet our customer's needs and requirements. Listening to our customers and being responsive to their needs has certainly contributed to our position as the number one supplier of transmissions in certain areas like inboards, sail drives and transmissions for fast craft

Looking back on the past year, looking at the maritime industry as a whole, do you see positive or negative, and why?

The industry itself claims to be very conservative, but I don't believe so. New technologies are introduced in all areas. In the propulsion business hybrid systems, new pollution prevention systems are introduced, diesel electric systems, user-

friendly control systems latest materials and state-of-the-art productions systems with its modern processes are implemented. This trend will continue therefore I see it absolutely positive and as an innovative industry which has always been able to balance advances with risks.

Looking ahead to 2016, what do you see as the defining trends that will drive your business forward in the year(s) ahead?

On the one hand we see low oil prices and a weak Euro, which is challenging the whole marine business and as well our business. But still there are a lot of opportunities for ZF Marine to grow and increase market share. Drivers for this growth are our up-to-date products - meeting the customer's expectations in all areas, paired with excellent services from project start all the way through the lifetime of the application.

Briefly describe the overall importance of the maritime industry to the whole of your company.

In terms of sales and employees, ZF Marine is a very small part of the global ZF Group. But ZF Marine plays a major role in the diversification of ZF towards non-automotive products. And we are 1,000 individuals who are working for ZF Marine with enthusiasm and dedication. ZF is a company were every single individual counts, who together make a very strong team.

What is on the calendar in terms of celebration to mark this historic occasion?

There are many ways we will celebrate. Every ZF location worldwide is hosting "family days," allowing families to visit and learn about the company. In addition, every employee will receive a history book on the company, as well as receive a personal greeting card from Dr. Sommer, ZF Group CEO.

In addition, there will be the ZF Group Gala anniversary event on September 9, the same day the company was incorporated in 1915. It is here that the new global headquarters in Friedrichshafen – the "ZF Forum" – will be unveiled. The new headquarters will include a museum that will be open to the public beginning in 2016.

As the business world grows increasingly complex and competitive, what do you count as the primary strengths of your company that make it stand out?

ZF, as a large, multi-faceted entity with 100 years of research and development in driveline technology, has a knowledge base not many companies in the marine industry have. ZF Marine as a division of the ZF group has access to this knowledge base. Our products use the latest materials, technologies, design and research capabilities, production systems and processes. This, paired with a large worldwide sales and services organization, makes ZF Marine a reliable partner and a technology leader in its field. ZF Marine is well prepared to take challenges and turn them into opportunities.

Standing on Guard(eon)

Preventing the 'Arc Flash' Casualty

As GE celebrates the grand opening of its Mebane Customer Experience Center and a multi-million dollar manufacturing facility renovation, Maritime Reporter & Engineering News gets an advance look at a new product line that could save marine and oil & gas customers millions of dollars in lost time and equipment damage.

By Joseph Keefe

GE Industrial Solutions CEO Bob Gilligan told GE employees, distributors, and state and local politicians that ultimately, the firm's energy management business would more than double to $13 billion annually as GE moves to recapture the lead in that market space.

Gilligan also predicts that once this sea change has been completed, GE will then be earning as much as 90% of its revenues from the industrial side of the ledger. No doubt he likes what he sees in the marine market, a pool of more than 100,000 vessels of all types that all need first rate energy management solutions.

At GE Industrial Solutions' Cary, N.C., offices and at its newly renovated Mebane, N.C., production facilities, the firm served notice that it is ramping up both its manufacturing capabilities as well as the speed at which will respond to market requirements. With its build and design groups now under one roof and collaborating on the production floor, the utilization of GE's FastWorks methodology can – according to GE – reduce the time from idea to market product rollout by half. According to Gilligan, FastWorks eliminates "the silos" that can slow product development. As that evolves, its Mebane, N.C. facility will be at the spearhead of that effort.

At the heart of the $6 million Mebane facility renovation is GE's Customer Experience Center, and the grand opening of that facility underscores GE's commitment to the marine and oil and gas industries. Beyond that, said Gilligan, the Mebane facility will serve as a place for GE customers to meet and collaborate on future products and industry needs.

1984 & Today

In 1984, some of the things that George Orwell foretold about that mystical year simply did not come true. Sure, we had some cool technology, but the PC in every home was still a few years away and much of the technology we take for granted today couldn't be envisioned – even by Mr. Orwell himself. Nevertheless, in 2015, the grand opening of GE's Mebane Customer Experience Center promises improved technologies, safer and more efficient ships, and the advent of predictive diagnostics; all brought to market at twice the speed of typical innovation – something GE bills as FastWorks – where the 'design' and 'build' functions come together as one.

In today's high tech world of multi-billion dollar equipment, sophisticated electronics and the legal and financial ramifications of a business interruption, the failure of a simple circuit breaker to perform its intended task – what GE describes as an 'arc-flash' event – can be devastating. Also according to GE, it can also cost you as much as $15 million, once all the variables of lost time at sea, ruined downstream equipment and all the rest of it are factored. In response, GE has expedited the development of a new, predictive Low-Voltage Molded Case Circuit Breaker (MCCB) Line.

GuardEon

GuardEon MCCB performs calculations to determine the health of the breaker, particularly how much contact wear has occurred. Every time a circuit is opened or closed, part of the breaker's contacts are burned away. This can cause a breaker to overheat and fail unexpectedly – and a failed breaker can lead to an array of problems in heavy industrial applications. In addition, GE's Guar-

The demonstration room at GE's Mebane, N.C., production facilities.

dEon MCCBs feature on-board timing functionality which is used to measure the breaker's fault reaction time. This enables testing to be done on the unit without having to remove it. GE calls this "predictive maintenance."

According to GE, in marine applications, for example, an arc-flash event that takes place in the middle of the ocean can result in severe ship fires. An arc flash produces temperatures as high as 35,000 degrees. Isolated at sea, there is no fire department nearby to help contain and reduce the damage caused by an arc-flash event. If it is not mitigated quickly and effectively, or prevented all together, the results can be catastrophic.

Norm Sowards is the General Manager of the Power Components Business Unit (BU) for GE's Industrial Solutions business, which is leading the future of electrification with advanced technologies that protect and control the distribution of electricity throughout a facility's – or a marine vessel's – infrastructure.

In his role, Sowards drives key product line initiatives such as product line profitability, strategic investment decisions and product line vitality. The crux of Sowards' push to more fully penetrate the commercial marine space is the effort to reduce unplanned downtime with predictive maintenance.

Sowards describes GuardEon as a high performance circuit breaker focused on industrial type applications. It meets global applications and standards. It has predictive maintenance features in the product including the ability to understand internal contact-ware, and the ability to understand the operating time in an event log. It takes all of that information and is able to coordinate it and provide it in a usable way to the operator."

But, of all the things that GE could be focusing on in this space – and there are many – the 'arc flash' is arguably a curious problem to be solving. Not so, says Sowards.

"It's less about breakers tripping than it is about the predictive maintenance that we talked about. Whether its marine customers or oil & gas customers or data center customers, what they care about is being able to predict if a breaker is going to trip in the future and take action in advance of that. So it wasn't a customer that came to us, but instead it's a problem that keeps coming up in heavy process industries. This is the solution to that problem."

Slated for rollout by midyear 2016 and suitable for retrofit on existing vessels, the GuardEon MCCB is already being testing in at least 100 industrial venues – although not yet at sea. Nevertheless, the innovative GE device already has ABS and DNV-GL class approvals. The number of GE GuardEon breakers needed aboard any particular ship would, says Sowards, depend on the size of a vessel. He explained, "Every AC low voltage circuit breaker on the ship, whether it is a previous vintage of our breaker or someone else's, then this would be a replacement in that application. The load determines the number of breakers that you use. In order to get the reliability and predictability that we've discussed, these work together as a network. GE has a team that can go out and determine what the needs are – performing a risk assessment."

Real Hazards, Real Costs

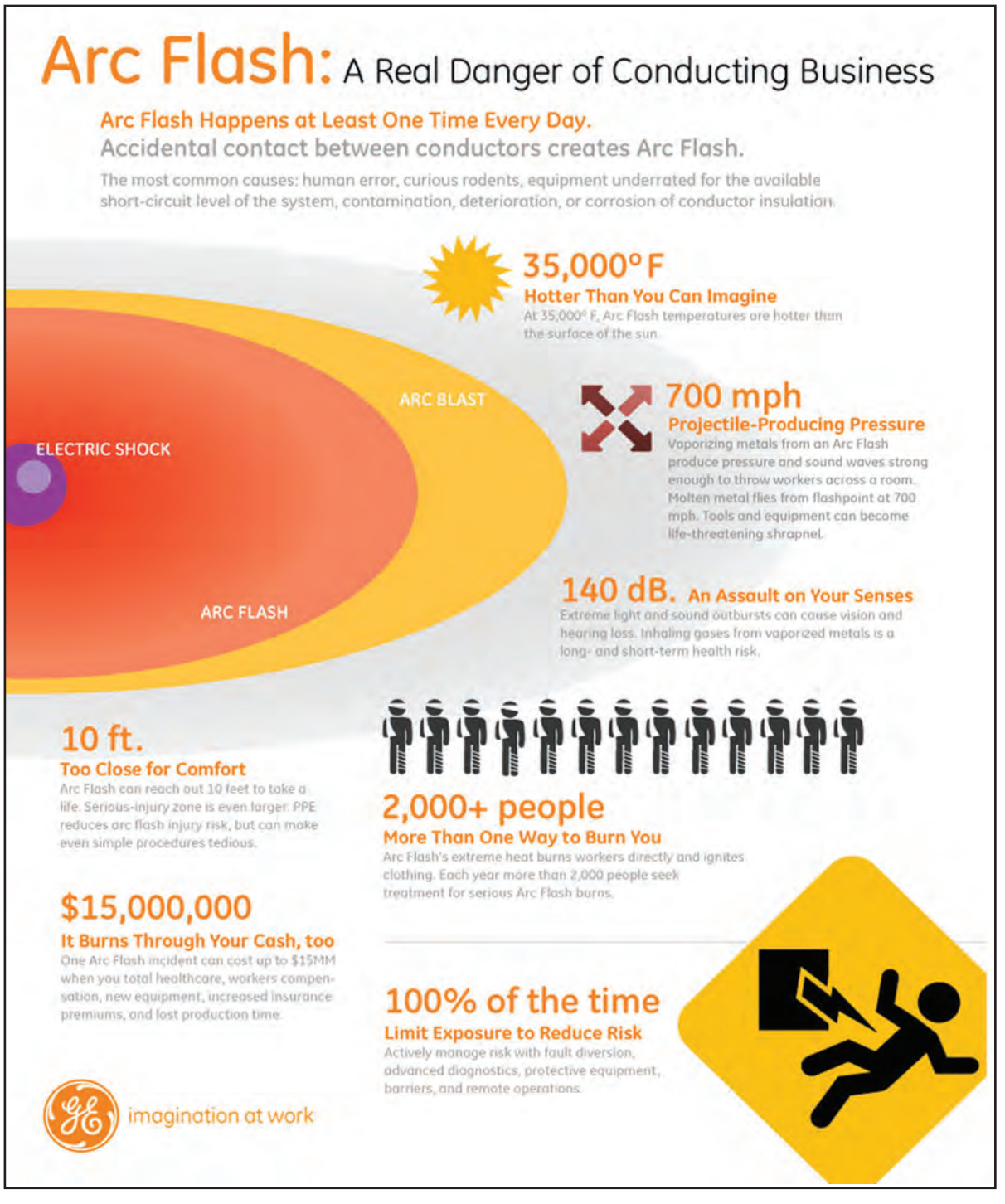
According to an Electric Power Research Institute (EPRI) study in the U.S., a single arc-flash incident can cost operators up to $15 million once healthcare costs, workers compensation, replacing equipment, increased insurance premium and lost production time are factored.

And that's just on shore.

Imagine the costs associated with your $120 million, 18,000 TEU ship rolling around in rough seas without power. With predictive maintenance, the ability to anticipate and schedule shutdowns can mean avoiding untimely, costly outages and downtime.

"Whether you are running a hospital, a steel mill, a ship or whatever, if you have an arc-flash event, the equipment gets damaged, and the revenue stream stops for some period of time," said Sowards. "The second part of that is the replacement of the equipment itself. And that could be the breaker itself or more likely, downstream equipment like a motor, etc. Summing up, we're providing a fairly inexpensive solution to the potential downstream catastrophe."

In the real world, there are plenty of other circuit breakers in the market today and what people are doing is, rather than predicting the arc flash event, they are controlling the event to minimize the damage. And whereas in a shoreside industrial situation this is a little easier, on board the vessel there are typically four



or less engineers to do the same thing in the power plant at sea. “What you care about with something like GuardEon is that you never notice that it is there,” said Sowards. “The added benefit is the predictive maintenance. What we care about is having enough data points to see in advance to stop something in advance from happening that we didn’t want to happen.”

Sharp Focus into the Marine World

GE and Sowards will next arrive into a marine marketplace that they already understand. That’s because GE has, for decades, been providing propulsion solutions to the world’s Navies. More recently, GE Transportation’s newest marine engine offering – one which meets EPA Tier 4i and IMO Tier III Emissions standards – all without the need for a Selective Catalytic Reduction system (SCR) exhaust gas aftertreatment, could change the way marine operators go about selecting their next set of engines for retrofit or new build. The GE Marine 12V250 Marine diesel engines reduce NOx emissions by 70 percent when compared to EPA Tier 2 or IMO Tier II. Beyond this, GE Marine’s self-described ‘breakthrough’ engine technology not only eliminates the need for a Selective Catalytic Reduction system (SCR) exhaust gas after-treatment, but also the requirement to store or use urea aboard a vessel, thereby preserving cargo and tank space – not to mention all of the extra costs associated with that extraneous equipment.

Norm Sowards has no intention of letting that experience and GE relationships already developed on the water go to waste. “Part of the synergy we’ll have with industry is though GE Power Conversion business because they deal directly with the end user in that space. We get intel and understand the real needs are through that sector. And the lines between oil & gas and marine sectors are becoming blurred. There’s plenty of concern about this issue today industry, but they are dealing with it in a different way. They are spending money on it – but they are not spending money on the one’s that have predictive diagnostics. That’s what we have to sell – explaining why predictive diagnostics is more important than a local breaker

"It's less about breakers tripping than it is about the predictive maintenance ... Whether its marine customers or oil & gas customers or data center customers, **what they care about is being able to predict if a breaker is going to trip in the future and take action in advance of that.** So it wasn't a customer that came to us, but instead it's a problem that keeps coming up in heavy process industries. This is the solution to that problem."

Norm Sowards, General Manager,
Power Components, GE Industrial Solutions

with real time information on it." All of that said; GE has no GuardEon units in the marine space at the moment. Sowards is looking ahead to the moment they do. "The product launches in the middle part of 2016. We are working with the GE propulsion division on this concept, actually. This product will go into the control panels that control those engines. One of the ways that we get this product there is through the product conversion business."

When that happens, many key features laid out by customers and determined through collaboration with GE's Power Conversion and Oil & Gas businesses have already been incorporated into the new GuardEon MCCB. These include the 200-kiloampere short-circuit rating typically required in marine applications, high shock and vibration ratings, a rotating face plate for versatile installation configurations and clear, brightly colored labels.

The new circuit breaker also was designed with 25 percent fewer internal parts than previous versions, reducing the number of potential fail points, improving unit reliability and driving long-term sustainability."

In a perfect operating scenario, a circuit breaker will never have to trip or respond to an electrical problem. In the real world, this is often not the case. Many circuit breakers may sit for months, years, even decades without any action, but must remain able to switch the power off in an instant if a system-damaging event (like an arc flash) occurs. 1984 has come and gone. But even George Orwell might admit that what is happening today in the world of energy management is truly amazing. The best may be yet to come.

LNGreen

Next-generation LNG Carrier Concept

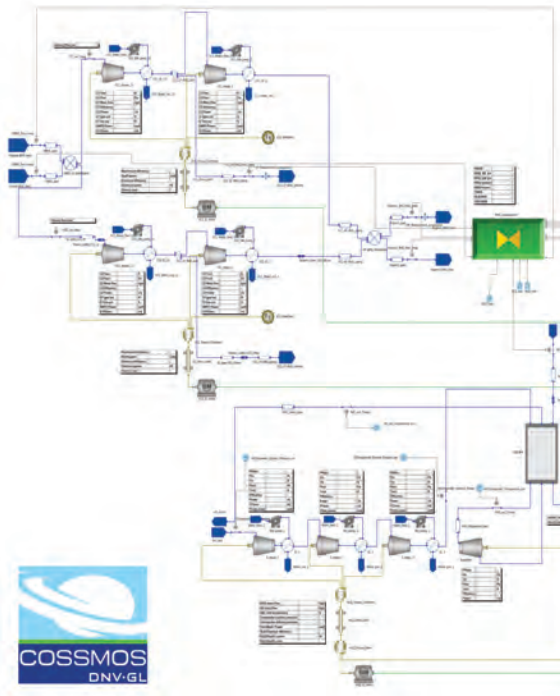
DNV GL announced the completion of the LNGreen joint industry project, which worked to develop a next-generation LNG carrier. The LNGreen joint industry project brought together DNV GL, GTT, Hyundai Heavy Industries (HHI) and GasLog. The vessel concept is designed to deliver an improved environmental footprint, a higher level of energy efficiency, as well as an improved boil-off rate and cargo capacity, making it much better suited to future trading patterns than existing vessels.

LNGreen investigated the improvement of efficiency and performance of LNG carriers by considering actual operational conditions and optimization in terms of hydrodynamics, machinery and system configuration. These developments were based on DNV GL's integrated systems engineering approach COSSMOS, computational fluid dynamics (CFD) calculations, and a containment system design, tailored to a specific operational profile and anticipated trades.

HHI and DNV GL carried out the hydrodynamic performance evaluation by comparing CFD simulations. Different CFD codes were applied for the comparison of resistance and self-propulsion performance but different scale effects were also considered.

Cargo containment optimization was investigated by GTT and HHI. The tank shape, necessary reinforcements and boil off rate calculations, were examined to develop alternative cargo tank designs that could yield additional cargo capacity. With a starting design point of 174,000 cu. m. cargo capacity, cargo tank optimization by GTT and HHI allowed for a cargo capacity increase to 182,800 cu. m., while maintaining the same main dimensions (length overall, breadth, draft) and taking into consideration newly introduced regulations and compatibility restrictions.

LNGreen



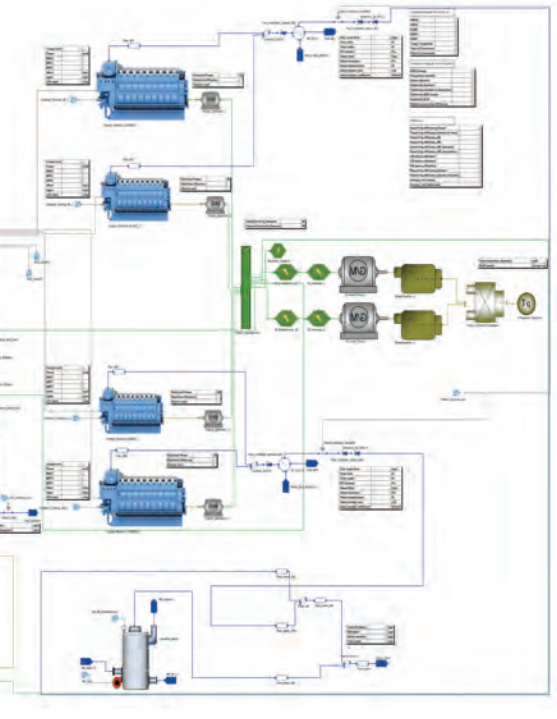
PERSEUS

Autonomous, Real-time Maritime Surveillance

Conventional surveillance technologies cannot easily help to detect fast boats, which generally have small radar signatures and do not carry automatic identification systems (AIS). For this reason, the NATO STO CMRE (Center for Maritime Research and Experimentation) has addressed this problem along with other project partners, as part of the European project PERSEUS.

The PERSEUS project (Protection of European BoRders and Seas through the IntElligent Use of Surveillance), coordinated by Spanish technological company Indra, is one of the most significant initiatives within the 7th Framework Program of the European Commission, and has constituted the flagship of R&D in the maritime security segment.

In the Project's term, ended in June 2015, CMRE scientists and engineers worked to design, develop and demonstrate at sea concepts of continuous, real-time passive underwater acoustic systems for maritime surveillance. The objectives have been successfully met by using innovative solutions integrated on board unmanned mobile platforms, i.e. both on an underwater glider (an autonomous underwater vehicle which uses shifts in mass to steer and changes in buoyancy to dive and surface) and a Wave Glider (an autonomous vehicle with a surface float and a submerged glider, generating forward movement by exploiting sea wave energy).



Fuel Efficiency: The Way Forward (Part II)

Due to a production error in the July 2015 edition, editorial information provided in the feature "Fuel Efficiency: The Way Forward," was formatted incorrectly, and quotes from Jan-Erik Räsänen and Victoria Stulgis appeared incorrectly. Below is the corrected information.

The Immediasea Shipping Debate Forum 'Fuel Efficiency - The Way Forward' was held in connection with the NorShipping event in Oslo, Norway, in June. Leading the panel was Mark Fuhrmann from Blue-C who invited leading maritime executives to share their views on the future of shipping fuel-efficiency. Below are select quotes.

Jan-Erik Räsänen, Energy Solutions, ABB

Jan-Erik Räsänen, Business Manager, Energy Solutions, ABB talked about revenue management and what it means as a base for fuel efficient operation, and on 'Big Data'. The importance of collecting data, both operational and technical, will increase dramatically. He introduced the phrase 'integrated operations' as a way forward, "linking operators and owners with vendors and suppliers, service providers." He also talked about full

A month ago two leading shipping banks said they use efficiency information in their investment decision making, using a tool worked on jointly with DNV GL.

electric battery storage technology, achieving zero emissions, and lower operational costs. “But the construction cost for a fully battery driven ferry is 30 to 50% higher than that of a conventional ship. We really believe that (battery fueled ships) is where we are going.”

Victoria Stulgis, Senior Operation Associate, Carbon War Room,

Victoria Stulgis, Senior Operation Associate, Shipping, Carbon War Room, with a mission to focusing on accelerating the adoption of business solutions that reduce carbon emissions at gigaton-scale and advance the low-carbon economy, talked about the three developments as future trends describing the focus on efficiency. Charterers had announced the week before that 20% of global shipped tonnage, represented by 25 companies, are preferring more efficient vessels, thus excluding inefficient vessels from their supply chain. A month ago two leading shipping banks (HSH Nordbank and KfW IPEX) said they use efficiency information in their investment decision making, using a tool worked on jointly with DNV GL. Carbon War Room works also with two Canadian ports which are offering discounts for more efficient vessels. Another current development is on retrofitting technologies for ships. An example is wind propulsion technology, where Norsepower’s now have verified Flettner rotor data.

Hydropath Marine: Scaling-Be-Gone

By Eric Haun

Green technology provides chemical-free solution to combat lime scale, bacteria, algae and biofouling in ships' various water systems

Shipowners seeking to combat the harmful effects of lime scale, bacteria, algae and biofouling inside their vessels' various water systems needn't look any further than Hydropath Marine, a chemical-free technology for onboard water treatment.

The patented Hydropath technology, which uses electrical signals to kill algae and bacteria, was initially developed in the early '90s to treat lime scale within the home, but has since been developed for a dozen different product ranges for both land-based and marine applications, serving the maritime sector in particular with the brand Hydropath Marine Ltd.

The Problem

A liquid solution inside ships' pipe systems may contain minerals dissolved in the form of ions. When temperature increases or pressure drops, the solution becomes supersaturated, causing the ions to adhere to piping and equipment surfaces in the form of scale. Over time, scale accumulates on heat plates along with biofilm consisting of bacteria, algae and barnacles, blocking narrow pathways to cause unwanted insulation, diminished heat transfer efficiency, reduced water flow and higher energy consumption. This means systems will need to be opened and cleaned, an often time-consuming process that typically requires the use of hazardous chemicals and can be damaging to the plates and seals.

The Solution

Hydropath Marine's water conditioning unit is fairly easily to install as it is simply fitted around a pipe as an add-on with ferrite rings, resulting in very little downtime with no cutting or plumbing required. There unit is available in various size and power ranges to fit an assortment of pipe dimensions.

Once installed, the Hydropath Marine water conditioner applies a unique electrical signal throughout the piping system (metal or PVC), causing the ions to form clusters. Now when supersaturation occurs, the clusters precipitate out of the solution and form stable crystals which do not adhere to piping and equipment. Signals agitate biofilm colonies, causing them to detach and flush out. Bacteria and algae passing through the water conditioner's ferrite rings are charged by the electrical signal, forming a hydration layer of water around the cell. Osmosis then forces water into the bacteria and algae cells, creating osmotic pressure which ruptures the cell membrane and causes it to die.

The Benefits

Commonly applied for fresh water generators, plumbing systems, heat exchangers and water heaters, Hydropath Marine helps protect onboard water systems against harmful and accumulating effects of lime scale, mineral scale and bio scale as the unit both cleans and keeps clean water treatment systems to help minimize required maintenance, resulting is minimum downtime and improved operation. All of this is done without the use of damaging chemicals.

"The main advantage here is the reduced maintenance expenditures, both in material and time," said Jere Widhalm, founder and CEO of D&W Marine Systems Management, a maritime engineering services company and U.S. distributor of Hydropath Marine.

"What Hydropath does is that it helps maintain peak efficiency for much longer periods of time, which translates to cost savings, a more efficient ship and equipment," added Tal Journo, CEO of, HydroFLOW USA, the U.S. distributor of Hydropath Technology. With the Hydropath Marine unit installed, vessels' systems become capable of running more efficiently for longer periods of time, meaning owners are able to minimize expenditure – in this case by avoiding the price of less efficient systems that will need to be opened up, cleaned and repaired, demanding chemicals, labor and vessel downtime.

"The worse the scaling and fouling problems are on the vessels, the more effective this system is going to be." Widhalm said. "And one of the greatest things that we're finding about this system is that its return on investment is very often one maintenance cycle."

Widhalm and Journo explained that all shipowners can benefit from Hydropath Marine. "Anyone that has a marine application that has scale involved – and virtually all of them do – is a prime candidate," Widhalm said. "From small ships to very large ships, small systems to giant systems; the largest tanker in the world could use this system, as well as a tugboat."

RECAB: Power in Computing

"RECAB is a provider of rugged computers; we are a hardware company," said Bjørn Espen Aase, Managing Director, RECAB Norway. "We create innovative computer systems for demanding applications, and that includes rough environments found at sea."

We met with RECAB at the recent Norshipping in Oslo to catch up with this fast-growing computer integrator, a company which sees its business spread across many industries that demand high-performance rugged computing.

"We are a typical subcontractor for the big players like Kongsberg and Rolls-Royce, for example. We are enabling world-class applications so they can put their software on top and integrate with the sensors. Stable hardware platform; that's our business," said Aase.

Central to the RECAB business plan is building computers and systems that literally are on the move, whether on the ground, in the air or at sea. Its four major markets served include maritime and offshore, avionics, defense and communications.

In particular the company specialized in building Advanced Modular Computers, scalable system with mega processing power for use in scientific, engineering or subsea arenas. According to Aase, about 30 to 35% of its business comes from the combined maritime niche, with the subsea industry and its thirst for advance computing solutions a ripe market for penetration.

At Norshipping in Oslo earlier this year RECAB sealed the deal via a contract with AKVA group ASA for delivery of embedded computer systems for its solutions to the global fish farming industry. "We have developed pilot series with great success, and this agreement formalizes a long-term relationship with AKVA group which is a world leader in its market," said Michael Ullskog, CEO of RECAB Embedded Computers AB.

The broad product portfolio of products from RECAB includes Embedded Servers, Vehicle-PCs, Medical-PCs, Ruggedized COTS, MicroTCA, ATCA, ATR-systems, CompactPCI, VME, communications servers, rackmount systems and solutions designed and built to customer's specifications. The products are often designed and tested to meet harsh environmental conditions including, dust, humidity, extended temperature, shock, vibration and EMC-requirements.

RECAB MPU (Maritime Processing Unit)

The RECAB MPU (Maritime Processing Unit) is designed to be versatile; easy to change or add hardware functionality such as AIS or other GPS system modules. This flexibility enables deployment in several other application areas.

- *Compact and scalable fanless high performance Maritime Processing Unit using Intel Ivy Bridge Core i3.*
- *Flexible design enables a range of optional modules and functionality to be added.*

Examples include DGPS, AIS receiver, UHF radio with Diplexer through a Single Antenna connector.

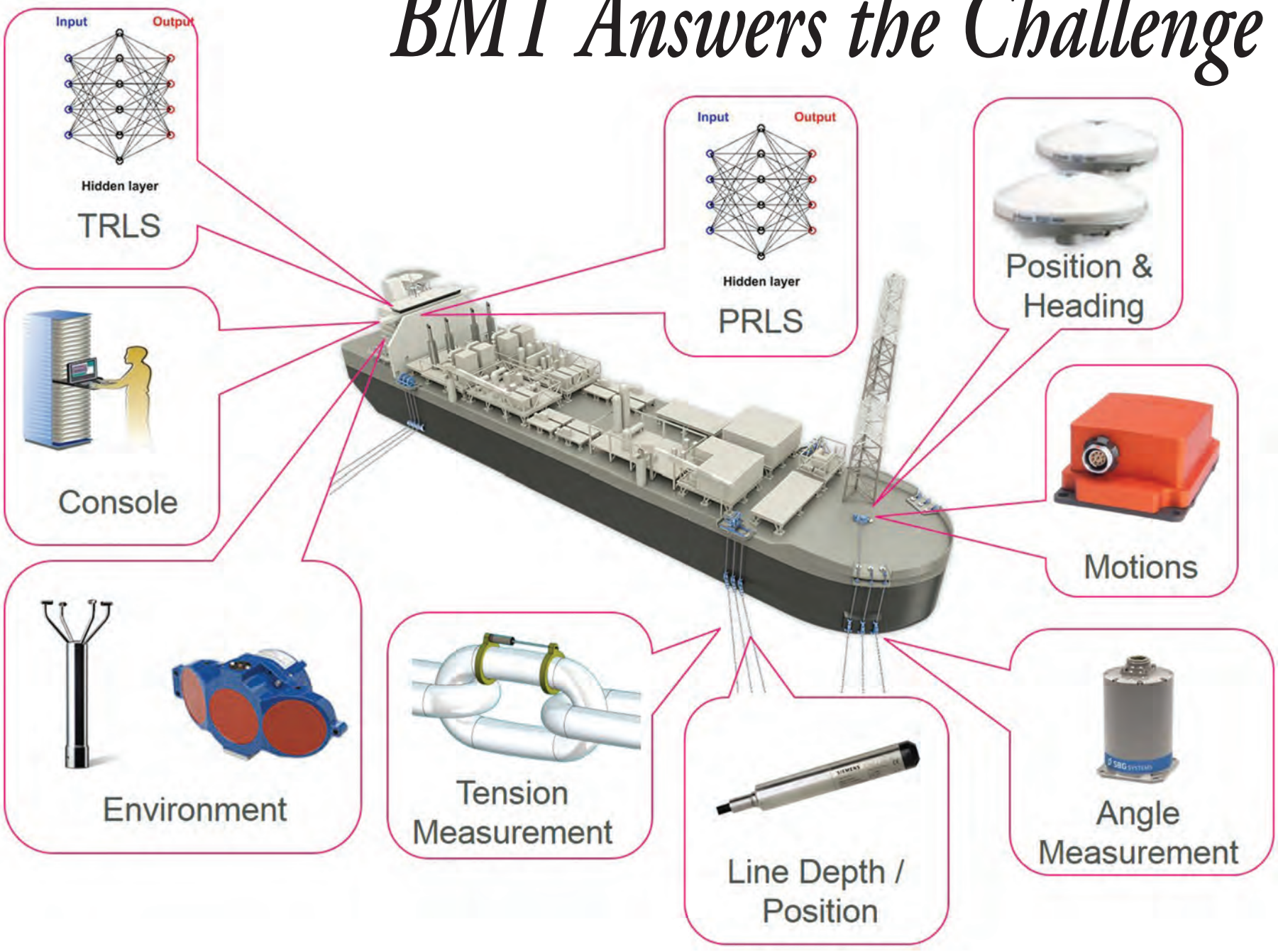
- *Optional Power over Ethernet 802.3af interface, and standard PC I/O interfaces.*
- *Recessed IP-65 shielded compartment for USB dongle and/or service port.*
- *Designed and tested for Maritime applications, including oil and gas sector.*
- *Wide operating temperature range: -10 to +60° C ambient temperature.*
- *Completely sealed unit, water resistant using rugged IP-65 connectors.*
- *Wide range DC input (9–30 VDC). Power supply designed for harsh maritime environments with unstable power sources.*
- *Modular backpack-solution with optional touchscreen.*

www.recab.com

***Sealing the Deal:** RECAB AB and AKVA group ASA signed a frame agreement during Norshipping 2015, for the delivery of embedded computer systems for AKVA's global fish farming endeavors. From L to R: Bjørn Espen Aase, Managing Director, RECAB Norway; Andres Lara & Sigurd Larsen, AKVA Group; Michael Ullskog, CEO, RECAB; and Nils Gjørvad, RECAB.*

Mooring Integrity Monitoring:

BMT Answers the Challenge



By Rizwan Sheikh, Senior data analyst at BMT Scientific Marine Services

The need for mooring integrity monitoring has of late come back under the spotlight, not least because the use of floating production systems in the offshore oil and gas industry has been predicted to grow at a significant rate between now and 2017 with a peak in the number of new builds expected to occur in 2016/2017. Recently, an updated industry guideline on mooring integrity has been issued by Oil & Gas UK with the support of operators, contractors and vendors. The guideline reinforces how mooring integrity management through effective monitoring and data management can provide information to help detect mooring line failure and assist with validation of mooring design strength and fatigue analyses.

Station keeping through the life of a field is of critical importance for floating production facilities in all parts of the world. The mooring system performs this function, and although it has not always been the case, current design practice is to engineer mooring systems that can withstand extreme environments with single or even multiple line failure scenarios. Even so, the offshore industry has experienced numerous unexpected mooring line failures in recent years that, in a small number of cases, have resulted in mooring system failure. On average between 2001 and 2011, there were more than two mooring system failures per year. During this period, nine were multiple line failures and other mooring incidents resulted in riser failures and hence extended field shut down. Based solely on these statistics, there is a clear business case for effective mooring integrity monitoring.

One of the challenges that emerged from these failings is the need to monitor mooring system integrity reliably for the life of the facility without the need for costly inspection or maintenance of subsea sensors. In general, most mooring line monitoring systems that have been deployed to monitor mooring line tension have themselves experienced

sensors failures, and the industry is now assessing ways of monitoring mooring line break detection as opposed to measuring mooring tension in a hope that the sensors will be more robust. However, many of the challenges of installing and maintaining these types of monitoring systems still need to be addressed.

Typical requirements for mooring integrity monitoring of permanently moored floating systems encompass the need to measure mooring line tension and/or behavior, and to transmit this data to the facilities topside for display and archiving. Monitoring systems therefore need to be conceived to withstand high structural loads as well as harsh seastates for the design life of the facility. This is achieved through robust design, proper installation and periodic maintenance and servicing once in service. Key questions to ask when selecting a system include: is the system for a newbuild or a retrofit? Is position or inclination sufficient, or is a measurement of in-line tension required? Can the system be diver or ROV deployable or serviceable? Will data be transmitted wirelessly or through a hardwired connection? Last but not least, where is the most practical location to place the sensors without compromising safety or the quality of the measurement?

To meet the growing demand for a cost effective and reliable means of monitoring mooring system integrity, BMT has developed a novel system to assimilate data from a range of topside-based sensors (which monitor factors like the environment, position, vessel motions, draft and available mooring line information) into a topside Response Learning System (RLS).

This system uses machine learning and cognitive science to learn the response of a system as well as the inter-dependencies of the numerous data sources. As a result, it is possible to estimate the behavior of a system (floating production facility) given a set of impulses (environmental loads from combined action of wind, wave and current) provided the RLS has sufficient measured marine data for learning.

There are numerous applications for machine learning algorithms. In fact, BMT is using them in the field to improve predictions of tension beneath the buoyancy can on a free-standing hybrid riser tower.

pIn the context of mooring monitoring, work conducted on a turret moored FPSO, where a mooring line monitoring system was installed by BMT, showed that an RLS can estimate mooring line tension to within 30kN using only position and draft as inputs.

Excursion monitoring can also be used as an indirect way to monitor the integrity of the mooring system. Simple watch circle monitoring systems do not integrate metocean and vessel motions data to verify that the vessel offset from its moored origin is as should be expected, given the environmental loading and mooring stiffness.

Furthermore, should the offset from design origin shift slightly in benign conditions, a watch circle processor would not be able to indicate a change in the mooring system. By using an RLS, the expected position, heading and response can be compared back to the measured position for the given environment. If the difference exceeds a predetermined threshold, an advisory can be issued on the mooring system integrity.

In conclusion, with mooring integrity now under a renewed emphasis within the oil and gas industry, there is a heightened need for a robust and cost effective mooring integrity monitoring solution for both new-build and existing installations.

The application of an RLS to monitor mooring system integrity builds upon BMT's many years of experience in providing custom designed and custom built Integrated Marine and Mooring Line Monitoring Systems to the deepwater offshore oil and gas industry. With the rapid advances in computing power and data telemetry, the development of a topside based mooring integrity monitoring system like that described above is a natural progression and further unlocks the inherent value of data acquired by real-time monitoring systems.

BallastMaster ultraV 500

MMC

Damen

Alfa Laval

Hapag-Lloyd Relies on GEA BallastMaster ultraV 500

Germany's largest shipping company, Hapag-Lloyd, relies on chemical-free UV ballast water reatment from GEA for fitting its container fleet. In April 2015, the BallastMaster ultraV 500 was technically accepted on board Panamax containership London Express (shipboard acceptance approval). "With a throughput of 500 cu. m./hr., our DNV-GL-certified system performs the required ballast water cleaning processes by mechanical pre-filtration with subsequent disinfection of the ballast water using UV-C and ultrasound application," said Tilo Pfützke, GEA Ballast Water Project Manager. "The 294-m-long freighter can therefore be used worldwide in accordance with the IMO-D-2 standards and actively contributes to the protection of the maritime ecosystem."

Thanks to its flexible design, bespoke modular integration of the BallastMaster ultraV 500 was possible in the existing ship infrastructure of the London Express, which entered operation in 1998 (gross tonnage 53,523). "One particular challenge was connecting to the ship's software system in order to guarantee easy, reliable and efficient system operation from the control room. This was achieved perfectly with the intelligent IO control from GEA," said Lars Voss, Hapag-Lloyd AG Senior Superintendent and Project Manager.

With the BallastMaster upgrade, Hapag Lloyd – although not yet obliged to do so for the existing container fleet – has now already voluntarily put in place the technical conditions for treatment of the ballast water on board the London Express in accordance with the requirements of the IMO convention.

www.gea.com

MMC Green:

70 Systems Sold in Two Years

A 2,800 passenger Ro-Pax ferry being built at Meyer Turku for Tallink, will be fitted with ballast water management system (MMC BWMS) from MMC Green Technology.

MMC Green Technology, a Norwegian manufacturer of ballast water treatment systems, have sold more than 70 systems since it went commercial with their ballast water management system (MMC BWMS) two years ago, with 40 systems installed..

"With 40 systems installed, we are starting to get feedback from the operators," said Børge Gjelseth, sales and marketing director at MMC Green Technology.

"So far, our clients say our system is easy to understand and to operate." And there is more to come.

"Recently we signed 10 orders, where the vessels and clients consists of two windmill support vessels for Bernhard Schulte built at Ulstein, two general cargo/container vessels for Royal Atlantic Lines built at Remontowa Shipbuilding, three live fish carriers built at Aas Mekaniske; two for Sølvtrans and one for Bømlo Brønnbåtservice."

A significant part of MMC Green Technology's order backlog is within the offshore supply market. "However, due to the slow oil and gas market, few new offshore support vessels are being ordered. It is in our strategy to enter new markets, which also the list of new orders clearly indicates," said Gjelseth.

E: bgj@mmc.no
www.mmcgt.no

Alfa Laval PureBallast Suited for Smaller Vessels

Alfa Laval PureBallast is now available to significantly smaller vessels. Alfa Laval's ballast water treatment technology, which was submitted for USCG approval in March 2015, can now be used in systems for flows of 87 cu. m./h.

A variety of vessel types, including offshore supply vessels, will benefit from the extended PureBallast flow range. The lower capacities are enabled by a new reactor, optimized for system sizes from 170 down to 87 cu. m./hr.. This is a major expansion of the PureBallast family, where a 250 cu. m./hr. system was previously the smallest available.

"Lower flow rates will make PureBallast accessible to smaller vessels, whose quality and performance needs mirror the needs of larger vessels," said Stephen Westerling Greer, Global Business Manager for PureBallast. "In some cases, as in the offshore industry, small vessel needs can be all the more extreme."

"Smaller PureBallast systems will be a full match for their larger counterparts," he said. "The reactors are built with SMO steel for a long and corrosion-free life, and the power management is equally effective. Performance-enhancing Cleaning In Place is there as well, in a new compact design to meet customers' need for space savings."

www.alfalaval.com/pureballast3

Damen's New BWTS

Damen launched two new ballast water treatment solutions onto the market, Damen LoFlo and Damen BalCon.

The new solutions are a response to the International Maritime Organization (IMO) Ballast Water Management Convention 2004, which is edging ever closer to ratification and the U.S. Coast Guard (USCG) Ballast Water Management regulations already in force.

Once the IMO convention passes into legislation, an estimated 60,000 vessels worldwide will require retrofitted treatment systems, Damen said, adding that it is imperative that installation be carried out swiftly and reliably to avoid costly vessel downtime. To meet this goal, Damen has developed standardized systems, using proven technology for a 'one time right' approach.

BalCon covers a range of capacity requirements from 100 up to 750 cu. m./hr. Damen developed the system with ballast water treatment equipment from its partner Trojan Marinex and a BioSea version is also in the pipeline. BalCon is designed to use minimal space, with all equipment contained within a single TEU.

This is especially useful when BalCon is to be installed on a container vessel, as the system is purpose-built to fit within the cargo hold. BalCon is also suited to tanker vessels, where the container is installed as a deckhouse. Not only does Damen offer BalCon in an optional explosion proof form for tanker usage, but there is also an option of a booster pump.

Damen LoFlo, powered by BioSea, is designed as a solution for vessels requiring a lower capacity treatment system. Currently, most offerings commence with a capacity to process 100 cu. m./hr., leading to an unnecessarily high energy consumption and bigger footprint. LoFlo is available with either 30 cu. m. or 60 cu. m. capacity, reducing footprint and energy usage. The system is fitted, in a compact arrangement, to a skid for easy and efficient installation on board the vessel. It can also be installed as a modular version.

www.damen.com

Gielle's Novec 1230 Plant is MED Approved

Gielle presents a new installation on the base of Novec1230 fluid firefighting system for extinguishing fires in engine rooms, pump rooms, transformer rooms and electrical rooms, for ship and offshore applications. The Gielle firefighting system can replace, without significant modifications, older systems using Halon, Halotron IIB, carbon dioxide and water mist on board ships.

The firefighting system designed by Gielle has passed approval tests and has certifications and approvals from most of the major classification societies.

The Gielle solution can detect the development of the fire in a few seconds, extinguish it automatically and rapidly and, as a result, limit damage to a minimum. It also has a series of benefits for the environment and in other areas.

www.gielle.it

Transas' iSailor for Android

Transas' chart plotter and AIS Viewer navigation app iSailor, available to iOS device users since 2010, is now also available in an Android version. An easy-to-use navigational system for amateur seafarers, Transas said iSailor is used by hundreds of thousands around the world. Intended for use on boats and yachts, the app presents navigation information, electronic charts and other content. iSailor for Android features the primary functions and options required for navigation included in the iOS version, and is powered by Transas iTX-97 marine vector charts. iSailor app is compatible with phones and tablets running Android operating system 4.4 or higher.

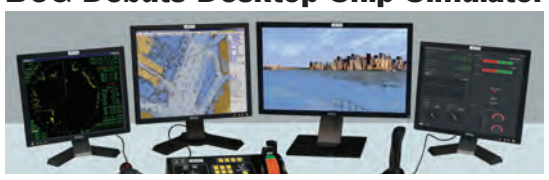
www.isailor.us

New FORAN Update from SENER

SENER Ingeniería y Sistemas SA launched a new version of its marine CAD/CAM system, the FORAN V80. The new version is fully compatible with the previous ones and includes improvements in all of its modules. The main upgrades come from the initial and basic project stages, where the calculations and results can be reused in further steps. Regarding the hull structure and outfitting modules, they add extra functionality such as the new advanced welding managing, or enhancements in the P&ID – 3D piping link, now with a more flexible and complete data locking system. The update bolsters total integration between FORAN and other PLM (Product Lifecycle Management) tools, which optimize the access control (security), the configuration and changes management (maturity control) and offers a solution for the handling of series of sister ships. The FORAN System has also incorporated additional functionality oriented to the design and manufacturing of offshore structures.

www.sener.es

BCG Debuts Desktop Ship Simulator



Buffalo Computer Graphics (BCG) Inc. launched a turnkey desktop ship simulator that adds a visual component to the company's existing line of radar and communication simulation products. The system represents the integration of BCG products with third party software for a complete desktop simulator which features an out of window single channel visual display. The simulator is scalable to meet the requirements and budget of the customer; but is suited for small schools looking to add ECDIS and Radar/ARPA capability to their list of available course offerings, BCG said. Included in the simulator is an IMO approved ECDIS, one of BCG's radar emulations and a selection of ownship controls to allow each student to maneuver his or her vessel.

www.bcgeng.com

Klüber Offers More than 70 PFPE Oils and Greases

Specialty lubricants manufacturer Klüber Lubrication informs it now offers more than 70 perfluorinated polyether (PFPE) oils and greases products under the BARRIERTA, Klüberalfa, and Klübertemp brand names. Known for their stable, non-flammable and non-reactive properties, PFPE oils and greases provide excellent high-temperature performance for many industries, including: marine, automotive, aerospace, electronics, chemicals, textiles, plastics and food and beverage. The thermal stability of these lubricants withstand operating temperatures up to 572 degrees F (300 degrees C). Many PFPE products from Klüber Lubrication are also NSF H1 registered for use in food processing and packaging equipment.

www.klubersolutions.com

New 20kA Surge Protector for 480V

SSL power solutions manufacturer Thomas Research Products (TRP) introduced a new surge protector for 480V circuits. The FSP3-480-20kA protects LED luminaires from surges up to 20,000 amps. Using new components, the FSP3-480-20kA is the same size as the company's current 277V model. An LED indicator on TRP's new compact device shows that it is functioning to protect the luminaire. The unit also includes in-line fusing to shut down the luminaire when the capabilities of the surge protector have been exceeded. These features not only offer advanced protection for the luminaire, they make it easier for maintenance crews to diagnose issues, the manufacturer said.

www.protea.pl

Barcelona Yacht Repairer Adds New Pearlson Shiplift

Yacht service, refit, repair and maintenance yard Marina Barcelona 92 (MB'92) has awarded a contract to Pearlson Shiplift Corporation (PSC) for the design and supply of a new ship lift and transfer system as part of an expansion project underway at its Barcelona shipyard.

The yard's new ship lift system will benefit from PSC technology originally established in 1957 with the invention of the Syncrolift system by Raymond Pearlson and its subsequent development worldwide. Expertise accumulated over more than 50 years is now vested in PSC under the direction of Douglas Pearlson, company president and son of Raymond Pearlson.

"The overwhelming advantage of ship lift systems is they lend themselves to a land level transfer system," Douglas Pearlson said. "With a ship lift system, especially with a broader scope onshore transfer system, the dry-docking capacity is only limited by the amount of land that's available to bring the vessels onshore."

The first phase of the MB'92 ship lift project will provide an 81- by 20-meter platform with the capability to lift and transfer mega yachts of up to 105 meters long. The system is designed to enable future increases in length and capacity for mega yachts of up to 120 meters long. The largest mega yachts can be docked in the graving dock, which is located in the expanded MB'92 site.

"The configuration of the lift can be easily expanded. The design of ship lift facilitates very easy expansion because you are just adding modules at the end of the lift," Douglas Pearlson explained. "As the requirement for docking larger vessels is identified, the length and capacity of the ship lift can be expanded accordingly."

The shiplift and single level transfer system has been custom designed to maximize the productivity of the MB'92 site layout. The transfer cradles will enable mega yachts to be moved longitudinally and laterally between the shiplift and the designated shore maintenance berths using rail mounted, rotatable bogie units.

Pepe García-Aubert, managing director of MB'92 said, "We have found the original ship lift and transfer system installed at MB'92 in 1999 to be a cost effective and reliable docking and transfer solution which is ideally suited for the mega yacht market. It was the obvious solution for our expansion project and we are delighted to have the support and expertise of the team, which originally invented and developed the Syncrolift ship lift technology."

The new shiplift and transfer system will incorporate shore berths for up to nine maximum length mega yachts. It is expected to become operational in the last quarter of 2017.

www.shiplift.com
www.mb92.com

Protea Launches Heavy-Lift Cranes

Protea, a manufacturer of offshore handling equipment, launched two types of heavy lift cranes at Nor-Shipping in Oslo earlier this year.

"The target of any marine crane design is to provide high lifting performance whilst minimizing overall weight," said Tomasz

Paszkiewicz, Protea's CEO. "Over the past three years we have been developing the technology and construction methodology to allow a step change in the structural efficiency of heavy lift cranes."

"We are now able to deliver high performance heavy lift cranes that comply with the relevant Class requirements but with a weight saving in the order of 40 percent in comparison to existing cranes of a similar capacity."

The two new crane types are the latest additions to the Proteus crane family.

The first is a 1,600mT SWL floating crane targeted at the offshore wind market for the installation of offshore wind turbines. It provides a high capacity lifting capability at both short and long outreaches over a large radius, a key feature for offshore wind farm operations.

The second is a 450mT SWL versatile cargo lift crane that can be used for handling both shipping containers and bulky items of hardware. Typically supplied as a working pair and designed to allow safe tandem lifts, the saving in crane weight translates directly to an increase in cargo capacity for the cargo vessel.

Both cranes can be supplied with a fully electric drive system with locally mounted permanent magnet synchronous motors to provide efficient and precise operation of all crane functions.

www.protea.pl

CAPE Holland Deploys Mew Vibro Lifting Tool

During its first commercial application, the newly developed Vibro Lifting Tool (VLT) of CAPE Holland has successfully installed four piles in up to 90m water depth. This installation is part of the pre-piling project for the Culzean Wellhead Platform jacket which will be installed next year. The VLT was used as a stabbing tool to install all four piles in one sequence to stable depth through a template without any tool change. Negating the need for a tool change meant it was possible to install all four piles in just one 12 hour shift to the predicted penetration depths, which resulted in a significant time saving.

CAPE Holland's CEO Laurens de Neef said, "This is a major milestone for our company and has once again shown the potential of the VLT by demonstrating that this approach contributes to improved productivity and safety. It increases the pile installation rates by optimizing crane handling operations with an added advantage of reducing the amount of required equipment on deck." He added, "I am very proud of our team, who have worked extremely hard over the past year to develop the VLT for its first application."

DMW Marine Military Cranes

DMW Marine Group, LLC. completed a number of projects for the U.S. Navy and foreign Navies in recent years, claiming a place as a go-to supplier for Navy departments globally. Notable projects as listed by DMW include a personnel handling 500 ton meter knuckleboom crane, six personnel handling 40 ton meter knuckleboom cranes and four 26 ton meter telescopic boom SOLAS boat handling cranes. DMW also recently received an order for two more 40 ton meter knuckleboom cranes for the Mexican Navy.

In addition to its military customers, DMW Marine Group supplies marine cranes of all types for offshore petroleum producers and service providers, oceanographic survey and research vessels, aquaculture, yachts, police and fire departments, etc. Its product range encompasses a collection of cranes specifically designed and manufactured to work in a marine environment, including knuckle boom, telescopic boom, stiff-boom, jib (knuckle) and small marine cranes.

www.dmwmarinegroup.com


HII
Petters


Fathom
Sutter


Matson
Gill


Odfjell
Nystad


Celebrity Cruises
McCue


Ensco
Swent

Coast Guard Foundation to Honor HII's Petters

The Coast Guard Foundation said that its 35th Annual Salute to the U.S. Coast Guard will honor Mike Petters of Huntington Ingalls Industries. President and CEO of America's largest military shipbuilding company, Petters is a graduate of the U.S. Naval Academy with a physics degree and holds a Masters of Business Administration from the College of William and Mary. He previously served as president of Northrop Grumman Shipbuilding and as president of Northrop Grumman's Newport News sector. Petters is on the executive committee of the Aerospace Industries Association. He serves on the Commonwealth of Virginia's Advisory Council on Revenue Estimates and as vice chairman of the Virginia Business Council. He also serves on the board of directors for the U.S. Naval Academy Foundation and the National Bureau of Asian Research; on the board of trustees of the Naval Aviation Museum Foundation; on the distinguished advisory board for the Dolphin Scholarship Foundation; and on the advisory council for the Naval Historical Foundation.

Carnival's Fathom Names Senior Sales Leader

Carnival Corporation's new brand Fathom has appointed Michelle Sutter as a company senior sales leader. Sutter will be responsible for marketing and business development supporting sales of the new "social impact travel" brand. Sutter joins Fathom from Holland America Line and Seabourn.

Matson Promotes Gill as Alaska VP

Matson, Inc. promoted Kenny Gill to the position of Vice President, Alaska. In his new role, Gill has management responsibility for all Matson operations in Alaska, including terminal operations, customer service, sales and financial performance of the company's terminals in Anchorage, Kodiak and Dutch Harbor.

Head of Odfjell Tankers Steps Down

Morten Nystad will step down as senior vice president of Odfjell Tankers after 35 years with the company. His departure is effective immediately. Nystad's exit follows the departure of president and CEO Jan A. Hammer in December 2014 "due to different views on the strategic direction for the company." Hammer was replaced by interim president and CEO Tore Jakobsen, who will be succeeded by Kristian Verner Mørch from August 1, 2015. Odfjell said it has begun the search to replace Nystad, whose duties will rest with the president/CEO until a new head of Odfjell Tankers is appointed.

Odfjell recently implemented a "restructuring plan" which saw the loss of 85 positions at its Bergen office as part of a series of "cost saving initiatives" related to general and administrative expenses, operating expenses, trade optimization and bunker consumption.

Cruise Industry Gets First American Female Captain

For the first time in the cruise industry, an American female will take the helm of a mega-ton cruise ship. At 37 years of age, San Francisco native Kate McCue will command Celebrity Summit, a 91,000-ton, 965-foot ship in the Celebrity Cruises fleet, sailing between the eastern United States and Bermuda. As Captain, she will be responsible for the navigation of the ship and the onboard experience of its 2,158 guests and 952 crew members.

The cruise brand, which operates a fleet of 10 ships, has elevated McCue to the position of Captain based on her 15 years of experience and leadership in the maritime industry. During her tenure, McCue has managed ship logistics while sailing worldwide itineraries, including Europe, Asia, Australia, the Caribbean, the Pacific Northwest and Alaska, and along the Panama Canal. Captain McCue has also served as a maritime leader while sailing several transatlantic and repositioning cruises, and played a role in the revitalization of ships in Singapore.

Kate McCue's appointment follows that of Lisa Lutoff-Perlo, who was named President and CEO of Celebrity Cruises in December 2014, continuing Celebrity Cruises' dedication to advancing the role of women in leadership, the company said.

A graduate of California State University's California Maritime Academy, Captain McCue has held a variety of roles in the maritime industry, beginning as a cadet and deck officer, then working through a series of successively more responsible positions to her most recent role as Master Mariner with Royal Caribbean International. McCue has earned numerous certifications in a variety of areas pertaining to leadership navigation, ship management and security.

Ensco CFO Swent to Retire

Ensco plc announced that EVP & CFO Jay Swent will retire after more than 11 years of service. Swent will continue to serve in his current role until the succession process has been completed and a new CFO has been named. The completion of the succession process may extend into the first half of next year.

Webb Institute Picks Crowley Scholarship Recipients

Webb Institute announced the 2015-2016 recipients of Crowley Maritime Corp.'s Thomas B. Crowley, Sr. Memorial Scholarships. Nicholas Ratinaud, of West Bloomfield, Mich., and Andrew Ko, of Philadelphia, were chosen by the school's scholarship selection committee for their leadership qualities, academic excellence and commitment to the maritime industry.

As a third year student, Ratinaud will spend this summer working with Herreshoff Designs, Inc., focused on multiple projects related to classic sailboats. He previously interned at New England Boatworks as a member of the build team for an 88-foot, high-performance ocean racing yacht and has also sailed as a cadet aboard a Greek, dual-fueled, diesel-electric, LNG tanker. Ratinaud competes as a member of the soccer, tennis and sailing teams and is actively involved with Webb's student Society of Naval Architects and Marine Engineers (SNAME).

Ko, a Carnegie Mellon University graduate with a bachelor's degree in civil and environmental engineering, and engineering public policy, is now a junior at Webb where he is pursuing his interests in offshore renewable energy. He has participated in Webb's work program by machining at Bay Ship & Yacht Co., sailing for MaranGas Maritime Inc. and working at both SafeBoats International and Glosten Associates. Ko is also involved with Webb's leadership and education committees, SNAME, the student Marine Technology Society (MTS) and is both class president and captain of the basketball team.

SAFE Boats International Promotes Hotz

Aluminum boat manufacturer SAFE Boats International (SBI) announced the promotion of John Hotz to Director of International Business Development for Caribbean, Latin America and Mexico, a region which currently operates more than 130 SBI vessels.

McGarry New PPG President, CEO

Michael H. McGarry has been elected president and chief executive officer of PPG, effective September 1, 2015. McGarry will join the company's board of directors immediately.

MMA Students Awarded Crowley Scholarships

Crowley Maritime Corp.'s 2015-2016 Thomas B. Crowley Sr. Memorial Scholarships have helped to further educational opportunities for four students of Massachusetts Maritime Academy (MMA). The four recipients, Bryan P. Wall, Robert M. Neal, Peter Persechino and Adam Szloch, were chosen based on their excellent grades, demonstrated financial need and plans to pursue a career in the maritime industry, Crowley said.

Wall is a freshman from Manasquan, N.J., majoring in marine transportation. He is a Midshipman in the Navy Strate-

Crowley

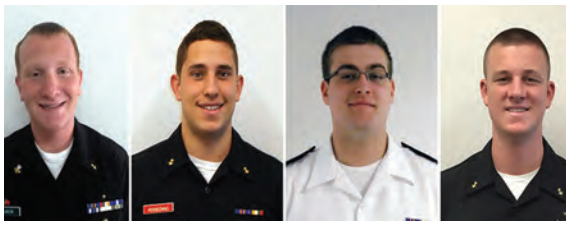
Tom Crowley with Nicholas Ratinaud (left) and Andrew Ko (right).

SAFE Boats Intl.

Hotz

PPG

McGarry



Crowley

MMA Crowley Scholarship Recipients: Adam Szloch, Peter Persechino, Robert M. Neal, and Bryan P. Wall

Milaha

Khalifa Ali Al-Hetmi

gic Sea-lift Officer Program, is a member of the Honor Guard, an Eagle Scout and certified diver.

Neal is a junior from North Billerica, Mass., majoring in marine engineering. He worked for the MMA Power Plant as part of the work study program this past year and has completed two cadet commercial cruises through Military Sealift Command and Crowley.

Persechino is a sophomore from Barkhamsted, Conn., majoring in marine transportation. Persechino has held a work-study position for the marine department on campus, completed two MMA sea terms on the T.S. Kennedy and looks forward to a commercial shipping opportunity.

Szloch is a junior from Melrose, Mass., and a marine transportation major. He was an orientation assistant disciplinary officer squad leader for Third Company and is now Cadet Chief Mate for the upcoming academic year of 2015-2016.

Milaha CEO Al-Hetmi to Step Down

Milaha president and CEO, Khalifa Ali Al-Hetmi, will retire in September, the Qatar-based marine transport and logistics conglomerate announced. Having joined Milaha 31 years ago, Al-Hetmi has been at the helm of Milaha for the past seven years.

ABS Grants AIP for Jensen's LNG ATB Design

A Jensen Maritime-designed, liquefied natural gas (LNG)-bunkering articulated tug-barge (ATB) has been granted approval in principle (AIP) by classification society American Bureau of Shipping (ABS). The designation establishes that Jensen's vessel concept, which is classed as an A1 Liquefied Gas Tank Barge, is compliant in principle with ABS rules and guides.

Jensen Maritime

Suited for mobile bunkering, Jensen's ATB is also oceans rated, meaning that it is not limited to the intracoastal waterways. This flexible design feature allows the vessel to facilitate the transfer and use of small-scale LNG in places with limited infrastructure, including offshore locations.

The ATB will be built with four 1,000-m3 Type C LNG tanks (seven bar working pressure), enough LNG to fill up a large containership twice before having to replenish its own supply. This capacity, combined with flexible operational areas, makes it an ideal solution for a customer who has significant LNG needs at one or more ports not located near an LNG terminal.

Pioneer Marine Names V.Ships as Technical Managers

V. Group

Pioneer CEO Pankaj Khanna (right) with Capt Sachit Sahoonja - MD V Ships Ship-management India left.

V.Ships, the ship management arm of global maritime services provider V.Group, has recently completed the transfer of the rapidly growing Pioneer fleet of geared dry bulk carriers into its management portfolio.

New Indian Maritime College

Mumbai-based Pentagon Marine Services is unveiling plans for a new $10 million, state-of-the-art maritime training college in the Patna district of Bihar State in India. Pentagon chairman and managing director, Capt Nalin Pandey, made the announcement, and said the latest Pentagon Maritime Training & Research Institute (PMTRI) would start construction in the autumn. It will complement a sister college run by Pentagon in Mumbai.

Pentagon Marine Services Capt Nalin Pandey.

Thome Ship Management signs Safety Service Agreement with WSS

Singapore-based Thome have signed a Safety Service agreement with Wilhelmsen Ships Service (WSS). WSS safety service technicians carry out services on a wide range of safety, firefighting and rescue equipment such as CO2 high-pressure systems, portable fire extinguishers, hydrants and fire hoses, inflatable life jackets, smoke sampling systems and portable gas detectors.

All WSS service stations operate in accordance with IACS, UR, Z17 approvals and governance. WSS is the only service network with an ISO 9001 approval. They are also approved by DNV GL, Korean Register, Bureau Veritas, ABS, Lloyds Register, Russian Maritime Register of Shipping and RINA.

Work Begins on $1.6B Container Terminal at Jebel Ali Port

DP World announced the start of construction work on a brand new container terminal at Jebel Ali Port, Dubai. Phase 1 of the Container Terminal 4 (T4) project will deliver new capacity of 3.1 million TEU (twenty-foot equivalent units) by 2018, taking Jebel Ali Port's total capacity to 22.1 million TEU.

The port complex will be equipped with at least 110 cranes with a total quay length of around 11,000 meters by that time. T4 will be located on a reclaimed island north of the existing Terminal 2 allowing DP World to further expand capacity to a total of 7.8 million TEU in line with market demand. As part of the project, a bridge is being built to provide access to the island from land near Terminal 2.

Rainmaker to Represent Asitcan, Astander

Penn International Shipyard Agency has turned over its exclusive agency for the Astican Shipyard and Astander Shipyard to Rainmaker LLC. Jack Caravello (above left), VP of Business Development, will manage the Astander account and Nicholas Fuller, Director of Business Development, will manage the Astican Shipyard account. Pictured above right is Louis W. Gomlick, president, Penn International Shipyard Agency.

ASTANDER is located in Santander, Northern Spain, and provides facilities for most any kind of ship repair and conversion. It has more than 100 years and is a world leader, particularly in conversions.

ASTICAN, located in Las Palmas, Canary Islands, is a privately owned drilling rig repair yard located convenient to the West African drilling region and within easy reach of U.S. Gulf and Brazilian drilling locations. Astican maintains shipyard staff of about 200, plus additional subcontractors, whose main activity is repair, maintenance and conversion of all kinds of vessels. The yard, which was founded in 1973, became fully operative in 1976.

Rainmaker LLC is led by Jack Berglund, President. It is headquartered in Pensacola, Fla., with a sale office in Houston.

(See a related story on Astican and Astander on page 42 of this edition.)

Air Conditioning

Ushio Reinetsu Co., Ltd.

Inverter control of fan improves the comfort of the accommodation space and can obtain energy savings by setting the rotation speed corresponding to each operation mode. Compared with the damper controlled, there is about a 57% reduction of the ratio in the energy equivalent. And there is a reduction of 53.1ton CO2 / year.

http://www.ushioreinetsu.co.jp/english/
E-mail: ushio@ushioreinetsu.co.jp

Autopilot

Tokyo Keiki Inc.

The model PR-9000 is the latest autopilot system from TOKYO KEIKI designed using the latest technology to enhance accuracy and reliability of information in the model lineup, thereby improving situational awareness and navigational safety. An indispensable autopilot system provides effective and safe bridge resource management and energy efficient navigation.

http://www.tokyo-keiki.co.jp/

Yokogawa Denshikiki Co.,

PT900 is the next generation autopilot with a modern controlled fuel saving function (BNAAC/E- Course Pilot). The 7 inch LCD allows navigation information and autopilot parameters to be confirmed and changed very easily.

http://global-sei.com/ballast
E-mail: wt-bwts@mml.is.hitachizosen.co.jp

Ballast Water Management

Ecomarine Technology Research Association

Ecomarine Technology Research Association (ETRA), run by Hitachi Zosen Corporation and Sumitomo Electric Industries Ltd., has developed an electro-chlorination Ballast Water Treatment System (BWTS) ECOMRINE EC, maximizing the combination of the filtration and electrolytic technology ship structure expertise. ETRA is planning to reorganize into a joint-stock company upon the acquisition of IMO type approval and then introduce ECOAMRINE EC systems with high efficiency and low power consumption into the market, together with an UV type BWTS ECOMARINE UV developed and marketed by Sumitomo Electric.

http://global-sei.com/ballast
E-mail: wt-bwts@mml.is.hitachizosen.co.jp

Miura Co., Ltd.

Miura manufactures ship machinery including auxiliary boilers, thermal oil heaters, incinerators, fresh water generators, compounds for boiler treatment, as well as providing parts and maintenance of products. The company now also sells ballast water management systems which adopts the filter + UV method.

https://www.miuraz.co.jp
E-mail: hakuyo_eka@miuraz.co.jp

Bearings

Mikasa Corporation

F.F.Bearing (Friction-Free-Bearing) minimizes both shaft sleeve and bearing wear. Water lubricating systems are available as an alternative to oil lubricating systems. Changing to F.F. Bearing results in reduced fuel consumption, lower vibration, lower noise levels, less maintenance cost and no possibility of sea contamination.

http://www.mikasa-industry.com/en/
E-mail: hirata@mikasasports.co.jp

Bilge Water Treatment System

Volcano Co., Ltd.

Bilge concentrator BILCON-X was developed to contribute to the reduction of cost and labor at landing. The fully automatic BILCON-X operation does not require labor and can condense ship bilge to one-tenth in 24 hours.

www.volcano.co.jp/english/index.html

Boilers, Auxilary & Economizers

Mitsubishi Heavy Industries Marine Machinery & Engine

Auxiliary Boilers feature simple and compact design with a small footprint due to top-firing burner design, high reliability and long lifetime, as well as easy maintenance. The boilers feature bare tube with in-line arrangement and the soot blower is reliable, with easy and safe operation.

http://www.mhi-mme.com
E-mail: info_meet@mhi-mme.com

Osaka Boiler Mfg. Co., Ltd.

Osaka Boiler's 'OH series' Hybrid Boiler recovers waste heat from Main Diesel Engine and Diesel Generator Engine simultaneously or from Diesel Generator Engine independently. The OH series are adaptable for new building and retrofit.

http://www.osakaboiler.co.jp
E-mail: marine@osakaboiler.co.jp

Boiler Burners

Sunflame Co., Ltd.

Dual Fuel Burner, LNG & HFO/MGO
The dual fuel burner for HFO / MGO and LNG combustion designed by Sunflame features low NOx and O2, HFO 700cSt, MGO 1.5cSt & LNG, good mixture of LNG & air, adjustable flame shape, designed for boilers up to 9t., and turn down 10:1.

http://www.sunflame.net
E-mail: info@sunflame.net

Volcano Co., Ltd.

The "MJ-M" fully automated pressure jet proportional control burner allows energy saving operation with composite boiler. Features include proportional control (turn down ratio / 3:1), allowing for reducing the burner ON/OFF switching and improving the boiler efficiency.

www.volcano.co.jp/english/index.html
E-mail: info-m@volcano.co.jp

Cables & Wires, Electrical

Hien Electric Industries, Ltd.

Halogen-free Flame-retardant cables offer a high degree of toughness as they protect against external impact. Their steel wire braid protects against sparks during welding, and a plastic coating protects against steel wire corrosion.

www.hien.co.jp/e/e_index
E-mail: fukuyama@hien.co.jp

Clutch

Hitachi Nico Transmission

A large hydraulic clutch has been developed as the technological development aid project by The Nippon Foundation. Selectable for two kinds of clutch plate (1100mm and 1500mm), if offers six times transmitting capacity compared with experienced clutch plate, 810mm max. Appropriate for 20000kw class of large vessel.

http://www.hitachi-nico.jp/en/index.html

Control Systems & Equipment

JRCS Mfg Co., Ltd.

J-S / Eco applies a smart frequency drive system which controls the speed of the motor of the main cooling sea water pumps at the most efficient point. It enables power consumed by the motors to be reduced to minimum levels, resulting in lower fuel consumption.

http://www.jrcs.co.jp
E-mail: jrcs@jrcs.co.jp

Taiyo Electric Co., Ltd.

This system supplies stable AC power to the vessel which is obtained from the various sources, contributing to users' energy saving and maintenance cost savings. The output of this system has the same electric characteristic as diesel generators, and therefore can be operated as a single running unit or in parallel running with the diesel generators.

https://www.taiyo-electric.co.jp/
E-mail: e-mail@taiyo-electric.co.jp

Coolers, Oil

Ushio Reinetsu Co., Ltd.

The low viscosity of the sulphur fuels may cause engine troubles. This MGO Cooling System solution helps achieve both low sulphur and low viscosity.

http://www.ushioreinetsu.co.jp/english/
E-mail: ushio@ushioreinetsu.co.jp

Diesel Engines, Propulsion

The Hanshin Diesel Works

Engine and propulsion systems manufacturer Hanshin Diesel Works has recently developed electronically controlled low speed four-stroke diesel engines that reduce fuel oil consumption by electronically controlling the fuel injection pattern in partial load. The system reduces fuel oil consumption by 3-5% in comparison with the conventional mechanically controlled system.

http://www.hanshin-dw.co.jp
Email: overseas-section@hanshin-dw.co.jp

Diesel United, Ltd.

Low-speed Low-pressure Dual fuel engine X-DF applies the premixed lean burn technology and can meet IMO Tier requirement without the exhaust gas after-treatment. X-DF offers lower Capex and Opex due to no requirement of a high pressure compressor.

http://www.ihi.co.jp/du/
Email: info@du.ihi.co.jp

Daihatsu Diesel Mfg. Co., Ltd.

The 6DE-18 and 6DE-23 have been developed as engines featuring energy saving, low maintenance cost and have a high potential for meeting stricter exhaust gas regulations in the future, of course IMO NOx Tier II compliant. The engines have achieved top-class fuel efficiency thorough weight-saving and optimized design.

http://www.dhtd.co.jp/
E-mail: products.info@dhtd.co.jp

Yanmar Co., Ltd.

This engine's dual fuel capability offers redundancy and continual operation either in the gas or diesel mode, changing over automatically should either mode become lost. In addition, the micro-pilot with its intense energy ensures stable ignition capability. As a result, since the capability to cope with faulty firing is enhanced, the application to the direct-coupling main engine with varied speed is made possible.

http://www.yanmar.com
E-mail: yutaka_koyama@yanmar.com

Nigata Power Systems Co.

The 28AHX-DF is an environmentally friendly engine, satisfying IMO Tier III NOx regulations. It uses clean gas combustion, making it possible to meet the new regulations without the need for an exhaust gas processing reactor.The 28AHX-DF offers both gas and diesel operation modes. It can be instantly switched at full load from gas to diesel operation, ensuring safe ship operation even in emergency situations. The 28AHX-DF is reported to be the world's first FPP directly culpable gas engine.

http://www.niigata-power.com
E-mail: info1_sales1@niigata-power.com

Diesel Engines Exhaust Gas Treatment

Mitsubishi Heavy Industries Marine Machinery & Engine

UEC Eco-Engines are Japan's only diesel engines for large ships that are developed entirely in-house, developed in response to the global tightening of emissions controls. They achieve the high levels of thermal efficiency through the electronic control of fuel injection, exhaust valve action, and startup and cylinder lubrication. The Selective Catalytic Reeducation (SCR) system enables denigration even of low-temperature exhaust gas of about 250 . It can reduce the NOx in exhaust gas to meet the IMO Tier regulation without taking away from the excellent fuel efficiency. A low pressure Exhaust Gas Recirculation (EGR) system uses a scrubber to remove SOx and particulate matter. It is also an exhaust gas recirculation system that can meet the next IMO Tier regulations.

http://www.mhi-mme.com
E-mail: info_meet@mhi-mme.com

Eco-Friendly Product

MOL Techno-Trade, Ltd.

MOL Techno-Trade, Ltd. developed air actuate Garbage Compactor AGC- which is available to compress various waste materials such as plastic film and beverage cans and bottles by using compression air onboard.

http://www.motech.co.jp/e_index.html
Email: control@motech.co.jp

Economizers, Steam Turbines, Auxiliary Boiler Heat Recovery

Mitsubishi Heavy Industries Marine Machinery & Engine

Mitsubishi Energy Recovery System (MERS) is a waste heat recovery system that generates power from marine engines' exhaust gas energy, recovered though the optimal control of the combination of exhaust gas and steam turbines, lowering a ship's fuel costs.

http://www.mhi-mme.com
E-mail: info_meet@mhi-mme.com

Energy Saving Device

Fluid Techno Co., Ltd.

The pre-swirl energy saving device Eco-Stator includes 4 or 5 stators welded to the stern tube radially upper part of axis before the propeller. The inflow into the propeller around the stern of ship is rectified and swirled against the propeller running direction with stators, contributing to reduce loss due to rotational flow by the running propeller. The output of main engine is reduced at same ship speed and attainable reduction ratio of output with Eco-Stator is by 3-5%.

E-mail: mtamashima@fluidtechno.com

Engine Telegraphs & Loggers

Kei System Co., Ltd.

The data logger system displays information by connecting with GPS via serial communication. The system confirms the fuel cost in real time inboard, displaying fuel consumption rate per day (tonnage), distance of cruise per a ton of fuel (mile) and fuel consumption rate per hour.

http://www.kei-system.co.jp
E-mail: info3@kei-system.co.jp

Exhaust Gas Cleaning System

Fuji Electric Co., Ltd.

EGCS is an alternative for SOx regulatory compliance consisting of a wet scrubber and electrostatic precipitator. The analyzer continuously monitors SO2 and CO2 concentrations which are requested to measure in the EGCS Guideline. The system's compact size facilitates retrofitting and installation in new ships, and it is small enough to be installed on exhaust gas pipes.

http://www.fujielectric.com
E-mail: inui-takashi@fujielectric.co.jp
E-mail: aoki-yukio@fujielectric.co.jp

Exhaust Gas Heat Recovery Unit

Miura Co., Ltd.

The GK-G exhaust gas heat recovery unit works with a composite boiler to recover the waste heat from the G/E for use as a heat source. It can contribute significantly to saving space and reducing fuel costs. The GK-G makes effective use of the normally unused exhaust heat from auxiliary generators, enabling it to be used as a heat source.

https://www.miuraz.co.jp
E-mail: hakuyo_eka@miuraz.co.jp

Fresh Water Generating Plant

Sasakura Engineering Co.

The VVC distiller system has four main components; a horizontal tube, thin-film evaporator; a rotary blower and a back-up heater. The unit's vacuum is maintained by a small pump. Features include scale-free horizontal tubular evaporator, maintenance-free and compact type heat-pump, as well as evaporation capable of being operated by only electricity.

http://www.sasakura.co.jp/
E-mail: marine@skm.sasakura.co.jp

Sasakura Engineering Co.

The Double-Effect plant is a compact, heat efficient seawater distilling plant with two chambers of first and second effect in a single shell. The triple-effect plant contains three chambers and is an even more efficient plant. As a heat source, either the waste heat from a diesel engine jacket cooling water or steam can be used. Between 40-200 tons per day capacity can be provided.

http://www.sasakura.co.jp/
E-mail: marine@skm.sasakura.co.jp

Gas Engine

Kawasaki Heavy Industries

In April 2014, Kawasaki Heavy Industries, Ltd. obtained type approval from DNV-GL for Green Gas Engine L30KG — the main engine for large vessels fueled solely by gas with an output capacity of over 2 MW. Green Gas Engine L30KG can reduce emissions far below the level set by IMO NOx Tier III regulations without relying on special equipment such as an SCR system.

http://global.kawasaki.com/en/mobility/marine/machinery/index.html
E-mail: marine-machinery-sales-e@khi.co.jp

Marine Solar Power

Eco Marine Power Co., Ltd.

Aquarius Marine Solar Power is an integrated renewable energy system for ships that includes a computer system, energy storage solution and marine solar power array. Energy collected via the marine solar panel array or string of photovoltaic panels can be used to power a DC load, provide back-up power or be connected to an AC load via an inverter, thus any ship can tap into the clean and renewable energy provided by the sun.

http://www.ecomarinepower.com/
E-mail: enquiries@ecomarinepower.com

Navigation Lights

Nippon Sento Co., Ltd.

Provider of Highly reliable design of LED light sources, with vibration-proof characteristics and projection-free lamp windows, ultimately providing power saving and long life.

http://www.nipponsento.co.jp
E-mail: nissen@nipponsento.co.jp

Paint

Chugoku Marine Paints, Ltd.

CMP BIOCLEAN PLUS is a third generation silicone elastomer foul-release coating (FRC) featuring "ultralow friction". Contrary to the second generation of silicone FRC, this product adopts "PLUS Technology" which resists and releases slime and contributes to long term fouling control for improved conditions, improved performance and fuel savings.

https://www.cmp.co.jp/en/inquiry.html

Nippon Paint Marine Coatings Co. Ltd.

LF-Sea is a biomimetic ultra-low-friction antifouling using a patented water trapping function to lower the hydrodynamic footprint of the hull. Stable and long term antifouling is achieved by the use of a self smoothing copper-silyl-acrylate copolymer. Target fuel-savings range between7-10%, depending on the application.

http://www.nipponpaint-marine.com
Nikoyamanoue@nipponpaintmc.com

PBCF

MOL Techno-Trade, Ltd.

PBCF recovers energy loss of a propeller hub vortex and decreases fuel consumption by up to 5% when operating at the same speed, or boosts speed by 2% with the same fuel consumption. Applicable for existing and newbuild vessels, installation requires only the replacement of the normal boss cap, with no other propeller or vessel modifications necessary.

http://www.pbcf.jp
Email: pbcf@motech.co.jp

Propellers, Controllable

Kamome Propeller Co., Ltd.

Controllable pitch propellers can be a valuable tool in maintaining efficient operations, despite the ill effects of fouling on the hull or wind and wave effects.

http://www.kamome-propeller.co.jp
E-mail: info@kamome-propeller.co.jp

Propellers, fixed

Mitsubishi Heavy Industries Marine Machinery & Engine

An improved tip shape enhances the efficiency of MAP Mark-W propellers while keeping cavitation performance levels virtually unaffected with streamlined tips and reduced blade area. The compact propellers can be tailored so suit slow-steaming needs, are ideal for retrofitting existing propulsion systems, and feature high propulsion efficiency and excellent strength.

http://www.mhi-mme.com
E-mail: info_meet@mhi-mme.com

Propulsion Systems (electric)

Daihatsu Diesel Mfg. Co.

Electric propulsion systems are different from the systems on conventional ships, where the propellers are turned directly by the main diesel engine. Instead, the propellers are turned by an electric motor.

http://www.dhtd.co.jp/
E-mail: dda@ddany.com

Yanmar Co., Ltd.

Marine Gas Engine 6EYG26L adopts new technology against fluctuation of propulsion load and fuel calories to reduce CO2 emission in the propulsion system by 25%. The system also brings NOx levels within IMO Tier 3 regulation through lean-burn technology.

http://www.yanmar.com
E-mail: yutaka_koyama@yanmar.com

Pumps, Inverter Control

Naniwa Pump Mfg. Co., Ltd.

Naniwa Pump supports customer expectation for "greener ships," paying close attention Environmental Protection, Safety of Operation and energy savings. The NEO-ME series controls rotational speed of Main Cooling Sea Water Pump according to Main Engine Load, Sea Water Temperature, Temperature Regulation Valve Position and Fresh Water Temperature.

http://www.naniwa-pump.co.jp/english/
E-mail: info@naniwa-pump.co.jp

Reduction Gear

Hitachi Nico Transmission

Much energy can be recovered from marine diesel engines' exhaust gas. Our lightweight and compact reduction gearbox is used in the exhaust power recovery system with power turbine and steam turbine, offering high reliability on many production experiences for continuous use of high speed turbines.

http://www.hitachi-nico.jp/en/index.html

Rudders, High Lift

Kamome Propeller Co., Ltd.

The K-7 Rudder consists of the main rudder and the flap fitted to the rudder with a hinge. As the flap turns more than 2 times of the main rudder angle during steering, the lift generated in the propeller slip stream is higher than the conventional rudder by the effect of the camber composed by the main rudder and the flap.

http://www.kamome-propeller.co.jp
E-mail: info@kamome-propeller.co.jp

Rudders

Japan Hamworthy & Co.

Excellent maneuverability is provided with a pair of high lift rudders fixed behind a propeller. Safe navigation maneuverability having any operation mode including going-astern with turning capability, hovering, extra dead slow forwarding, and turning port and starboard, with forward direction propeller revolution, which develop thrust in all directions.

http://www.japanham.co.jp/
E-mail: jhc@japanham.co.jp

SCR

Daihatsu Diesel

In order to cope with IMO Tier III NOx regulations set to come into force in 2016, Daihatsu Diesel has implemented technology of D.E.C. Marine AB, a company with more than 350 SCR units delivered so far.

http://www.dhtd.co.jp/
E-mail: products.info@dhtd.co.jp

Niigata Power Systems Co.

Niigata has developed marine a SCR system compliant with the NOx Tier III enforced by the IMO, and applicable for engines from 550 to 6,600kW. Niigata's first SCR system for a marine propulsion engine was delivered in 1995 and is still operational. The SCR, applicable for new builds and retrofits, is based in part om research undertaken by Niigata for "Super-clean Marine Diesel" project of the JSMEA.

http://www.niigata-power.com
E-mail: info1_sales1@niigata-power.com

Hitachi Zosen Corporation

Hitachi Zosen, together with MAN Diesel & Turbo, has developed a SCR system for marine engines that adopts NOx removal catalysts for industrial plants to comply with TIER NOx emission standards (The TIER standards regulate 80% reduction of NOx from 2016 compared with the TIER I standards in 2005).

http://www.hitachizosen.co.jp/english/E-mail: machinery_process001@hitachizosen.co.jp

Yanmar Co., Ltd.

YANMAR offers an SCR system suited to various engine specifications, to meet the requirements of Tier III NOx emission standards by IMO. NOx emissions can be reduced by more than 80% after our SCR system is loaded. A catalyst reactor is set up after the turbocharger in flow. The SCR system is combined with a bypass system both for switching in Emission Control Areas (ECA) and for saving space in the engine room.

http://www.yanmar.com
E-mail: yutaka_koyama@yanmar.com

Sewage Treatment Equipment

Sasakura Engineering Co.

The vessel discharge restrictions of the International Convention for the Prevention of Pollution from Ships are not limited to oil, but control sewage as well. Sasakura's Sewage Treatment Plant meets IMO regulation, MEPC. 159 (55).

http://www.sasakura.co.jp/
E-mail: marine@skm.sasakura.co.jp

Shaft Driven Generating System

Nishishiba Electric Co., Ltd.

The shaft generating system is driven by a high-efficiency main engine to enable energy savings. http://www.nishishiba.co.jp

Turbochargers

Mitsubishi Heavy Industries Marine Machinery

Hybrid Turbochargers: The compact hybrid turbocharger has a built-in power generator so that it not only supplies supercharged air to the engine but also uses rotational energy to generate electrical power at the same time. http://www.mhi-mme.com

JSMEA

JSMEA helps member companies advance into the offshore oil and gas development market. JSMEA has published a brochure that contains member companies' product descriptions, delivery records, certificates they obtained and rules they comply with. Details are available online at http://www.jsmea.or.jp/offshore.
JSMEA also introduces energy-saving and eco-friendly products on the Internet at www.jsmea.or.jp/eco-products

Kyokuyo Electric

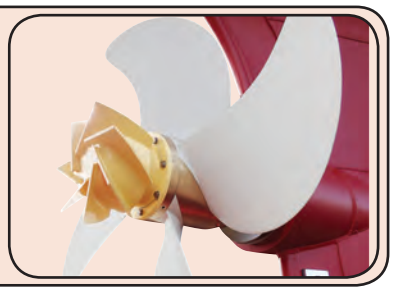
Kyokuyo Electric has developed the Smart Digital Tuner Worldwide (KST-1000-W), a TV tuner supporting terrestrial digital broadcasts systems all over the world. Smart Digital Tuner Worldwide enables viewing of terrestrial digital broadcasts, on ships in port or navigating along a coastline, simply by connecting it for ships to an existing TV and antenna.

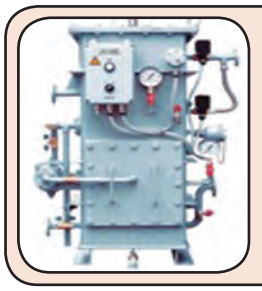
http://www.kyokuyoe.co.jp/kyklpwe/
E-mail : teppei.kamiya@kyokuyoe.co.jp

Nakashima Propeller Co.

ECO-CAP is an energy saving device that can recover hub vortex and increase propeller efficiency, adopting FRP material to cut weight. Compared with a copper alloy propeller cap, the installation work is much easier and safer.

www.nakashima.co.jp/eng/





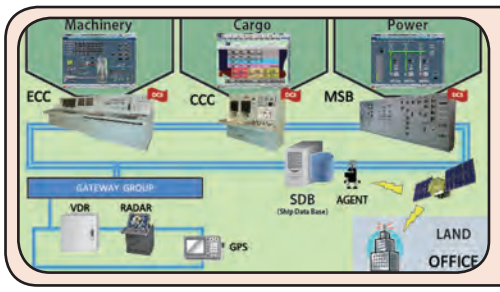
Bilge Separator 'TAIKO'

The company introduces the USH series of top-quality and compact bilge separator with long-life and high performance coalescer by applying advanced technology. The design is most suitable for offshore and commercial vessels and is certified to the latest regulations such as MEPC. 107 (49), USCG and CCS.

Nitto Chemical Industry Co., Ltd.

Nitto Chemical Industry Co., Ltd. has produced a fire-tight putty product, PLASEAL NF-23 (NF-23), used for sealing electric cable penetrations in any commercial vessels and offshore vessels. NF-23 ensures easy-to-use application under any cable transit conditions with its one-component typed material and the features of its pliable, moldable and flexible performance.

www.nitto-kasei.co.jp/en



BEMAC

BEMAC introduces the dual distributed control system to control and monitor each independent system such as voyage information, PMS, cargo handling equipment, ballast equipment, etc. Information is retrieved safely and speedily by using an appointed network, and integrated operation status information are to be recognized by the system as one.

www.bemac-uzushio.com/en/

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

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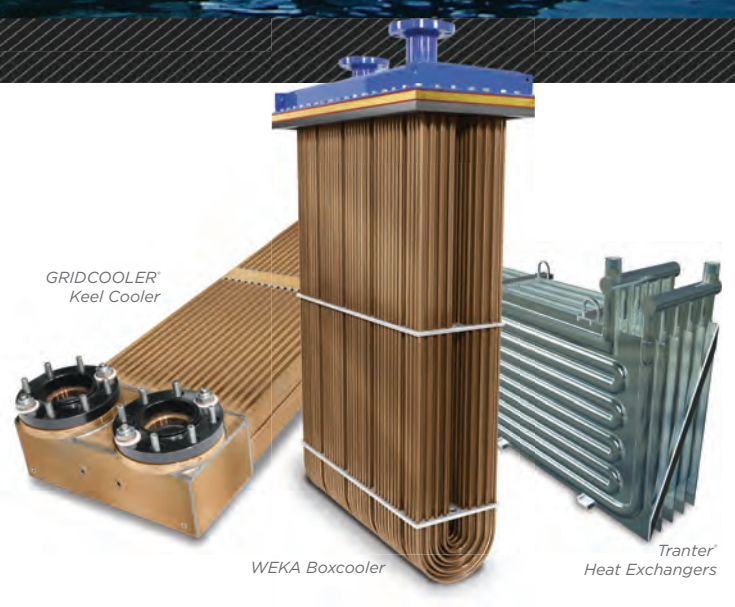

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