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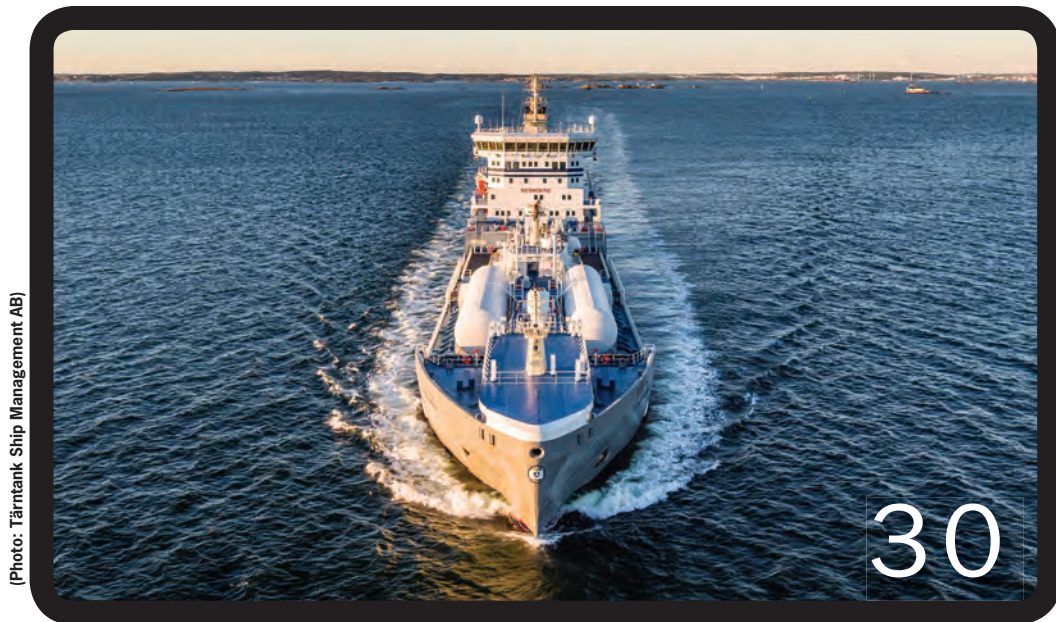
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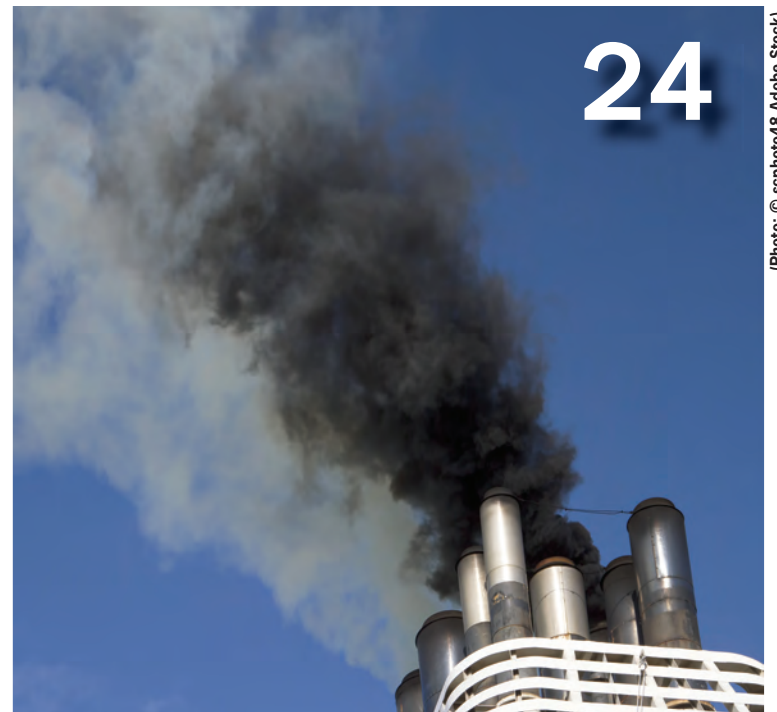
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THE COVER

M/T Ternsund
Pictured on this month's cover is M/T Ternsund owned by Tern-tank. Story starts on page 42.

(Photo: Tärntank Ship Management AB)



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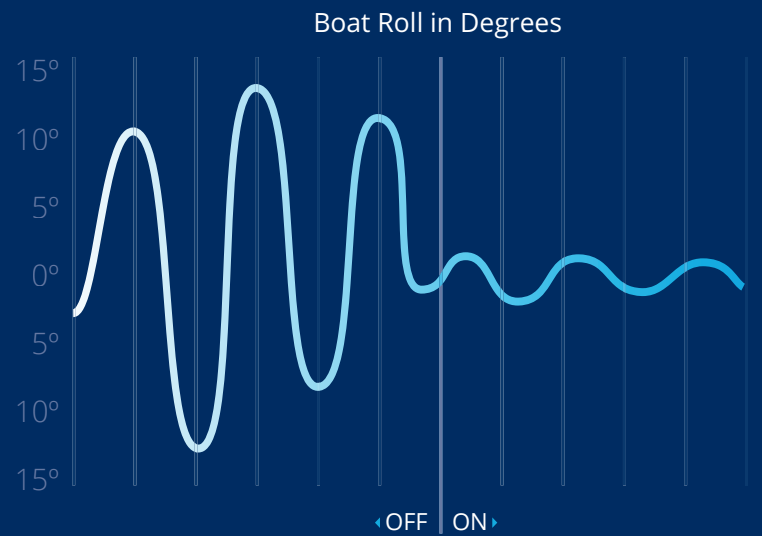
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Craig began his career with W&O in 2001, as a sales representative tasked with developing a fledgling oil and gas market. Over the years, he served in progressively responsible positions, including Manager of Offshore Projects, and Offshore Sales Manager. Craig is a graduate of Colorado State University with a BSBA degree in Public Accounting.

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He graduated Trinity College Dublin in 1979 with a BA Hons Degree in Natural Sciences (Chemistry). Following a period as a production chemist in an electronic circuit board manufacturing company, he returned to the University of Limerick in 1986 where he obtained a Masters Degree in Industrial Chemistry in 1988.

Stoichevski

After a honing the media campaign of Norwegian green group Bellona (current fuels advisors to the European Commission), William Stoichevski began working for the Associated Press in Oslo. In 2003, he left the AP to oversee and write for a number of print and electronic energy industry publications

in the Norwegian capital. He has written thousands of offshore-focused reports from his North Sea vantage point. Hard-to-match access has granted him interviews with hundreds of industry captains and policy makers across the globe. William lives and works in Oslo. He started writing for Maritime Reporter in 2014.

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THE MARITIME REPORTER CREW IN NEW ORLEANS ...
 (L TO R): **FRONT ROW: JEAN VERTUCCI & LUCIA ANNUNZIATA; BACK ROW: ROB HOWARD, JOE KEEFE, ERIC FREER, ERIC HAUN, GREG TRAUTHWEIN, JOHN CAGNI, MIKE KOZLOWSKI, FRANK COVELLA, TERRY BREESE & MITCH ENGEL.**

Freshly returned from New Orleans and the workboat exhibition, I think the three days in Louisiana are best summarized by a quote from one exhibitor: *'For a bad market, this is a good show.'* Business at the moment is challenging for many companies in this sector – as I'm certain you are tired of hearing, reading and discussing – but there is still opportunity. Our company enjoyed a vibrant exhibition, with a dozen staff representing *Maritime Reporter*, *Marine News* and *Maritime Logistics Professional* on hand (pictured above), perusing the Ernest N. Morial Convention Center – and other local stops – for stories and business. Courtesy of my business travels in the past six months ... from Asia to Europe, and domestically from the Gulf Coast to the West Coast to the Great Lakes ... I have seen that there still are vibrant market sectors. Looking back at 2016 courtesy of our Great Ships, this year we present 18 vessels. Unofficially this year was a record, as you will find more "World's First" than any year past, and I think it fair to brand this period the "Age of Fuel." From diesel to LNG to methanol to electric, the industry is changing how it fuels its fleets of the future. With that I provide a glimpse of the trends that will shape 2017 and beyond.

- **TRUMP** The new U.S. president-elect with the support of a Republican Senate and Congress could drive a transcendent period of military ship and boat construction in the United States. While I think it may be premature to conjure memories of the "Ronald Reagan 600-Ship Navy," it is safe to assume that emphasis and funding for military assets on and under the seas should enjoy a strong revival.

- **FUELS** The advent of alternative fuels in the maritime sector is well underway, but the big target is 2020 and the IMO mandated reduction of sulfur in marine diesel from 3.0% to 0.5%. This switch – to a fuel which today does not exist – car-

ries with it a number of logistics, technical and financial implications. Our coverage starts this month starting on page 24, and Tom Mulligan will follow this closely with regular coverage with varying slants throughout the year. **Next up: January 2017's "Bunker Fuel" Report.**

- **DATA** The push to collect, disseminate, analyze and use increasingly massive amounts of data will work to make maritime operations overall more efficient and productive.
- **PASSENGER VESSELS** From the largest cruise ships to the smallest ferries, the maritime movement of paying passengers is expanding rapidly. In January 2017 we cover in-depth the design, construction, outfit and operation of up to 20 new ferries operating around New York City, premised on my interview with **Cameron Clark of Citywide Ferry** by Hornblower.
- **ENERGY** Energy markets, both fossil fuel and renewable, will continue to dominate conversations in 2017 and beyond. At press time oil prices were edging higher based on an agreed production capacity cut by OPEC, and on the renewable front, pockets of innovative projects in offshore wind and tidal power continue to drive innovative design and operation.

As we close 2016 I offer a sincere *'Thank You'* to our readers, our advertisers and all who have interest in and support our various media outlets serving the global maritime, naval, offshore and subsea sectors.

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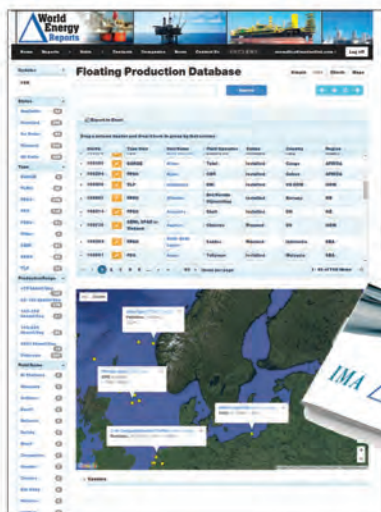
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Laudable Logistics

Happy Holidays from Hong Kong

Hong Kong's impressive logistics hub(s) set to get even better. A local look at all of it from the sixth annual Asian Logistics and Maritime Conference provides unique perspective.



About the Author

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Hong Kong: Last month's version of the Asian Logistics and Maritime Conference is an eye opener. I have been all around the world over the past 40 years, but had never before been to this eclectic and remarkably diverse city located strategically in the heart of the Pacific intermodal equation. In fact, one could argue that Hong Kong IS the heart of logistics for this region – and beyond. That said; it is remarkable that local commerce stakeholders have absolutely no intention of taking their foot of the gas at a time when you wouldn't think it possible to cram one more square inch of anything into this tightly packed, 427 square mile autonomous territory.

To say that that Hong Kong's collective container terminal(s) handle 20 million boxes annually with a daily capacity of 67,000 TEU's on any given day doesn't really give you an idea of the scope of this maritime operation. For example, and having only recently visited and written an article (4Q *Maritime Logistics Professional* magazine) about the port of Charleston, SC, the scope of the world's number five ranked container port (Hong Kong) becomes only too clear. Already a top 10 U.S. container hub, Charleston is today expanding its

capacity, deepening its harbors and improving its intermodal connectivity in an ambitious plan to move the port into the nation's top 5 ports. When they are done, the port will be capable of moving as many as 4 million TEU's annually. At that point, you will be able to fit five 'Charlestons' – with room to spare – into the port of Hong Kong.

Passing by the container terminals on the way in from the airport – the number one air cargo hub in the world – it takes five minutes driving at full speed to get by all of it. I have honestly never seen anything like it. I'm told that seven of the world's top ten container ports are in China. In my mind, that makes Hong Kong's ability to attract commerce that much more impressive. Hence, it shouldn't be a surprise that almost 25% of the local economy is driven by logistics, and much of that – the local maritime cluster. Hong Kong is additionally home to the world's 4th largest ship register and Hong Kong-based ship owners further control as much as 9 percent of the world's tonnage. A vibrant group of maritime law, marine insurance and ship finance professionals contribute much more to the global shipping picture.

The conference – despite the excruciatingly long (16.5+ hour) flight from

the states – is well worth attending. I'm quite sure the airline is still buffing out my fingernail marks from the inside of the fuselage, but I am nevertheless glad that I made the effort to come. Of particular note was the high quality Liner Shipping presentation on day one. Featuring speakers such as Alphaliner's Mr. Tan Hua Joo, McKinsey & Company's Steve Saxon, Maersk China Chairman Tim Smith and MOL Chief Commercial Officer Richard Hiller, it was without a doubt the finest panel discussion of its kind that I have ever had the pleasure of attending at ANY trade event. That sentiment was echoed by many others here, as well. They said it, I believe it, and that settles it.

And, it isn't over yet. Predictably, much of the discussion centers around Hong Kong's ongoing effort to build the new bridge to the mainland – eventually shortening trucking transits to and from the local container terminals from today's 4 hours to just 45 minutes – a planned third runway for the world's busiest air freight hub, and of course, China's Belt & Road initiative, something that will eventually impact the local maritime cluster here like nothing else that ever came before it.

On Monday, I toured Cathay Pacific's

amazing air cargo freight handling center at the airport. Although at first glance only of peripheral interest to me (and perhaps you, as well), I'm glad that I made the effort. The logistics technology and efficiencies on site there are enviable, and I think, the maritime sector could take some lessons there. More on that, at a later date. Stay tuned.

Tomorrow, I will have the opportunity to tour the massive container terminal complex and then, several other local meetings, topping off what has already been a busy one-on-one interview schedule. And, it came as no surprise that, as one of the few Americans here at the show, I frequently get asked about our new President-elect, especially in the wake of his announcement that he would pull the United States out of the Trans-Pacific (TPP) Partnership. For my part, I tell them, "I think everything is going to be okay." I reserve the right to define what that means, exactly, at a later date.

So, it looks like Dim Sum on Turkey Day, from here in what is arguably the world's greatest trading hub. I admit that I need adult supervision when ordering. I've eaten a couple of things that I wasn't quite able to identify. Perhaps that's best. It's all good. Happy Thanksgiving from Hong Kong!

Optimarin: First BWT System Supplier to Win USCG 'OK'

In what can best be termed an excruciatingly long slog toward approval, it was announced recently that Norway's ballast water treatment (BWT) specialist Optimarin became the first system supplier to gain full USCG type approval. The development, which adds to IMO approval and certification from a host of classification societies, means Optimarin's environmentally friendly UV-based technology now leads the market in terms of global compliance.

While there are several units with USCG Alternate Management Systems (AMS) certification, this is a temporary

wide range of shipowners, operators and yards. These include contracts with Atlantis Tankers, Vard Group, Saga Shipholding, Fincantieri Bay Shipbuilding, Fisherman's Finest, Solvang ASA, and

Carisbrooke, amongst others. Of the OBS units installed, over 60 have been retrofitted, fitted in conjunction with global engineering partners Goltens and Zeppelin Power Systems.

Optimarin's technology is certified by a comprehensive range of classification organisations, including DNV GL, Lloyd's, Bureau Veritas, MLIT Japan, and American Bureau of Shipping.



"This is a huge day for our company, and our customers. USCG has the world's most stringent testing standards, meaning that once a system has approval it is assured of total global compliance, now and into the future."

**Tore Andersen
CEO, Optimarin**

certification and does not imply that the unit will be in compliance in the future.

The Optimarin Ballast System (OBS) uses a combination of filtration and 35kW UV lamps to treat ballast water without the need for chemicals. DNV GL tested the system to USCG standards for fresh, brackish and marine water at the NIVA test facility in Norway.

"We now have over 300 systems installed worldwide and have received almost 500 unit orders," said Andersen.. "With this approval confirmation we expect the business to move even further ahead and consolidate our leading position."

Optimarin has had its best year in business in 2016, taking orders from a

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“That is one of the strengths of Evoqua – we are not a small, one-horse-only company. We are a consortium of different water companies; we have roughly 4,000 employees in 170 locations.”

– Matt Granitto, Evoqua

Matt Granitto

Global Business Manager, Ballast Water Solutions, Evoqua

At SMM 2016 in September in Hamburg, Maritime Reporter TV caught up with Evoqua’s Matt Granitto the day after the global ballast water technology mandate came into force with ratification of the measure by Finland, bringing the percentage of world tonnage in agreement above the benchmark 35%.

Let’s start out with the big news: the IMO approval came through. You tell me it’s 35.1411%. Could you please explain.

● There were rumors flying around all of the halls yesterday that Finland would be the next to ratify; the question was whether they would have enough of the world’s tonnage to push it over the 35% limit. This morning, we heard that Finland did indeed ratify, and about one hour later, we got the official announce-

ment on the IMO website that the tonnage has finally reached the 35% mark. So come next September 8, the convention will be in force.

And that’s good news for the ballast water manufacturers and, I think, for industry, because we have to start putting in the capacity to build these systems. It also gives ship owners a bit of direction. Please describe your system.

● As you mentioned, we are Evoqua,

which is relatively new to a lot of people. Two years ago you would have known us as Siemens Water. We have been in the industry a long time, and we have a couple of thousand installations with the heart of our system, which is a Chloropac system. We are a filtration and electro-chlorination system. The heart of the system being the Chloropac, which has been in production consistently since the early 1970s. So we’re filtering the large stuff and killing the small stuff with a small dose of chlorine. Our target mar-

kets are on the larger flow rates, and we believe that we are a better solution in the 500 to 6,000 cu. m./hr. systems.

Six thousand cubic meters per hour is a pretty robust flow rate. Is it safe to say you would be targeting large container ships and the VLCC market?

● Yes, that is exactly our target market; along with LNG carriers. Traditional users of our Chloropac modules are LNG gas carriers. So they already are famil-

iar with our technology for MGPS, now they are going to be using it for their ballast water treatment systems. They have the same 6,000 cubic meter per hour flow rate. That's our target, that's our "sweet spot."

won't say that we can build a thousand a year, but we don't have any real restrictions as far as capacity, other than what everyone else is going to face. We all use a lot of similar components – filters,

pumps, and other things. There could be bottlenecks there, but from our side, what we produce and what we manufacture, there's no real limit, no manufacturing bottlenecks.

Excerpted from a Maritime Reporter TV video. For the full video, visit:
<http://www.marinelink.com/videos/video/maritime-reporter-tv-interview-matt-granit-to-evoqua-100081>

Where are you in the approvals process?

● Right now we've received our IMO-type approval, Germany is our flag state, BSH is the approval body. Right after that, we started basically testing for U.S. Coast Guard approval. We are testing solely in the United States for the Coast Guard, under their watchful eye, both at the MERC facility in Baltimore and Norfolk, and the GSI facility in Duluth and Superior. We have DNV, GL-type approval for the system. We are in process of obtaining Lloyd's approval. We anticipate the end of this year to be able to turn in the (USCG) application, hopefully receiving the Coast Guard type approval the beginning of next year (2017).

So Evoqua may be a new name for the ballast water market, but this isn't your first rodeo. Tell us about your first test ship.

● Our first test ship was a 13,000 TEU container ship. At the time (2012) it wasn't the world's largest, but it was close. It was a new build, but it was basically a retrofit because the shipyard in Korea had not planned to put the system on. So we gained experience both as a newbuild and a retrofit with that one. Not only did we use it for all of our testing for IMO, but the same vessel agreed again to allow us to use them for our Coast Guard type approval. We should be finished with our shipboard testing on board that vessel this month.

One of the things that ship owners are worried about is whether the manufacturing capacity there to keep up with demand. Tell us a little bit about your manufacturing capacity.

● That is one of the strengths of Evoqua – we are not a small, one-horse-only company. We are a consortium of different water companies; we have roughly 4,000 employees in 170 locations around the globe. For ballast water only, we will have three manufacturing facilities: in the U.K., in China, and in Korea. The Korean and Chinese facilities will mainly focus on new build, while the European, the U.K. facility, mainly on retrofit. I



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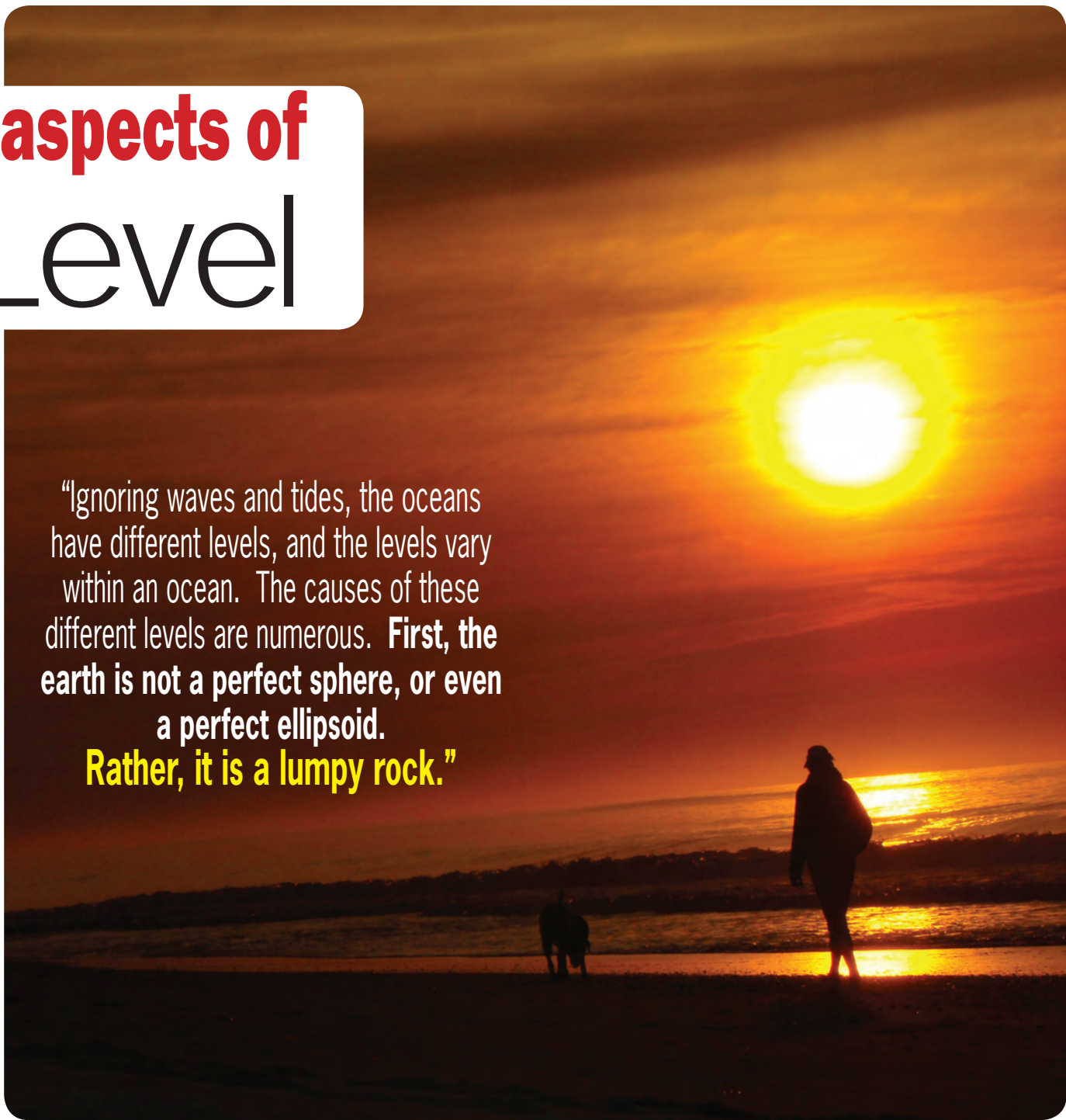
The many aspects of Sea Level

Sea level is defined broadly as the mean level of the sea's surface and is used as the baseline for various measurements, including the height of land features (e.g., mountains) and the depth of the sea floor (e.g., submarine canyons). There are numerous complexities with this system, which has grown up piecemeal over many centuries across the world's coastal areas.

There is no one baseline, but many, for measuring sea level. Mean sea level is generally defined as an average level for the surface of the sea or ocean. Depths on nautical charts are measured from the chart datum. Many national charting agencies, including those of Australia and the United Kingdom, use the lowest astronomical tide (LAT) as the chart datum. This is the lowest tide that can be predicted under average meteorological conditions. The United States uses mean lower low water (MLLW) as the chart datum. MLLW is the average height of the lowest tide recorded at a tide station each day during the recording period. Other nations use their own chart datum.

Sea level calculation also depends on the point at which it is measured. In the U.K., the Ordnance Datum is mean sea level measured at Newlyn in Cornwall. In France, sea level is referenced to the Marégraphe in Marseilles. The Netherlands utilizes the Amsterdam Peil elevation. In the United States, with its thousands of miles of coastline encompassing three oceans, there is the National Water Level Observation Network, comprised of 54 sites.

The lay person imagines that, since the entire world's oceans are interconnected, they must all be at the same height – sea level. While that assumption is true on the small scale, it is fallacious on the world-scale. Ignoring waves and tides, the oceans have different levels, and the levels vary within an ocean. The causes of these different levels are numerous.



(Photo: Greg Trauthwein)

“Ignoring waves and tides, the oceans have different levels, and the levels vary within an ocean. The causes of these different levels are numerous. **First, the earth is not a perfect sphere, or even a perfect ellipsoid. Rather, it is a lumpy rock.**”

First, the earth is not a perfect sphere, or even a perfect ellipsoid. Rather, it is a lumpy rock. Dense material is not evenly distributed, resulting in variations in the effects of gravity. Ocean currents, such as the Gulf Stream, cause regional accumulations or diminishment of water. Thus, sea level in Bermuda (in the middle of the Gulf Stream) is almost three feet higher than sea level in Charleston, SC (which is outside of the Gulf Stream's flow). Salinity is a significant factor. The higher salinity (and density) of the Atlantic Ocean is a major reason that its average level, on average, is eight inches lower than that of the Pacific Ocean. The height difference at the Isthmus of Panama is four inches, making a true “sea level” canal a physical

impossibility. Temperature causes water to expand and become lighter. Sea water in warmer climes has a higher level (all other things being equal) than does water in cooler regions. As with many other subjects, on close examination sea level is much more complex than it first appears.

Another complicating factor is that the land against which sea level is measured is not static. It can rise or fall due to a number of factors. The 1964 Alaska earthquake tilted the island of Kodiak such that one end of the island was raised by 30 feet while the opposite end dropped about ten feet. It was years before the new depths in surrounding waters were recharted. Land can also subside. Some of the Louisiana levees

failed during Hurricane Katrina because they were lower at the time the hurricane struck than they were when originally constructed, having lost altitude due to widespread land subsistence.

The major long-term issue with sea level is that it is rising worldwide. This is caused by two primary factors. Sea water, like the atmosphere, is getting warmer. Warm water occupies more space than cold water. This thermal expansion causes the sea level to rise, as the water has nowhere else to go than up. Secondly, the warmer atmosphere is causing naturally-occurring ice, such as found in glaciers and in the Antarctic and Greenland ice caps to melt faster than it is being replaced. Water from melting glaciers (whether in Alaska, Siberia, the

Alps, or Mount Kilimanjaro) flows into the sea, as does water from the melting ice caps.

While estimates vary, experts calculate that thermal expansion will cause 45% of the projected sea level rise in the near future, while glacial melt will add 31%, melting of the Greenland ice cap will add 13%, and melting of the West Antarctic ice sheet will add 11%. The East Antarctic ice sheet appears to be currently relatively stable. These percentages can be expected to change over time, particularly as glaciers dwindle in size and if the melting rate of the Greenland ice cap increases as projected.

Experts estimate that sea level rose between 0.10 inch and 0.11 inch per year between 1993 and 2004 and that the rate of increase has accelerated since 2004. Projections vary, but the average estimate for sea level rise between now and the end of this century is 15 inches (estimates vary between 7 and 23 inches). A fifteen inch sea level rise will make numerous islands and coastal areas uninhabitable. Island nations like Tuvalu and the Maldives could disappear, and with them their legally-sanctioned territorial seas, exclusive economic zones, and

continental shelves. Low-lying coastal lands, such as major portions of Bangladesh and Nigeria, will be at risk.

Finally, coastal/tidal cities, including Venice, New York, and London will be forced to relocate or adopt major remedial measures. The city of Miami Beach has already commenced planning a multimillion dollar project of sophisticated flood water pumps and conduits, as well as raising many of its streets and structures, in anticipation of higher sea levels. Superstorm Sandy awoke those living and working on Manhattan Island to the fact that much of the island, particularly Lower Manhattan, is only a foot or so above the current sea level. The Hampton Roads area of Virginia, home to one of the largest naval bases in the world and to a major commercial seaport, already experiences frequent flooding. An extensive system of levees and sea walls has been proposed for much of the Louisiana Gulf coast, but plans and funding are currently not in sight.

Saint Mark's Square in Venice floods on a regular basis. Plans are being considered to construct a levee around all or most of the city. The Netherlands, with much of the nation below sea level and

with the world's most sophisticated system of levees, dikes, and sea walls, is considering enhancement of that system. The Thames Barrier was built after the catastrophic North Sea Flood of 1953 to protect the London area from similar occurrences. When finished in 1984, it was estimated that closure would be required only two or three times each year. It is now closing at a rate of six to seven times annually. A more robust replacement has now been proposed. This listing merely scratches the surface of coastal locations at risk.

As a practical matter, it is impossible to protect all of these resources. Thus, it is incumbent upon society to select which at-risk resources are of the highest priority and then develop plans and funding to minimize the adverse impacts of sea level rise at those locations. For the locations that do not make the list, plans must be developed and implemented to minimize the adverse impacts upon the current inhabitants. Those individuals must be relocated and economically compensated at a fair and equitable level. Society cannot wait until the subways, streets, piers, and islands are flooded – it must act now to counter this



About the Author

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known threat.

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Hull-Structure Damage and Future Consequences

Forensic Analysis

Forensic analysis of hull-structures, after damaging events, can provide critical data and assist in the determination of necessary actions to ensure future safety and feasibility of company assets. Such analysis can also be requested to see exactly what took place to bring upon the damage, how to fix the damage, as well as placing blame on a party at fault. The following information is pulled from work conducted on the side shell of a converted double-hull floating ship-shape structure, damaged in multiple locales, while in transit to its work site.

In order to conduct successful advanced analysis in a forensic case, provider of services must obtain the ability to assess and interpret the situation and data with both a quantitative and qualitative approach. To begin advanced analysis for such situations there are many factors to take into consideration; vessel type

and size, work site environmental conditions, original design life expectations, nature of operations for the structure, class society designation, etc. The FEA damage assessment can be performed on local FEA models created in way of the areas of interest. Areas of interest are the most severely damaged areas from the damaging incident, as these findings will generate the most conservative answers for an owner and operator.

Models of both the original as built configuration and the damaged shape configuration are loaded with the original class-required conversion loads, damage-specific DLA cases designed to maximize the global and local load conditions, as well as our intuitive knowledge gained through our history of operation as an engineering support services company. Performing a spectral fatigue life calculation is also critical to show the new minimum fatigue life values for the

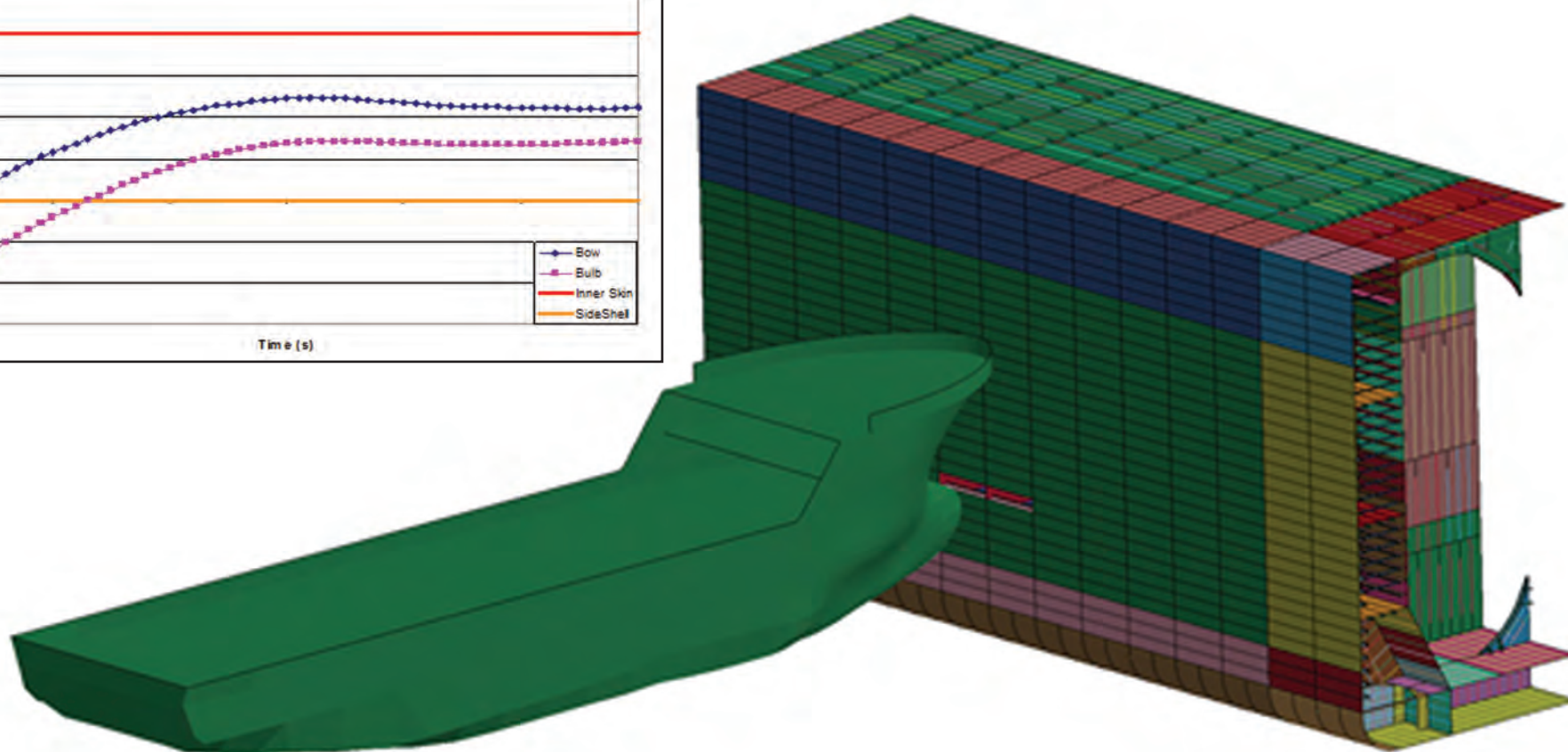
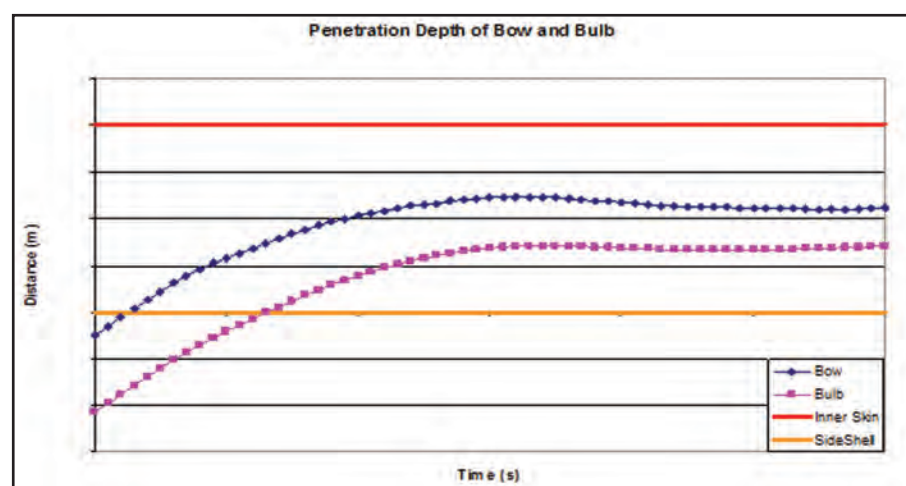
areas of interest. Generating these values using both at conversion and end-of-life scantlings gives the conservative answer as to whether the vessel can still function on its last planned day of service – as previously decided at construction or conversion. The specific vessel focused upon in this editorial is one that is in service in a benign environment, giving the owner a wider range of options when deciding how to handle the damage and generate a solution for moving forward.

To provide further insight to the change in global hull strength and shear force, a midship section was modeled to determine the change in hull girder ultimate strength by comparing the strength in the as-built configuration and damaged configuration by eliminating the damaged members from the calculation of overall hull girder section properties. The still water allowables for vertical shear force are determined to calculate

the total shear force capacity of the hull structure, and calculates the still water allowables by subtracting the wave induced load component. This analysis concludes the impact of the dent on the shear flow through the global structure, and the impact on the total shear force capacity of the hull structure.

For this specific side shell case, away from the area of interest, primary stiffeners and minor panel breakers are modeled with beam elements with cross-sectional moments of inertia modified to account for the effectiveness of the associated plating. Material properties, such as mild steel and any high-tensile steel in the surrounding structure are also modeled.

As it pertains to the FEA loading description for both class required cases and additional cases, the initial analysis of the damage to the vessel side shell has been completed using the original



design load cases developed for conversion analysis. Also, new dent-specific DLA cases have been created to maximize the global load components in way of each of the damage locations. The full global hull FEA model has been solved with these new load cases. The local fine mesh models have been loaded with the resulting pressures and enforced displacements from the global model. Additionally, new damage heel cases were developed to investigate the effect of the additional hydrostatic pressure on the dents. These specific cases have been selected as most likely to produce the greatest hydrostatic pressure at each dent location due to vessel pitch and heel.

Conducting fatigue life assessment consists of the calculation of fatigue damage from the past wave induced stress ranges resulting from the vessel history prior to conversion, the damage accrued along the transit route to the operating site, and the expected fatigue damage from desired design life in its operating environment, as well as damage resulting from the on and off loading of the vessel's operating purpose (if applicable). As previously mentioned, it is typical to use site conditions that are all corroded to the end-of-life scantlings - ensuring the most conservative results. The local fine mesh model of the damaged side shell, in their respective locations, were analyzed for fatigue using the element centroidal stress results from the elements in way of the areas of interest and the detail specific S-N curves.

Within Viking's structural assessment software suite, SAGA, there is a crack growth program integrated that performs a fracture mechanics analysis on the most highly stressed locations of the damaged structure to determine the likelihood a crack will grow to critical length. The crack propagation analysis was performed on two locations within each of the areas of interest, chosen as the worst location for fatigue in the side shell and side shell longitudinal in way of the dents, and the worst location for fatigue at the transverse web frame cutouts in way of the dents. The crack propagation analysis showed that the probability of a crack in the side shell plating or side shell long growing to critical length is low. However, a crack developing in the web frame plating in way of the long stiffener cutout at the dented area may become critical within the design life of the vessel. As a service provider for forensic analysis, this conclusion leads to the recommendation to increase inspec-



About the Authors

Fritz Waldorf (pictured) is Director of Sales and Marketing for Viking Systems International and based in their Houston office. Viking assists shipyards, ship designers and owner/operators with the efficient implementation of advanced analysis tools for floating vessels and structures.

Arnold Balster is an Engineering Manager for Viking Systems International. Arnold is based in Viking's Houston office and has a naval architecture and hull structural background and together with his team is responsible for conducting the various engineering and design tasks.

tion frequency by a specific period of time to ensure continued vessel safety and avoid any downtime.

To approximate the effect of the residual stresses remaining in the dented steel from the original impact, a nonlinear impact analysis was performed. To the best ability, a similar shape of the projectile was modeled and the impact was recreated using the same mass, moving at a velocity calculated to deform the side shell plate to approximate the observed dent depth. It is not feasible to exactly match the dent depth observed in the original 3-D laser reports, due to the size and shape of the projectile chosen for these tests. Failures begin to occur in the side shell plating as the corners of the coarse-meshed projectile contact the side shell. The determined factors allow for interpretation of the stress locked in the structure, which will work its way out over time - relieving itself of the pressure can also help give an indication of how fast a crack could grow if one were to appear.

Experience in such advanced forensic analysis cases is key to prevent future pain and expense for owner and operators of maritime assets. An approach both quantitative and qualitative, while acting as doctors for vessels, leads to the most accurate diagnosis.

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There are numerous factors that are driving global environmental regulatory growth and the growth in renewable lubricant technologies, such as natural resource constraints, standardizing requirements due to globalization, public opinion and pressure, increase in climate change concerns, new technologies, new evidence from research and overall growing Environmental Health and Safety (EHS) concerns, and most recently the improvements in the durability of lubricants made from renewable technologies. According to environmental consultants and advisors, there are currently thousands of new environmental regulations awaiting attention from legislators and regulators around the globe. Different standards hamper growth and thus, pressure to harmonize regulations is likely to continue alongside the regional and global integration of markets.

The marine industry is one of the most heavily regulated industries and was amongst the first to adopt widely implemented international safety and environmental standards. With the U.S. Environmental Protection Agency's (EPA) 2013 Vessel General Permit (VGP), drafted Small Vessel General Permit (sVGP) and other global sustainability initiatives firmly in place to regulate discharges, two main EAL solutions have emerged for marine applications – Hydraulic Environmental Synthetic Esters (HEES) and Hydraulic Environmental Polyalphaolefin and related hydrocarbons (HEPR). While both options are globally available and meet current environmental regulations, the HEPR technology has inherent advantages

that drive economic value and enable environmental leadership. While HEES products can deliver high performance, they can be prone to hydrolysis in the presence of water (they can decompose to form acids and alcohols which impact lubricity and can cause potential damage to metals and seals). In contrast, HEPR solutions have excellent thermal and hydrolytic stability and broad temperature range performance.

Building on the proven success of the HEPR technology, RSC Bio Solutions has developed new bio-based lubricant formulations that pair enhanced renewability with an excellent performance profile to meet the growing global regulations and evolving market needs. FUTERRA™ is a new Ecolabel-certified (a voluntary label promoting trusted envi-

ronmental excellence) renewable hydrocarbon EAL. According to the European Commission, the EU Ecolabel helps to identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw material through to production, use and disposal. The only EAL from a renewable hydrocarbon resource, FUTERRA offers drop-in replacement for mineral oil- or petroleum-based lubricants and was designed to outperform other EALs in both wet and dry environments.

FUTERRA outperforms other EALs in several key areas, such as durability, water separability, oxidative stability, hydrolytic stability and seal compatibility. It allows for easy conversion and, while some EALs are incompatible with certain types of seals, FUTERRA has very broad seal compatibility, even with traditional seals like NBR, allowing operators to use the seal that is the best choice for their specific needs.

FUTERRA is demulsifying, allowing for the effective separation and removal of water from the fluid and system. A product that is capable of quickly and completely separating from water has multiple practical applications, such as allowing operators to recycle and reclaim product contaminated with water. In comparison, HEES lubricants are emulsifying, which means they have a tendency to absorb water contamination. Many producers of HEESs have claimed that, given their fluids' ability to emulsify water, there is no need to check for or remove water from the system. However, most OEMs disagree, recommending draining and refilling any fluid

with water content above 5 percent. The industry generally appears to be moving toward wider use of demulsifying lubricants, which allow water to be easily removed through normal separating methods. Because of this capability, HEPRs generally offer longer drain intervals and enhanced performance, which result in better long-term return on investment.

FUTERRA has better oxidative stability compared to other EALs (see Figure 1). Oxidation is a chemical reaction that naturally occurs with a combination of the lubricating oil and oxygen. The rate of oxidation is accelerated by high temperatures, water, acids and other catalysts such as copper. Generally, oxidation reduces the service life of a lubricant by half, for every 10 degrees C (18 degrees F) increase in fluid temperature above 60 degrees C (140 degrees F). FUTERRA is more capable to resist degradation in the face of moisture and heat.

FUTERRA performs well in low temperature environments. In early versions of biodegradable products, there had been performance issues at low temperatures. FUTERRA accomplishes this and more. FUTERRA even has a lower pour point than the Polyglycol HEPG products that are based off of similar chemistries to anti-freeze.

Air contamination can have serious effects on lubrication. Air can exist in oil in four different states of coexistence (dissolved, entrained, free and foam). Foam indicates more than 30 percent air, which can lead to numerous problems, including oxidation, thermal degradation, poor heat transfer, retarded oil supply and cavitation. Depending on the machine design, application and aera-

Figure 2: Foam performance in standardized testing

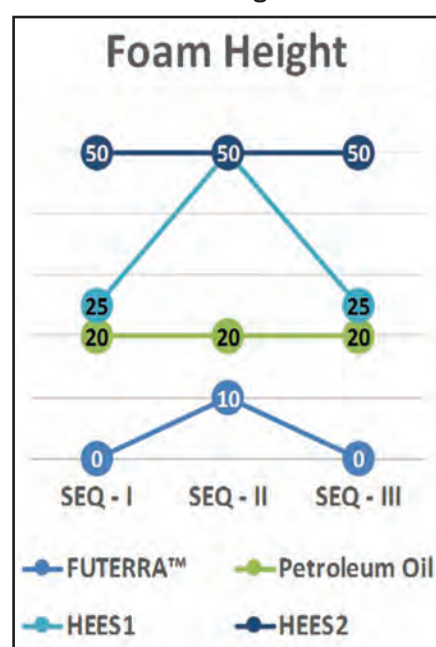


Figure 1: Oxidative Stability

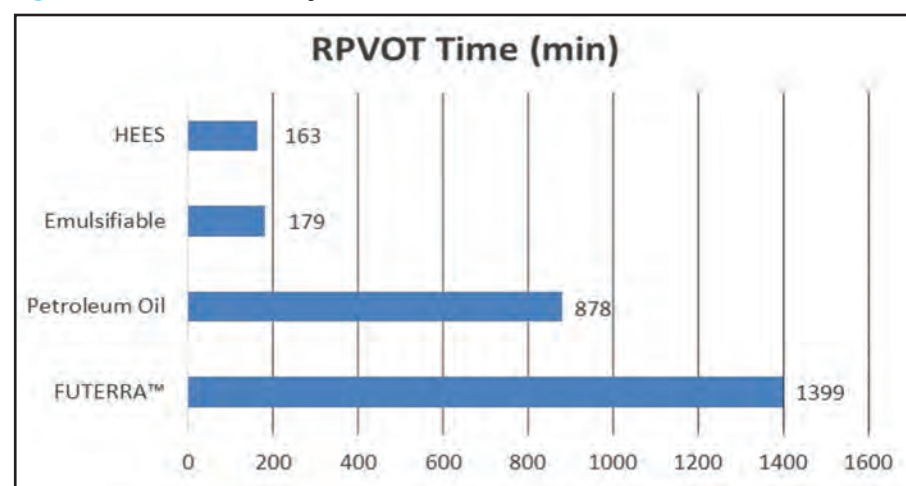
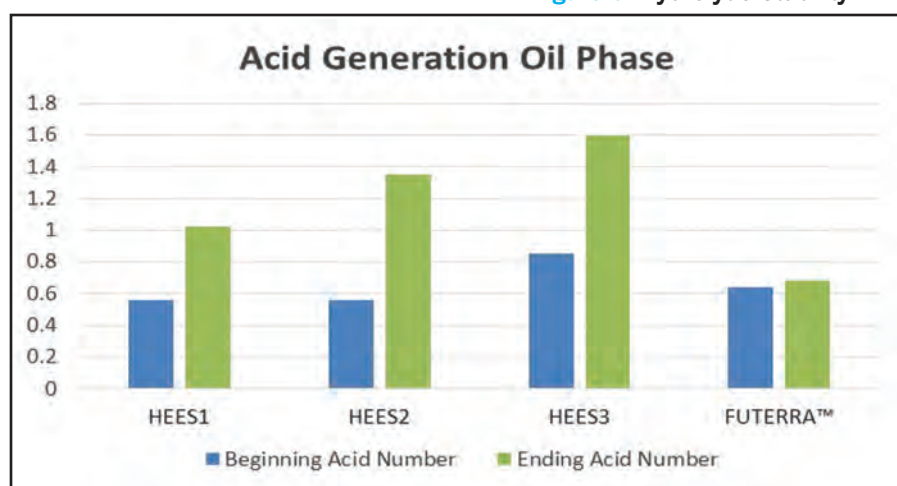


Figure 3: Hydrolytic Stability



tion severity, it is possible that all five of these conditions could be happening concurrently. Air is a real contaminant that requires thoughtful monitoring and control, and left unattended, it can destroy equipment. FUTERRA has near zero foam tendency (see Figure 2), thus, eliminating the problems associated with air contamination.

FUTERRA resists corrosion. The need for corrosion inhibition in a wet environment has been a need as long as there have been vessels in the water. Testing results show that FUTERRA protects from corrosion even when water is not removed from the system and allowed to contact the metals. Corrosion and sludge in the system plug filters and reduce the life of the equipment, but with FUTERRA corrosion is not an issue. FUTERRA's corrosion inhibition capabilities

reduce the need for oil and filter changes and extend equipment life, thereby reducing maintenance. Ultimately, this reduces expenses and increases flexibility.

FUTERRA has incredible resistance to hydrolysis (see Figure 3). FUTERRA is made from chemistry that is designed to resist hydrolysis, and it also removes acid from the lubricating phase keeping corrosive materials out of equipment in the face of moisture contamination. This is the first EAL ever designed to not only resist hydrolysis, but provide a means of dissociating acids from the lubrication zone. FUTERRA is the only EAL that acts like an oil. FUTERRA succeeds in places where EALs that are sensitive to water and hydrolysis have failed, which will keep your equipment running better for longer. With unsurpassed durability, FUTERRA minimizes

fear of fluid failure while extending the life of the fluid and offers the ultimate compatibility with legacy equipment and seals. By meeting current and pending global environmental regulations, including EPA's VGP and drafted sVGP, FUTERRA allows operators to future-proof their fleets by addressing evolving standards upfront in a cost-effective and performance-enhancing manner. In fact, FUTERRA is backed by a limited 10-year warranty for stern tube applications that surpasses anything in the market today. FUTERRA not only offers the highest level of sustainability, but also ensures compliance for years to come.

For more information on FUTERRA or any of RSC Bio Solutions' environmentally acceptable products, as well as regulations, applications and considerations, please visit www.rscbio.com



About the Author

Lisa Clark is vice president of marketing and market development of RSC Bio Solutions. She directs marketing activities including marketing communications, lead generation and brand and product management.

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Dry Bulk's Biggest Spenders

By William Bennett

In the last month, we have seen the Baltic Dry Index (BDI) recover to the same level it was 12 months ago (see circles in fig.1). Vessel values have started to firm, but not at the same rate and are still at historically low levels.

In the last 12 months, contrarian owners have taken advantage of the low values and have been buying cheap tonnage. With hindsight, this looks to have paid off with many values having increased above the purchase price.

This article takes a look at which dry bulk owners have been buying the most in the last year.

Anangel Maritime Services
Spend: \$247 million
Size change: 863,200 DWT

In January of this year Anangel purchased seven Capes (four resales from Star Bulk and three one-year-old vessels from Scorpio Bulkers) at \$247m. Current VV market value is \$230 million.

John Angelicoussis, principal at Anangel, has a reputation at picking the bottom of the market.

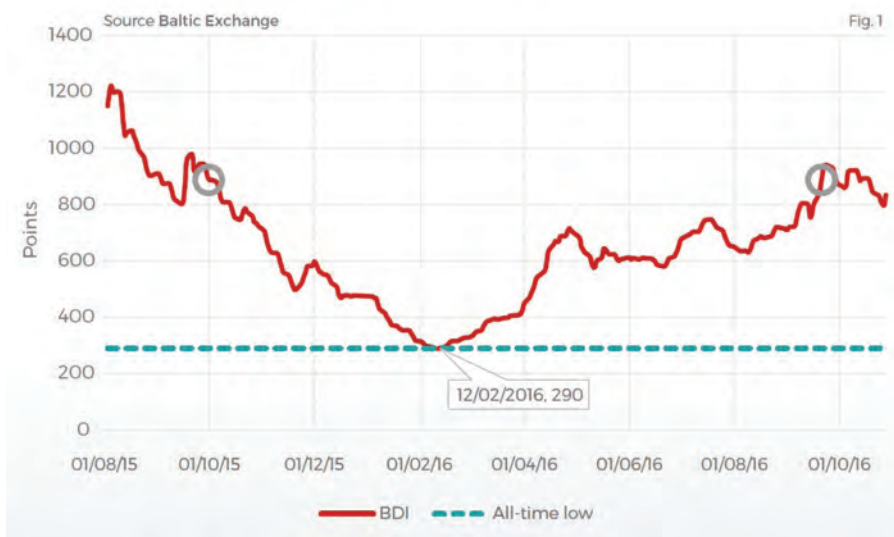
For example, following the supercycle in 2007-2008 he bought the cape resale Anangel Argonaut (177,800 DWT, 2009 Blt, SWS) at \$63.50 million. Following this he bought three more resale capes from Scorpio also at a market bottom in April 2015.

Figure 4 illustrates the timing of these purchases Vs the market.

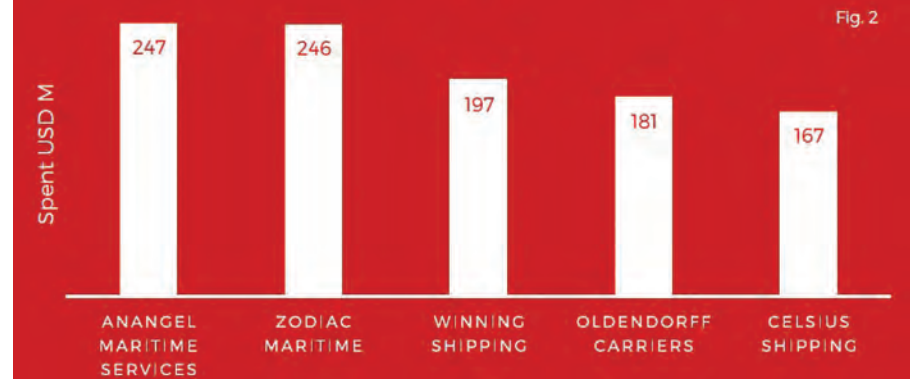
Zodiac Maritime
Spend: \$246 million
Size change: -91,000 DWT

Eyal Ofer's operation was buying steadily throughout 2015 and closed the year off with a mammoth acquisition from Scorpio. Following two lone purchases in December 2015 (PRT Future) and March 2016 (Grand Future), Zodiac began scrapping, shedding nearly 1.5 million DWT. This brought Zodiac's fleet back to the similar level it was at in

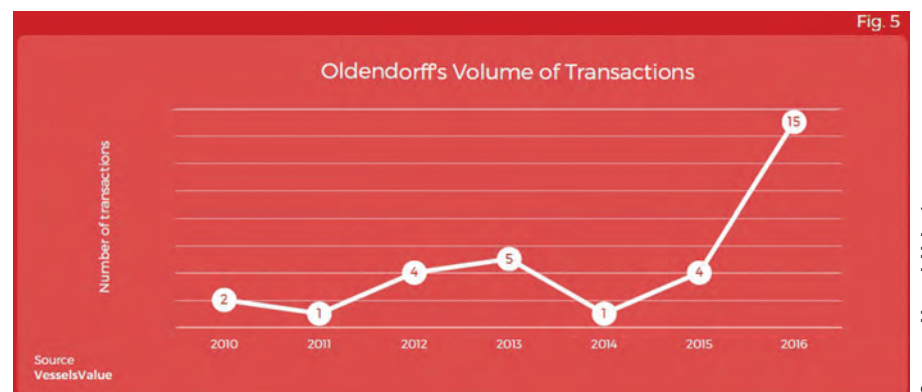
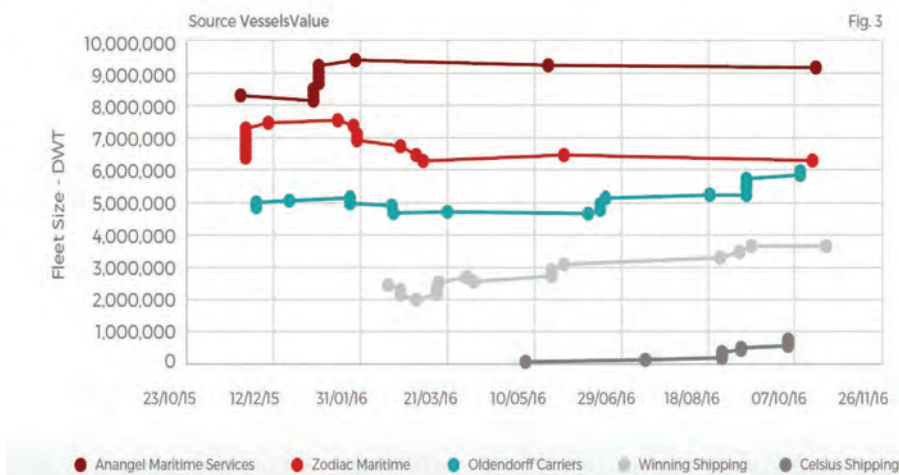
THE BALTIC DRY INDEX 2015-2016



5 BIGGEST SPENDERS IN DRY BULK OVER LAST 12 MONTHS



FLEET DEVELOPMENT



2015, shrinking the fleet by 57,800 DWT year-on-year. Following a spend of \$246 million (today's equivalent price: \$236 million), new additions to the fleet have a VV value of \$235 million.

Winning Shipping

Spend: \$197 million

Size change: 1,207,800 DWT

Winning began the year scrapping some of their older tonnage as the rates and asset prices slumped. Winning's first purchase was the acquisition of the Golden Hope (176,900 DWT, 2009 BIt, Namura) at \$18.5 million. Winning focused on buying throughout the rest of 2016, also purchasing two Capes with its management arm, Winning Alliance. Winning has grown their fleet by 49 percent with a spend of \$197 million. The current value of acquisitions is \$192 million.

Oldendorff Carriers

Spend: \$181 million

Size change: 1,095,500 DWT

Oldendorff has been more active in S&P in weaker markets and the last 12 months have been very busy for the ship owner (see fig. 5). Overall fleet growth in the period was 23 percent adding 1.1 million DWT to the fleet. Oldendorff's first purchase was a bank sale of Paragon Shipping's distressed assets. The ship owner's purchases have predominantly been distressed transactions and cheap Chinese ships adding good value to the acquisitions. In the early months of 2016, a spate of scrapping removed some of the fleet's older assets and a further sale of a 2005 laid up Supramax in March saw the fleet at its smallest in year. From then on Henning Oldendorff has been active in bulker S&P. Oldendorff spent \$181 million and the acquisitions now have a VV Value of \$216 million, a 19 percent increase in asset prices.

Celsius Shipping

Spend: \$167 million

Size change: 688,800 DWT

Prior to the dry bulk crash Celsius were exclusively in the small chemical tanker sector. Backed by Breakwater Capital (U.K.) and Bayside Capital (U.S.), Celsius purchased an Ultramax resale at Hantong SHI in May. Their appetite was for Chinese-built, modern ships, snapping up a number of resales, many direct from the yards including Huangpu and Yangfan Zhoushan. Over the course of 2016 their fleet grew by 688,000 DWT (newbuilds included) with a spend of \$167 million. They now operate a fleet of four Ultramax and

Supramaxes with three vessels still to be delivered. As it stands Celsius' fleet of bulkers now has a market value of \$196 million which equals a rise in values of 17 percent from the purchase price.

About the Author
 William Bennett is a senior analyst for VesselsValue.com.

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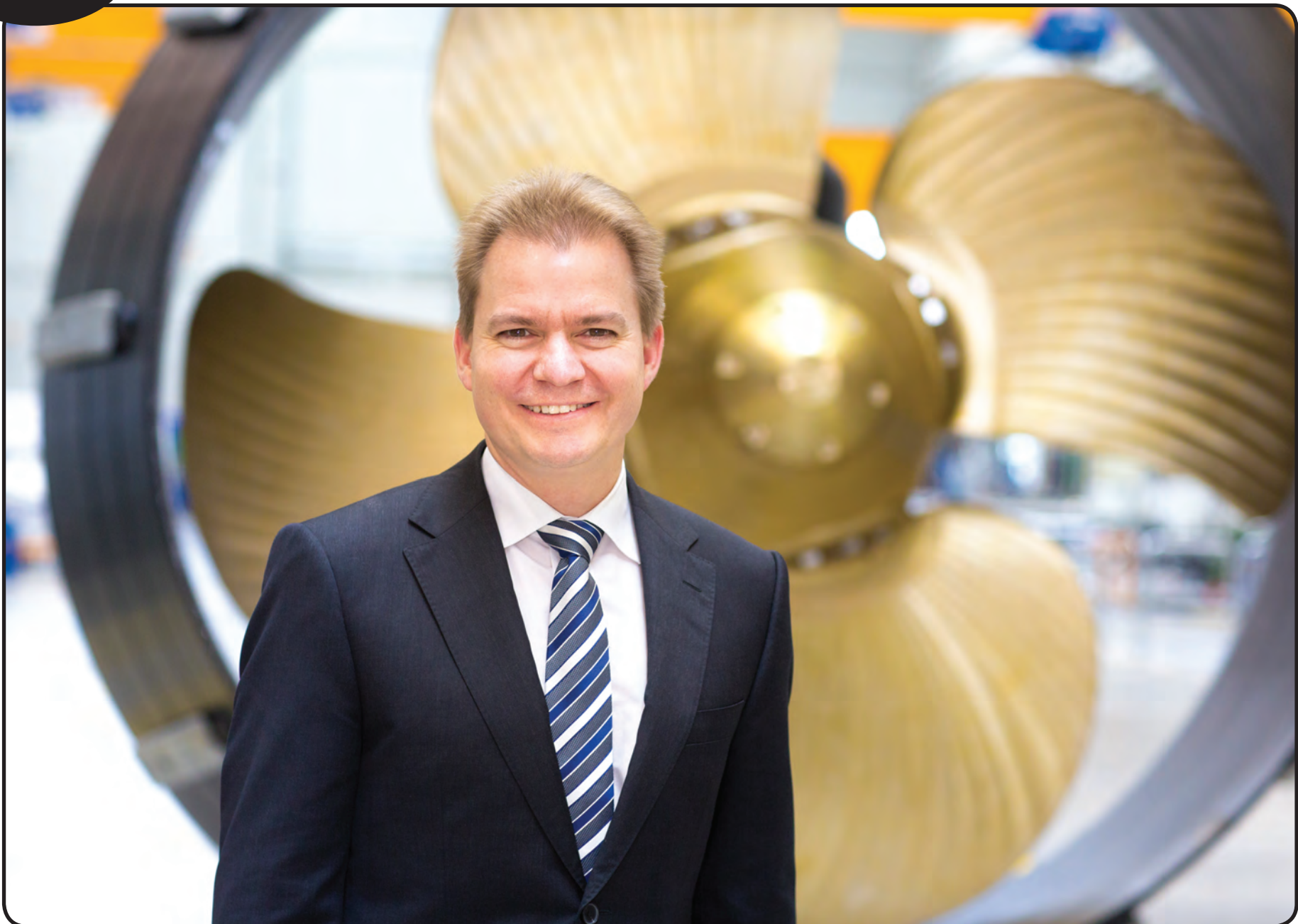


Photo: Schottel

Dr. Christian Strahberger

Schottel, a ubiquitous German-based maritime propulsion company, is firing on all cylinders and preparing now for the inevitable maritime market upturn. As Schottel's new Managing Director, Dr. Christian Strahberger, closes in on his first year at the helm, he discusses the strategy with Maritime Reporter & Engineering News.

By Greg Trauthwein

While the maritime industry endures an overall downturn, quality, long-term companies see opportunity amidst the challenge, using lean times to optimize operations and staff while plotting a course for the inevitable turnaround. This is the case at Schottel, led by its energetic new leader and CEO Dr. Christian Strahberger who joined Schottel in January 2016.

"When you join a new company you have an outside perspective," said Strahberger. "I think the important perspective is not my vision before I joined, rather building a vision jointly with the management team, and jointly with the employees of the company, so that we have a shared common goal and passion for what we want to achieve. This

was the task for the first half year."

Like many leaders in this industrial sector, Strahberger recognizes that all of the machinery and technology in the world is only as good as the people managing and operating it. To that end he highly values the company's human assets.

"The greatest strength (of Schottel) are the employees of the company," said Strahberger. They are focused on the customer, with a shared passion and drive that is in the genetics of Schottel; I will try to keep it this way. I had the luck to find a passionate team, a group that is fun to work with and very dedicated to the company and to the customers," he continued. "I also had to fill two key positions on the sales and service side, and I think now we have a team with a shared

“ If you look back in history you will find time and again that **big innovations have been started during down cycles.** ”

vision and direction for the coming 12 to 18 months.”

‘Down’ is the New ‘Up’

While Strahberger admits that current market conditions are difficult in some sectors, when he looks at the market in overview he sees a marine industry that

is fragmented, which makes broad generalizations difficult. “Oil and gas related and exploration are really dreadful at the moment, but there are other parts (of the industry) that are doing well,” said Strahberger. “We see good activity in the tug and the ferry business, we see good activity in some merchant sectors. The

business here may not be great, but it is stable and companies keep investing at a moderate level.”

While the tug, ferry and offshore business will always be staples, he sees potential in the megayacht market and inland waterways markets as ripe for growth. Beyond a specific market seg-

ment however, he sees opportunity everywhere as the industry evolves from fixed shaft lines to steerable thrusters. “You see this transition taking place in many sectors, and they are about to happen in others. I see this as a big opportunity,” said Strahberger.

Looking internally, he values these

Schottel's new Doerth production site.



Photo: Schottel

market pauses as a point to reflect on his own company's processes and operations, evaluating every step in the chain from product conception through life-cycle management with the end user. "I believe these down cycles are very important for industry," said Strahberger. "If you look back in history you will find time and again that big innovations have been started during down cycles. I think it's important to use this down cycle to re-think what you're doing and how you're doing it. Now is the time to adapt to the 'new norm.'"

'The new norm' is a phrase often ban-

died about when discussion turns to the offshore oil and gas markets, and Strahberger like many others does not foresee energy pricing rising fast or high in the near term. "We have to be agile and adaptive to understand the customer needs for the coming five to 10 years so that the company is better set up to take advantage when the market turns around; this is easier said than done, but that is our goal."

Never Stop Innovating

Strahberger comes from a technical education and has a clear passion for

technology, a passion which he shares by extension with Schottel's Research & Development department. He believes continued investment in times good and bad is critical to his company's long-term health. "The current focus is on new products and we are ramping up R&D," said Strahberger. "This is one of the advantages of being a family owned company and we have a strong backing of the family, committed to the company and the maritime industry. This is an advantage particularly during tough times to continue pushing to innovate and develop in shaping the company with new

products and new technologies."

Schottel is committed to the entire value chain, and to that end it houses complete manufacturing steps in house, from raw steel and machining to assembly and testing, including CFD and in-house design. "This is a core concept to really understanding the product and quality control throughout the chain," said Strahberger.

Schottel's continued investment in this regard is plain to see, as it currently explores new means to help its ship owner clients meet new international emission, safety and environmental regulations.

Schottel's new Doerth production site.



Photo: Schottel

“The greatest strength (of Schottel) are the employees of the company. They are focused on the customer, with a shared passion and drive that is in the genetics of Schottel.”



Christian Strahberger

Dr. Christian Strahberger took over as the Managing Director of Schottel GmbH in 2016. Strahberger, 42, is an industry expert with a strong technical and intercultural background. After studying in both Germany and the United States to earn his doctorate in Physics, he began working for Siemens AG in 2001 and later for the mechanical engineering company Voith in 2009. While there he held several managerial positions. Most recently, he has been serving as Chairman of the Board of Management for the Marine division of Voith Turbo Schneider Propulsion. He has extensive experience in the area of ship propulsion.

One such innovation is the Schottel EcoPel-ler (SRE), a thruster optimized for open sea and coastal operating conditions. The SRE is designed with hydrodynamic insights from CFD simulations and model tests, and it is designed to be a flexible and efficiency propulsor choice available in power ratings between 1,000 and 5,000 kW, in both FPP and CPP variants.

Central to the SRE is another Schottel investment in innovation, namely the HTG high torque gears. HTG is designed as an efficient, robust gearbox with low maintenance requirements. Specifically the HTG enables bevel gears of the same dimensions to transmit up to 15 percent higher drive torque with the same

safety margins. For the same drive torque, it is possible to have a more streamlined underwater gearbox housing, helping to increase overall hydrodynamic propulsion efficiency.

Last but certainly not least, in 2015 Schottel commenced operations at a new plant near the company's headquarters in Germany, and now offers customers a more rugged Rudderpropeller courtesy of an optimized coating process.

The underwater elements of the propulsion unit are coated with several layers of hard, two-component epoxy resin, which according to the company is characterized by 2.3 times greater abrasion resistance and approximately 60% greater adhesion.



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All Eyes on 2020

IMO Low-Sulfur Fuel Mandate Triggers Mixed Reaction

By Tom Mulligan

The International Maritime Organization's proposals to reduce sulfur levels in marine fuels to a maximum of 0.5% m/m (mass/mass) by 2020 may prove to be controversial, having met with various responses from major shipping organisations and other bodies. The decision to implement the proposals by 2020 was taken by IMO, the regulatory authority for international shipping, during its Marine Environment Protection Committee (MEPC 70) meeting, which was held in London, UK in October 2016, and represents a significant reduction from the 3.5% m/m global limit

currently in place. IMO said its decision demonstrated its clear commitment to ensure that shipping meets its environmental obligations, the Organization's Secretary-General, Kitack Lim, said that it reflected IMO's determination to ensure that international shipping remains the most environmentally sound mode of transportation: "The reductions in sulfur oxide emissions resulting from the lower global sulfur cap are expected to have a significant beneficial impact on the environment and on human health, particularly on that of people living in port cities and coastal communities beyond the existing emission control areas," he said.

Further work to ensure effective implementation of the 2020 global sulfur cap will continue in IMO's Sub-Committee on Pollution Prevention and Response.

BIMCO: "Serious Concerns"

The Baltic and International Maritime Council (BIMCO), however, one of the world's largest international shipping associations, has voiced serious concerns about some of the conclusions of the official study on which the decision of the IMO Committee to set the implementation date of the 0.5% global sulfur cap was made. The Council stated that the official IMO study that assessed the

relevant availability of fuel oil failed to fully address IMO's terms of reference in several critical areas, including fuel oil quality, a shortage of sulfur removal capacity in oil refineries, and a failure to model the disruption that an overnight introduction of the global cap would cause. BIMCO believes that a significant amount of the fuel oil that the IMO study concludes will be available for marine use is unsafe to store and unsafe to use on board ships, and in addition says that the means to address the shortage of refinery capacity for sulfur removal has yet to be determined. It therefore concludes that it is not possible to be certain that



IMO

“The reductions in sulfur oxide emissions resulting from the lower global sulfur cap are expected to have a significant beneficial impact on the environment and on human health.”



Photo: IMO

Kitack Lim, Secretary-General, International Maritime Organization (IMO)

the global refining industry will have the capacity to produce enough marine fuel by 2020. BIMCO is also concerned that the supply of fuel to other sectors of the global economy could face major disruption if these issues are not addressed beforehand. It has funded, with others, an independent supplementary study carried out by EnSys and Navigistics to assess the availability of marine fuel, the conclusion of which being that it is unlikely that there will be sufficient low-sulfur fuel available for marine purposes in 2020 if an uninterrupted supply of fuel to all other sectors of the global economy is to be maintained. Lars Rob-

ert Pedersen, Deputy Secretary General of BIMCO, stated: “It is clear that the IMO study is flawed, meaning it is not possible to determine from the study that there would be sufficient fuel available in 2020. On that basis, our opinion is that it was irresponsible for IMO to make the decision to go for 2020 at MEPC 70. There is clearly a need for additional analysis to ensure the supply chain for global trade is not seriously disrupted and developing nations are not hit hard by a lack of affordable energy.

“This is not about the cost of low-sulfur fuel for ships – that has long been known,” Pedersen continued. “We know

that the shipping industry will buy the fuel they need. But if it is in short supply, the cost will rise not just for shipping but for all users of the fuel. This will price those in poorer economies out of the market. “It’s a complex issue – but the difficulties in ensuring sufficient refinery capacity and the disruption caused by an overnight introduction have to be thoroughly taken into account.”

The Current Position

Regulations governing sulfur oxide emissions from ships are included in Annex VI to the International Convention for the Prevention of Pollution from

Ships (MARPOL Convention). The Annex sets progressively stricter regulations in order to control emissions from ships, including sulfur oxides (SOx) and nitrous oxides (NOx), which present major risks to both the environment and human health.

The date of 2020 was agreed by the Convention participants in amendments adopted in 2008. When those amendments were adopted, it was also agreed that a review should be undertaken by 2018 in order to assess whether sufficient compliant fuel oil would be available to meet the 2020 date. If not, the date could be deferred to 2025. The review, which



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The agenda will also include the Global Shipbuilding Executive Summit (*by invitation only*), an International panel of shipbuilding experts, and the popular Point-Counter-Point panel. In addition, TSS 2017 will feature a naval engineering heritage lecture which will highlight the experiences and opinions of one of our great naval engineers.

Day 1- will focus on technical papers, the young professionals program kick-off and an evening exhibit hall reception.

Days 2 & 3- will focus on the systems and the programs designing and procuring them.

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“It is not possible to determine from the study that there would be sufficient fuel available in 2020”

BIMCO



Photo: BIMCO

Lars Robert Pedersen, Deputy Secretary General, BIMCO

concluded that sufficient compliant fuel oil would be available to meet fuel oil requirements, was completed in 2016 and submitted to MEPC 70, thus forming the basis of IMO's decision to reduce the cap to 0.5% by 2020, a significant reduction on the current maximum sulfur content limit of 3.5%, which has been in effect since January 1, 2012. The interpretation of “fuel oil used on board” includes fuel used in main and auxiliary engines and boilers, however exemptions are provided for situations involving the safety of the ship or saving life at sea, or if a ship or its equipment is damaged.

Ships can meet the requirement either by using low-sulfur fuel oil or by using gas as a fuel, which, when ignited, emits negligible amounts of sulfur oxides, an option being adopted by an increasing number of ships. This has been recognized in the development by IMO of its International Code for Ships using Gases and other Low Flashpoint Fuels (the IGF Code), which was adopted in 2015. Another alternative fuel is methanol, which is being used on some short sea services.

Ships may also meet the SO_x emission requirements by using approved equivalent methods, such as exhaust gas

cleaning systems or ‘scrubbers’, which ‘clean’ the emissions before they are released into the atmosphere. In this case, the equivalent arrangement must be approved by the ship's administration (the flag state).

The new global cap will not change the limits in SO_x Emission Control Areas (ECAs) established by IMO, which has been 0.1% m/m since January 1, 2015. The ECAs established under MARPOL Annex VI for SO_x are: the Baltic Sea area; the North Sea area; the North American area (covering designated coastal areas off the US and Canada);

and the US Caribbean Sea area (around Puerto Rico and the US Virgin Islands).

Support for IMO

Contrary to BIMCO's reaction, the IMO proposals have been welcomed by the European Community Shipowners' Associations, its Secretary General, Patrick Verhoeven, commenting: “These important decisions demonstrate the global leadership of IMO on regulation of ship emissions. The mandatory GHG data collection system will make it possible to define what will be the contribution of international shipping

“There is now new impetus to resolve the structural and commercial obstacles hindering the widespread adoption of LNG as marine fuel”



Peter Keller, Chairman, SEA\LNG

to the climate goals set by COP21 in Paris last year. The adoption of an initial strategy to meet the Paris targets is already planned for 2018 and an agreement on targets and measures, including an implementation plan, will come about in 2023 once real-time data have been analyzed. It is important that IMO member states agreed that work on emission reductions and further measures will already start now, in parallel to the process of data collection and analysis. This way we do not lose time.

“It is good news that IMO took a decision on the global deadline as shipown-

ers need certainty. Year 2020 is tomorrow however, so we have to speed up work on implementation. In particular, we have to ensure that there is quality fuel available everywhere in the world and that adequate enforcement measures are in place to ensure a global level playing field”, he added.

“Today’s decision on the roadmap for developing a comprehensive IMO strategy on reduction of GHG emissions is a logical follow-up to technical and operational measures taken earlier such as the Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Manage-

ment Plan (SEEMP) adopted in 2011 to ensure that ships will be more CO2 efficient in the future,” he concluded.

Multi-industry coalition SEA\LNG also welcomed the proposals, saying it “applauded” the action taken by the IMO at the MEPC 70 meeting and that “certainty of the regulatory regime going forward is important for the maritime industry.”

The organization’s Chairman, Peter Keller, stated: “In light of MEPC 70’s approval of the global sulfur cap in 2020, there is now new impetus to resolve the structural and commercial obstacles hin-

dering the widespread adoption of LNG as marine fuel. We expect increased and significant investments across the shipping value chain as a result of this decision and the certainty it provides. LNG is an economic, clean and safe marine fuel with increasing global availability, offering shipowners a real opportunity to improve the environmental performance of the industry.”

SEA\LNG also stated that for those with concerns about the availability of low-sulfur fuel, the LNG sector is well prepared and will be able to meet the future emissions limits required by IMO.

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NASSCO

Balancing Commercial, Navy Work

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Offshore Ports



Name: **Ethane Crystal**

World's Largest Ethane Carrier

Builder: Samsung Heavy Industries

Owner: Reliance Industries, Ltd.

The world's first very large ethane carrier (VLEC), Ethane Crystal, has been delivered to India's Reliance Industries Ltd. by South Korean shipbuilder Samsung Heavy Industries (SHI).

The vessel is now the world's largest, purpose-built ethane carrier – comparable in size to today's very large gas carriers (VLGC) – and with its 87,000 cu. m. cargo carrying capacity, represents a significant step up from the largest ethane carriers delivered to date: the 37,000 cbm Navigator Aurora and Navi-

gator Eclipse.

With a larger size that supports a more efficient operation that helps make large-scale ethane transportation more economically viable, the VLEC Ethane Crystal was built to serve trade routes between North America and India, carrying ethane that will be used as feedstock for petrochemical production.

The first of its kind to be constructed with a specially designed GTT Mark III membrane cargo containment system, the state-of-the-art liquefied gas carrier

is able to transport both ethane and liquefied petroleum gas (LPG) cargoes.

"Ethane Crystal is the world's largest ethane carrier, featuring multi-cargo capability of ethane and LPG based on an eco-friendly design," said Mun Keun Ha, EVP-Shipbuilding Drilling Operation, SHI.

"We are proud to be the builder for Reliance's newbuilding program and believe that Ethane Crystal, successfully delivered on November 9, will be the vanguard for boosting India's petro-

chemical industries."

Demand for Ethane Crystal and other ethane carriers currently on order is driven by a surplus of ethane produced as a byproduct of shale oil and gas in North America.

ABS, which classed Ethane Crystal and served as a technical advisor alongside the owners, shipyard, designer and port and flag state teams throughout its development, said the ship is the first of six VLECs scheduled to be delivered under ABS Class through 2017.



(Photo: SHI)

Name:

M/V AUTO Eco

Builder:

World's First Dual Fuel LNG PCTC

Kawasaki Heavy Industries @ NACKS in China

Owner:

United European Car Carriers (UECC)

M/V Auto Eco

- 181 m long
- The world's first, largest dual-fuel LNG PCTC
- Biggest ever 1A super Finnish/Swedish ice class PCTC
- 4000 car capacity
- LNG fuel/marine gas oil/heavy fuel oil capable
- 14 day sailing capacity on LNG fuel



(Photo: UECC)

United European Car Carriers (UECC), which is jointly owned by Nippon Yusen Kabushiki Kaisha (NYK) and Wallenius Lines, held a naming ceremony for the M/V Auto Eco, a historic ship in that it is the first of two dual fuel LNG PCTCs with 1A Super Finnish/Swedish ice class. The world's first dual fuel LNG PCTC M/V Auto Eco had her formal naming ceremony at the Port of Zeebrugge, Belgium on November 21, 2016.

Dignitaries attending the event including: Mrs. Claire Tillekaerts, CEO of Flanders Investment & Trade, is The

Godmother of M/V Auto Eco; Mr. Geert Bourgeois, the Minister-President of the Government of Flanders, Flemish Minister for Foreign Policy and Immovable Heritage; Mr. Philippe De Backer, Secretary of State for the Belgian North Sea Coast; Mr. Reneet Landuyt, Mayor of Brugge; Mrs. Ingrid Schulerud, Norwegian Ambassador to Belgium; Mr. Masafumi Ishii, Japanese Ambassador to Belgium; and, Mr. Joachim Coens, President - Managing Director, Port of Zeebrugge. "On March 6, 2014, in Oslo UECC signed a contract to build two

dual fuel PCTCs with Kawasaki Heavy Industries at the NACKS yard in China," said Glenn Edvardsen, CEO, UECC. "This was the start of an incredible journey - to construct the most technically advanced PCTC ever built, where the LNG installation would be a pioneering design and one of the largest employed on any commercial vessel, and the largest yet of its kind on a pure car and truck carrier. It is the first PCTC of its kind in the world to be fitted with a dual-fuel LNG propulsion system, allowing it to complete a 14-day round -trip voyage

solely on LNG without refueling. Auto Eco not only meets existing emissions regulations but also exceeds them, allowing her to trade in any Environment Control Area, worldwide."

To make sure the vessel can trade safely in icy waters, Auto Eco has been constructed to meet the highest ice class standard: Super 1A Finish /Swedish Ice Class. She may be scheduled to trade in the Baltic Sea, but Auto Eco is capable of sailing just about anywhere – including the Northeast or Northwest Passage if ever called upon."

Greenland LNG powered cement carrier

Dutch shipbuilder Ferus Smit delivered what it is calling the world's first LNG-powered cement tanker, MV Greenland. The delivery was preceded by an extensive program of trials and tests in which the proper working and safety of all systems was verified. On December 23, MV Greenland left the harbor of Delfzijl on its first commercial voyage to Rostock where it was scheduled to receive its first cement load. M.V. Greenland is a dedicated cement carrier build for the joint venture JT Cement, in which Erik Thun AB cooperates with KG Jebsen Cement from Norway.

According to the shipbuilder, the vessel is the first ever dry cargo vessel with an LNG fueled propulsion system and LNG tanks integrated inside the hull. The design incorporates a pressurized LNG tank positioned in the foreship. The cement cargo system consists of a fully automated cement loading and unloading system, based on fluidization of cement by means of compressed air. The cement can be loaded and unloaded fully enclosed through pipes, thus dust-free.



(Photo: Ferus Smit)

Name:

Lindanger

World's First Methanol Fueled Tanker

Builder: Hyundai Mipo Dockyard

Owner: Westfal-Larsen

Launched at the Hyundai Mipo dockyard in Ulsan, South Korea, the newly built Lindanger has become the world's first methanol fueled ocean-going vessel. The ship is the first of two dual-fueled 50,000 dwt tankers owned by Norwegian firm Westfal-Larsen that will be chartered to global marine transportation company Waterfront Shipping.

With a MAN designed Hyundai-B&W 6G50ME-9.3 ME-LGI dual-fuel, two-stroke engine on board, the Lindanger can run on methanol, fuel oil, marine diesel oil or gasoil. Lindanger has been

assigned the additional notation LFL FUELLED to demonstrate its compliance with the DNV GL rules for low flash point marine fuels. "We are very pleased to see the completion and launch of this exciting and innovative new-building," said Knut Ørbeck-Nilssen, CEO at DNV GL – Maritime. "This is the first time a dual-fuel engine with a Low Flashpoint Liquid (LFL) fuel system has been installed on an ocean-going vessel and it is a testament to the excellent cooperation between all the project partners that we have been able to com-

plete this unique project and gain flag state approval. Methanol as a marine fuel is a very promising option to enable owners to reduce the environmental impact of their vessels and to comply with low sulfur and ECA regulations and we look forward to working on many more projects using this innovative marine fuel and technology."

Lindanger is the first in a series of seven vessels which will be chartered by Waterfront Shipping over the course of 2016. Four of the seven vessels are being built to DNV GL class, including

two vessels owned by Westfal-Larsen, the Lindanger and a sister ship, and two owned by a joint venture between Marininvest/Skagerack Invest and Waterfront Shipping. Three additional ships, where DNV GL carried out a hazard identification study, will be owned by Mitsui OSK Lines (MOL). Waterfront is a wholly-owned subsidiary of Methanex Corp, the world's largest producer and supplier of methanol, and operates a fleet of 22 deep sea tankers of between 3,000 dwt and 50,000 dwt, which are used for transporting methanol worldwide.

Lindanger Main Particulars:

Type	Tanker for chemicals and oil products with LFL fueled engine
LOA	186 m
LBP	177 m
Breadth	32.2 m
Depth	19.1 m
Draft	12.85m
Deadweight	49,999 dwt
Speed	15.8 knots
Main engine	Hyundai-B&W 6G50ME-9.3 LGI (Tier II)
Output	10,320 kW at 100 rpm



(Photo: Hyundai Mipo)

Name:

NYK BLUE JAY

Builder:

Marine United Corporation

Operator:

Nippon Yusen Kaisha

Propulsion "World First"

NYK Blue Jay Main Particulars

Builder	Marine United Corp.
Owner	NYK
Length	364m
Width	50.6m
Load draft	15.8m
Main engine	Wärtsilä 9X82



[Photo: NYK]



[Photo: Winterthur Gas & Diesel Ltd.]

Japan Marine United Corporation delivered the 14,000 TEU container ship NYK Blue Jay, which is chartered by Japanese shipping company Nippon Yusen Kaisha (NYK), the first of 10 that the shipyard is building for NYK for operation on the Asia-European shipping lanes. While on the outside NYK Blue Jay may appear a standard container ship, inside it is anything but standard as it houses a world first in marine power: a dual-rated Wärtsilä X82 diesel engine designed by Winterthur Gas & Diesel (WinGD) in Winterthur, Switzerland,

and manufactured by Diesel United Ltd. in Japan, which means the engine and ship can respond more quickly to changing market conditions. "This engine was originally designed for the VLCC tanker market. But with the change of the trading pattern in container shipping, with slower speeds, different engines were required. It became suitable for large containerships after a revision of certain technical features," said Rolf Stiefel, Vice President Sales & Marketing, Winterthur Gas & Diesel Ltd. "By doing the revisions of these features we developed

a dual rating, which is offering the ship owner the possibility to adapt the engine to different trade patterns (speed). With this dual rating we can also make the engine very fuel efficient at these slower speeds. That is the benefit we're offering with this engine." In spite of its smaller capacity, the new container ship series is designed to be able to compete in terms of operating economy with new generation of ultra large container vessels carrying around 20,000 TEU. The advanced propulsion concept includes a narrow dimensioned engine room allowing a hull

design with exceptional hydrodynamic efficiency. And of course the central attraction is the Wärtsilä brand Generation X two-stroke diesel engine, the 9-cylinder Wärtsilä X82.

Specifically designed and developed by WinGD to meet ship owners' demands for the lowest total cost of ownership (TCO), the Generation X diesel and dual-fuel engines are conceived for maximized vessel payloads combined with low fuel consumption and emissions and for rational, economic production by WinGD's licensees.

Texas LNG-ready tanker for Crowley

Crowley Maritime Corp. took delivery of Texas, the second of four new Jones Act product tankers from Philly Shipyard, Inc. (PSINC). The 50,000 dwt, 330,000-barrel Texas joins sister ship Ohio, which was received by Crowley in October, as the first ever tankers to receive the ABS LNG-Ready Level 1 approval, meaning Crowley has the option to convert the tanker to liquefied natural gas (LNG) propulsion in the future. The remaining two product tankers being built by PSINC (formerly known as Aker Philadelphia Shipyard, Inc.) for Crowley are under construction with planned deliveries in 2016. The new 50,000 dwt product tankers are based on a Hyundai Mipo Dockyards (HMD) design which incorporates numerous fuel efficiency features, flexible cargo capability and the latest regulatory requirements. The vessel is 600 ft. long and is capable of carrying crude oil or refined petroleum products. Crowley's Seattle-based, naval architecture and marine engineering subsidiary Jensen Maritime provided construction management services for the product tankers.



[Photo: Crowley]

Name: **Carnival Vista**

New, Largest Flagship of Carnival Cruise Lines

Builder: Fincantieri Monfalcone

Owner: Carnival Cruise Lines

Carnival Vista is the new flagship of the fleet of Carnival Cruise Line, brand of the Carnival Group, delivered from Fincantieri's shipyard in Monfalcone. With its 133,500 gross tons and 323 meters in length, Carnival Vista, which flies the Panama flag, is not only the 13th ship built so far by Fincantieri for the fleet of Carnival Cruise Line, but also the largest. It has 1,967 passenger cabins, 785 for the crew, and it is able to accommodate 4,977 passengers on board, with a

total capacity of over 6,400 people, including the staff.

The vessel offers a wide range of on-board entertainments, such as an IMAX 3D cinema, a 5D cinema, a brewery with onboard craft beer production, restaurants, theaters, shops and wellness centers. Some of Carnival Vista's innovations are an open-air bike course at 45 meters above sea level, the fleet's biggest waterpark, the WaterWorks, with a 137-m waterslide. Carnival Vista fea-

tures the Havana Area, a themed private and exclusive area, with cabins, open bars and an Infinity Pool. The access to this area is limited, during the day, only to those passengers whose cabins are in the Havana Area.

The new ship is built according to the latest navigation regulations and equipped with the most modern safety systems, including the "Safe return to port".

Furthermore, it features technologies

for energy saving and for meeting environmental regulations with energy-efficient engines and an exhaust gas cleaning system. Lloyd's Register bestowed the "ECO Notation" designation on the new Carnival Vista, marking the first Carnival Cruise Line ship to achieve this distinction. The notation recognizes that the cruise line designed, built and operates Carnival Vista in a manner that exceeds current maritime statutory environmental regulations.



(Photo: Carnival Cruise Lines)

Name:

SUNRAY

Builder:

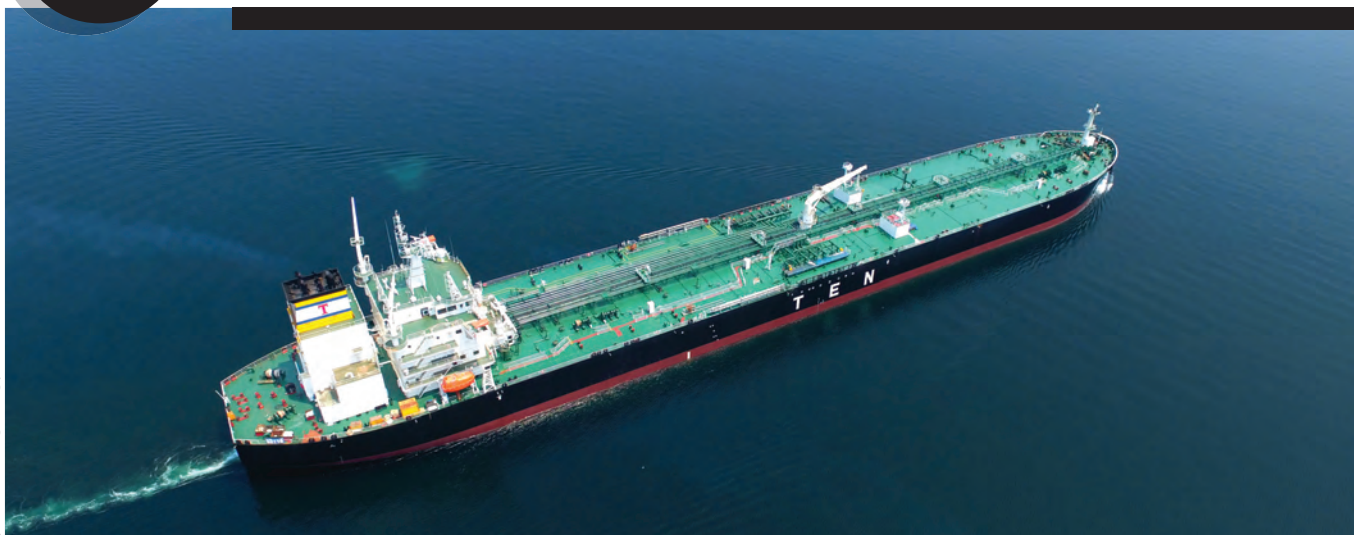
First of Two Dual Class Tankers for TEN

SungDong Shipbuilding & Marine Engineering Co., Ltd.

Owner:

Tsakos Energy Navigation Ltd.

Photo: SungDong



Sunray is the first vessel in a series of two LR I Product oil Carrier, built by SungDong Shipbuilding & Marine Engineering for Tsakos Energy Navigation Ltd. The vessel is built under the survey of Dual Class (ABS and KR) and designed in accordance with IACS Common Structure Rule. The vessel features a double side skin and has a flush deck, bulbous bow, transom stern, open water type stern frame, semi-balanced rudder and single propeller driven by a slow speed diesel engine. The main engine MCR of MAN 6G60ME-C9.5 with Low

Load EGB tuning Tier II is de-rated to 10,215kW at 77rpm for economy fuel oil consumption. The speed of the vessel at design draft (12.2m) is 14.5 knots at NCR with 15% sea margin based on well optimized hull form and propeller design which had been analyzed by CFD(Computational Fluid Dynamics)."

Electric power is generated from three diesel generators driven by alternator with 960kW output and steam is generated by two auxiliary boilers of with capacity of 20,000 kg/hr. and one composite boiler with capacity of 1,500kg/h (Oil

fired section). In addition, this vessel is carried out the trim optimization model test and installed OBFC (Optimum Ballast for their lowest Fuel Consumption) software for trim optimization in loading computer. It is possible to sail at optimized ship condition and to enhance the fuel efficiency. The vessel has six pairs of cargo oil tanks, two slop tanks, one residual tank, fore and aft peak tanks, six pairs of segregated water ballast tanks, fuel oil tanks and fresh water tanks. Cargo tanks are divided by plane type transverse and longitudinal bulkhead. The

Sunray Main Particulars

Type	75,000 dwt Product Oil Carrier
Length, o.a.	228m
Length, b.p.	219m
Beam	32.24m
Depth	20.9m
Draft, Td	12.2m
Draft, Ts	14.45m
DWT, Design	58,914t
DWT, Scantling	74,114t
Gross Tonnage	42,290t
Speed	14.5 knots
Flag	Liberia, Monrovia
Classification	ABS/KR
IMO No.	9761944
Main Engines	MAN B&W/6G60ME-C9.5/10,215kW x 77rpm
Generators	HHI
Propulsion/Propellers	HHI
Fuel Consumption (t/d)	25
Cargo capacity (cu. m.)	84,850
Bunkers(cu. m.), heavy oil	1,150
Bunkers(cu. m.), diesel oil	750
Deck Machinery	Macgregor Pusnes/Elec-Hyd. Deck machinery/Two Windlass (FWD), Six Mooring Winch
Ballast Treatment	Erma First

Water ballast system is designed to be environmentally friendly by one ballast water treatment which have a capacity of 3,000 cu. m./hr. by electrolysis type that service ballast tanks of the vessel. The vessel is fully considering latest environmental guidelines such as fuel oil protection, Inventory of Hazardous Materials for ship's recycling, Performance Standard for Protective Coating(PSPC) and IMO Tier II NOx requirement. The vessel also has a specific reinforced part of upper deck for installing LNG tank in accordance with ABS Guidelines.

Milos**Suezmax crude oil tanker**

Photo: SungDong

Milos is the first vessel in a series of two Suezmax Crude Oil Tanker, built by SungDong Shipbuilding & Marine Engineering for Kyklades Maritime Corporation. The vessel is built under the survey of Lloyd's Register and designed in accordance with IACS Common Structure Rule(CSR). The vessel features a double side skin and has a flush deck, bulbous bow, transom stern, open water type stern frame, semi-balanced rudder and single propeller driven by a slow speed diesel engine. The main engine MCR of Wartsila 6X72 with delta by-pass tuning Tier II is de-rated to 15,088kW at 71.8 rpm for economy fuel oil consumption. The speed of the vessel at design draft (16m) is 14.2 knots at NCR

with 15% sea margin based on well optimized hull form and propeller design which had been analyzed by CFD (Computational Fluid Dynamics).

Electric power is generated from three diesel generators driven by alternator with 980kW output and steam is generated by two auxiliary boilers of with capacity of 35,000 kg/h and one composite boiler with capacity of 1,200 kg/h (Exh. gas section) and 1,800kg/h (Oil fired section).

The vessel has six pairs of cargo oil tanks, two slop tanks, fore and aft peak tanks, segregated water ballast tanks, fuel oil tanks and fresh water tanks. Cargo tanks are divided by plane type transverse and longitudinal

bulkhead. Cargo handling is performed by three cargo oil pump of 4,000 cu. m./hr., driven by steam turbine. Water ballast is handled by two ballast pump, driven by electric motor. The water ballast system is designed to be environmentally friendly by one ballast water treatment which have a capacity of 4,000 cu. m./hr. for main and 300 cu. m./hr. for APT by electrolysis type that service ballast tanks of the vessel.

The vessel is fully considering latest environmental guidelines such as fuel oil protection, Inventory of Hazardous Materials for ship's recycling, Performance Standard for Protective Coating (PSPC) and IMO Tier II NOx requirement.

Name: **Polaris**

World's First LNG-Powered Icebreaker

Builder: Arctech Helsinki Shipyard

Owner: Finnish Transport Agency

A

Arctech Helsinki Shipyard delivered the most powerful newcomer in the Finnish Icebreaker fleet, Polaris, to the Finnish Transport Agency. The Finnish Transport Agency handed the vessel over to Arctia Icebreaking Oy. The prototype vessel built at Helsinki Shipyard is designed to serve for at least 50 years in icebreaking, oil recovery and sea rescue ops. Icebreaker Polaris is a continuation of Finnish ship design and construction for work in what is arguably the most harsh of all maritime environments. Innovative design is used for the vessel's hull form and propulsion unit arrangement, and the vessel is able to use either LNG or low sulfur diesel oil as fuel. The vessel complies with the international IMO Tier III emission standards and special requirement for Sulfur emissions in the Baltic Sea. The vessel is equipped with three Azipod propulsion units rotating 360 degrees, enabling excellent maneuverability. The icebreaking capacity of Polaris is 1.8 m at speed of 3.5 knots.

Polaris' Main Particulars

Shipyard	Arctech Helsinki
Length:	110 m
Breadth:	24.4 m
Draft, design:	8 m
Speed:	17 knots
Gross Tonnage:	9300
Deadweight:	3000 t
Crew:	16 (+8)
Classification:	Lloyd's Register
Ice class:	PC4
Diesel-electric propulsion	
Main engines	Wärtsilä 2x 6000 kW, 2x 4500 kW, 1x 1280 kW, Dual fuel
Azimuth prop. units	ABB Azipod 2x 6500 kW (stern), 1 x 6000 kW (bow)
LNG tanks:	2 x 400 m ³
Oil recovery capacity:	1400 cu. m.
Towing winch:	300 m, 110 t
Bollard pull:	214 t
Icebreaking capability	1.8 m @ 3.5 knots
Customer:	Finnish Transport Agency



Name: **Seri Camellia**

New LNG Carrier for MISC Berhad

Builder: Hyundai Heavy Industries

Owner: MISC Berhad

Seri Camellia is the first in a series of five 150,200 cu. m. Liquefied Natural Gas (LNG) MOSS-Type LNG carriers built for MISC Berhad (MISC), ordered from Hyundai Heavy Industries Co., Ltd. (HHI). Upon delivery, these new LNG Carriers will be chartered to PETRONAS for the next 15 years.

It is a historic occasion for MISC as Seri Camellia will be part of the new generation of the Seri C Class LNG fleet, comprising MOSS-Type vessels that provide a more robust and superior

cargo containment system and ensuring a higher degree of operational flexibility for MISC to operate in harsh meteorological conditions.

The new generation of LNG carriers incorporate state-of-the art technologies in various forms including the Integrated Hull Structure (IHS) with four spherical tanks shielded by the continuous cover, which improves the overall structural strength of the hull.

Additional green technology features adopted for these new carriers include

energy efficiency, emissions reductions, biodiversity management and end-of-life disposal. These features also include the installation of the Selective Catalytic Reduction (SCR) system for the diesel generator to comply with the latest IMO Tier III requirement and the Ozone Ballast Water Treatment System. The carriers will be powered by an Ultra Stream Turbine (UST) plant, and installed with pre-swirl duct and Propeller Boss Cap Fin (PBCF).

The MOSS-Type newbuilds are part of

MISC's long term fleet expansion program to cater to the energy transportation needs of PETRONAS. They have been designed for worldwide trading capability to enable them to call at all major LNG terminals in the world.

MISC is one of the world's largest single owner-operators of LNG vessels and for over three decades, have safely delivered more than 400 million tons of LNG. In 2015, MISC delivered 20.74 million tons of LNG, carving 8.3% of the total world LNG trade.



(Photo: MISC Berhad)



Citywide Ferry Takes Shape @ Metal Shark

One of the most exciting boatbuilding projects is taking shape at both Horizon Shipbuilding and Metal Shark, the contract to build a fleet of new ferries for New York City. In the December 2017 edition we will publish our interview with Cameron Clark, SVP of Development and Project Manager for Citywide Ferry by Hornblower. Until then, here is a photo of the vessel under construction at Metal Shark.

Main Particulars

Material:	Marine grade aluminum
Length, Beam, Depth:	85 x 26 x 8'
Draft (empty):	3'
Draft (max):	6'
Freeboard:	5'
Tonnage:	< 100 tons
Weight (Lightship)	103,617 lb
Fuel:	(2 x 750 gal)
Hull:	Round chine catamaran
Fresh Water:	200 gal
Flag:	United States
Survey:	USCG/Subchapter T
Emissions:	EPA Tier III
Operating Speed:	25 knots
Propulsion:	2x Baudouin
Range:	400nm
Designer:	Incat Crowther

GREAT SHIPS OF 2016

(Photos: General Dynamics NASSCO)



Perla Del Caribe for TOTE



Constitution for SEA-VISTA LLC



Independence for SEA-VISTA LLC

General Dynamics

NASSCO Enjoys a Record Year

San Diego yard delivers a '6-pack' in 2016: 5 tankers, 1 container ship

General Dynamics NASSCO fits a lot of activity on its 86 acres, a shipyard which deftly balances commercial and navy work, newbuild and repair. Last month we visited with **Kevin Mooney**, Vice President, Programs and Supply Chain Management, for his insights on how NASSCO delivered a record six ships in 2016.

By Greg Trauthwein

While many global shipbuilding entities suffer through the worst new build drought in a generation, General Dynamics NASSCO logged a record year for deliveries in 2016 and gearing up for two major new build programs. "This has been a historic year for NASSCO," said Mooney, the man in charge of new-build programs and the entire supply chain management. "In the first six months of this year we have delivered six ships, the most we have ever had."

Mooney is an industry veteran with more than 30 years experience, 20 years spent in the U.S. Navy as an officer on a nuclear submarine, the last 10 plus years at NASSCO serving many roles while ascending the corporate ladder. He summarized the yard's workload as such:

- NASSCO is finishing an eight ship tanker program, with number seven and eight coming by mid-2017.
- NASSCO completed a program for TOTE, the construction of the world's first two LNG containerships.
- NASSCO recently won a contract to build two new ConRo ships for Matson.
- It recently started building the fourth ship, and in early 2017 will start building the fifth and last ship for the U.S. Navy ESB program.
- It was contracted by the U.S. Navy to design and build six (one firm, five options) oilers for the fleet, the TAO program. The contract will likely include 17 ships in total. Construction on the first ship starts in 2018.
- NASSCO is conducting studies for the navy on an amphibious ship series, the LXR program.
- Last, but certainly not least, NASSCO is gearing up to compete for the new United States Coast Guard Polar Icebreaker construction contract.

The Tankers

"Our ECO tanker program is winding down, as we



Kevin Mooney

just delivered Constitution, the sixth ship in the class, our fifth tanker delivered this year," said Mooney. The tankers are being built for two owners, American Petroleum Tankers (APT) (owned by Kinder Morgan) and SEA-Vista LLC.

"By June of next year the tanker program will be complete, and we will have delivered eight tankers over a period of about a year and a half."

From a construction standpoint, the eight ships in the ECO Tanker series are similar to a tanker series NASSCO built 10 years ago, said Mooney. But from a ship capability standpoint, "these ships are significantly better," pointing to a better main engine, better hull form and a more efficient propulsion system – up to 30% more efficient – as points of differentiation.

The Containerships

From the time the contract was announced, the quest to build the world's first LNG fuelled containerships was monitored closely by the world. "From a shipbuilding performance perspective, when we built the LNG containerships (for TOTE), that was a case where we had to do some things we had never done before," said Mooney. For example the ships sport a large main engine which had to be shipped over from Korea in three pieces and assemble it in the yard, on the ship. Mooney also pointed out that "dimensional control for containerships is absolutely critical, with the cell guides for the containers and the hatch covers. Our accuracy was as close to perfect as you can be. We had zero leakage on the hatch covers, and when we put containers up and down on the cell guides, we had zero rework throughout our cell guide testing. We are really proud of those ships."

Heavy Metal

All of this shipbuilding activity demands steel, and lots of it.

According to Mooney, in 2015 and 2016 the shipyard processed more than 60,000 tons of steel per year, a nearly 3x increase from 2014. NASSCO, like most shipyards, is in perpetual investment mode, fixing, updating and finding new technology to make its operations more efficient. To that end, the company broke ground earlier this year on a new Prime Line, "a gateway piece of equipment for the shipyard" that Mooney said will operate about 30 percent faster processing steel, improving its blast and paint quality, giving the ability to handle larger plates and eliminating nearly all sources of emission. The new Prime Line will be enhanced with an investment in a new crane in the steel-yard to be replaced.



From left: Magnolia State, Garden State and Bay State, all built by NASSCO for American Petroleum Tankers (APT).

NASSCO “Great Ships” of 2016

The Five Eco Class Tankers

Names: Bay State, Magnolia State, Garden State
Owner: American Petroleum Tankers (APT)

Names: Independence, Constitution
Owner: SEA-Vista LLC

The 50,000 DWT ECO Class design product tankers measure is a 610-ft.-long, are LNG-conversion-ready with a 330,000 barrel cargo capacity. The ECO Class tanker is one of the most fuel-efficient and environmentally friendly tankers in the world and symbolizes the emerging future of green shipping, with a 33 percent fuel efficiency improvement compared to product tankers built only a few years ago.

The ships were designed by DSEC, a subsidiary of Daewoo Shipbuilding & Marine Engineering (DSME) of Busan, South Korea. The design incorporates improved fuel efficiency concepts through several features, including a G-series MAN ME slow-speed main engine and an optimized hull form. The tankers will also have dual-fuel-capable auxiliary engines and the ability to accommodate future installation of an LNG fuel-gas system.


The ECO Class are the first in the Jones Act fleet to obtain a PMA+ Notation from the American Bureau of Shipping (ABS), representing compliance with one of the highest standards of human factors in engineering design. The PMA+ notation is created to facilitate safe access to vessel structure and spaces in ways that are rooted in the fundamentals of human ergonomics.

The LNG Fuelled Containership

Name: Perla Del Caribe
Owner: TOTE Maritime

NASSCO delivered the world’s second containership to be operated by liquefied natural gas (LNG), the Perla Del Caribe. The ship was delivered two months ahead of schedule and is the sister ship of the world’s first LNG-powered containership, the Isla Bella, also built by NASSCO for TOTE Maritime.

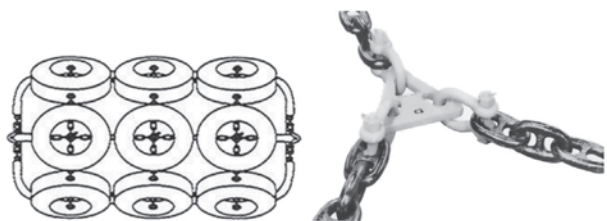
As part of a two-ship contract signed in December 2012 with TOTE, the 764-ft. long Marlin Class containerships will be the largest dry cargo ships powered by LNG. The two ships serve the U.S. to Puerto Rico trade route for TOTE.



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Interview:

Mika Koli, The Switch

Business Development Manager, The Switch – a Yaskawa Company



(Photo: The Switch)

The Switch is a 10 year old company working to advance the world with electrical drive train technology. It is still a relative new player in the global maritime sector with nearly four years of experience, but its first reference ships with The Switch technology onboard are starting to ply the world's waterways – including one of this year's "Great Ships of 2016," Ternsund. Maritime Reporter & Engineering News met with Mika Koli, Business Development Manager, for his insights on The Switch and its future in maritime.

By Greg Trauthwein

Concisely describe "The Switch."

The Switch is a specialist in advanced drive train technology, a manufacturer of permanent magnetic motors and frequency converters. We have been active in this for 10 years, to start in the wind power industry. The company has an installed base of over 11 GW of megawatt-class permanent magnet machine and power converter packages. The main focus areas are wind, marine and special industrial solutions.

What was the impetus for the start of The Switch?

Wind power has been the main market to date for The Switch, but we have high expectations for the marine market for the future. We have a very promising start, and we see that there are many companies happy to see us in this space.

So how does experience in the wind power market translate to the marine industry?

We have much experience with many turbine manufacturers, and in the wind industry you have hundreds of turbine (references), so you really have to brush up your drive train and focus on efficiency. That has given us excellent back-

ground in optimizing efficiency. This is quite a good background for focusing on energy efficient solutions where cost of operations must be minimized.

Is every solution from The Switch custom created?

Previously we tailored everything, now we want to concentrate on having more efficient ways to work on smaller projects. (ie. moving away from custom design and manufacturing for each project). We want to have product standardization so that we are able to act more quickly, using modules and products that we have and then, with small tailoring, we can offer a variety of products.

Looking at the markets you serve, put the marine market in perspective.

You have to put in perspective that we started seriously in marine about three and a half years ago. Relatively, that's a short time, but now there are ships with our shaft generators sailing, which is a big achievement for us. But in this short time, we already have approximately 20 ships sold, and it is starting to grow very fast.

What type of vessels?

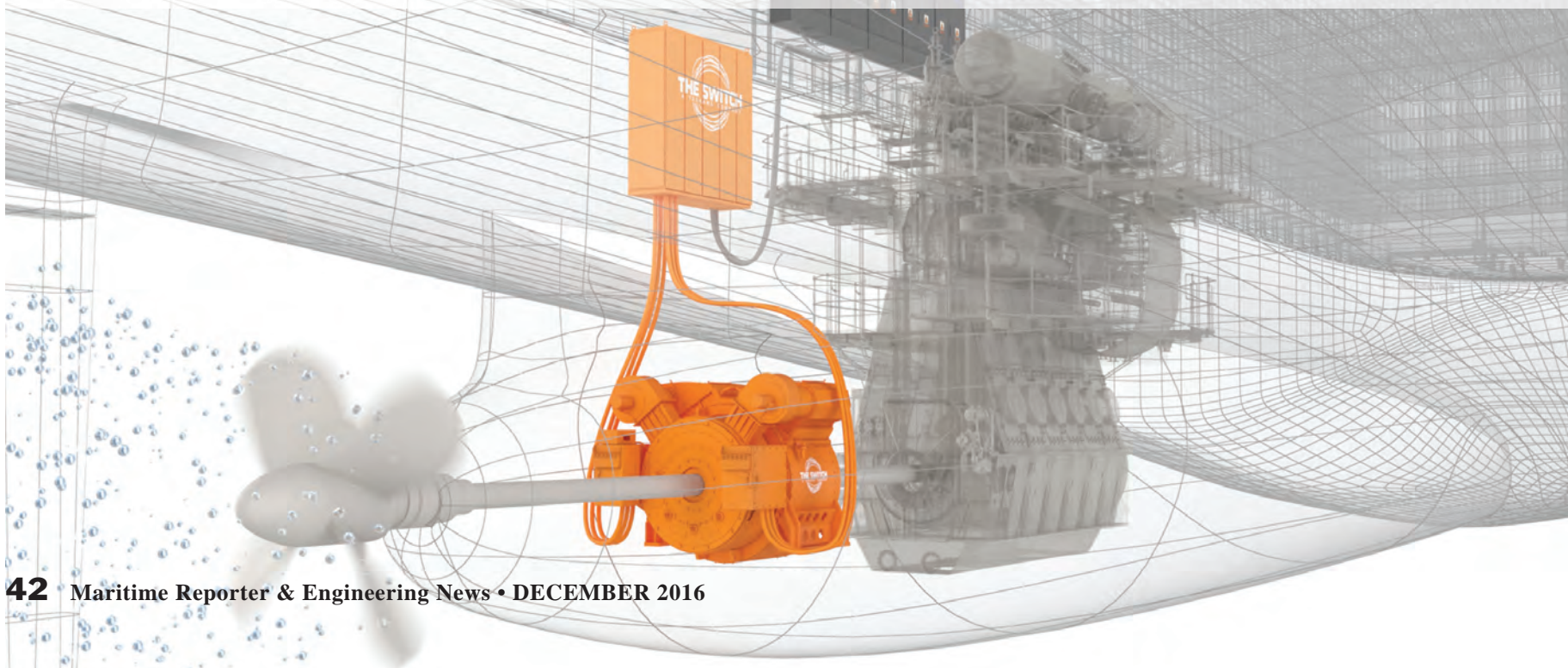
The first is the tanker M/T Ternsund, which is powered by a two-stroke LNG diesel.

If I'm a shipowner, why would I talk to The Switch?

Efficiency, fuel savings, cost of operations ... we are able to deliver equipment that will make our customers more competitive.

Most see a difficult maritime market today. Tell us how you see the market?

When times are a bit slower, people and companies tend to have a bit more time to look into new developments. When the industry is going through tough times, regardless of the oil and fuel price being low, especially then you still want to be competitive, and spending less on fuel is a good thing when the price are high or low. With our technology, ships will be future proof, giving ship owners a comparative advantage over competitors when it comes to operational costs. For example, while prices for batteries are coming down, they are not coming down perhaps as fast as some would like. With our system you have everything in place to leverage the benefits of batteries once the prices hits an acceptable.



(Photo: The Switch)

Name: Ternsund

LNG fueled tanker with Direct Drive Permanent Magnet Shaft Generator

Builder: AVIC Dingheng Shipyard

Owner: Terntank Rederi AS

The Switch has been engaged in the maritime industry for only three and a half years, but it already has approximately 20 ships in its reference list, including the first, the 15,000 dwt M/T Ternsund (featured on this month's cover) owned by Terntank, which is a fourth generation company that in 1958 was a one ship company, and today is an operator of ten modern chemical/product tankers in the range from 8,000 to 15,000 dwt.

MT Ternsund was built by Avic Dingheng Shipbuilding Co. of China, and is a Rolls-Royce Marine AS, type NVC 615 CT design ship measuring 147 x 22 x 11.7 m.

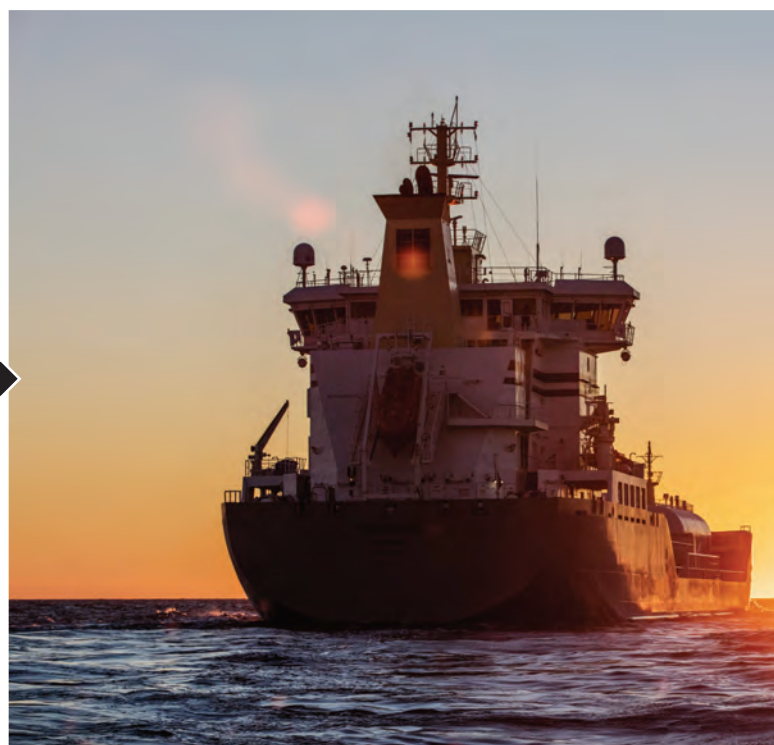
The ship is ultra modern in its choice of propulsion, power by a Wärtsilä 5RT-flex 50 DF 5.850 kW 102 RPM 2-stroke, low pressure, LNG dual-fuel main engine, with a Kongsberg fuel performance system. From The Switch it features a Permanent Magnet Shaft Generator with Variable Frequency Drive to allow running the engine/propeller in combinator mode for optimum efficiency. In total, at 12 knots, it consumes 8.9 tons of LNG per day.

WE Tech Solutions (WE Tech) announced the operational success at sea of its first Direct Drive Permanent Magnet (PM) Shaft Generator solution. Ternsund is the first in a line of four Terntank Rederi AS chemical/product tankers destined for the Baltic Sea.

"WE Tech's shaft generator solution is working well on both Ternsund and Ternfjord. Terntank has set huge expectations on this technology and believes that this will be the future for the shipping industry," said Trygve Möller, Chairman of the Board of Terntank Rederi AS and Managing Director of Tärntank Ship Management AB. "We are very happy that Ternsund and sisters now are in service and that all our expectations on emission, performance, and fuel savings has been reached," said Möller. "Even if Ternsund only has been in service a few months, we have found it to be a "happy vessel" for owners, customers and crew."

WE Drive allows the shaft generator to operate over the full main engine speed range, while generating electricity for the vessel's electrical network with high efficiency.

With the WE Drive and the Direct Drive PM Shaft Generator in Power Take Out (PTO) mode, the available power for the vessel's electrical network is up to 780 kW, generated by a fuel efficient two-stroke, low pressure, dual-fuel main engine. In this mode, the auxiliary generators are not running. In Power Take In (PTI) mode, the WE Drive converts auxiliary generator power to propulsion power by employing the Direct Drive PM Shaft Generator as a motor, with a maximum rated output of 1000 kW.



MT Ternsund	
Builder:	Avic Dingheng Shipbuilding Co. LTD,
Owner:	Terntank
Imo No	9722390
Flag	DIS
Call Sign	OWPV2
Length, o.a.	147m
Length, b.p.	143.5m
Breadth (molded)	22m
Depth (molded)	11.7m
Draft, scantling	9m
DWT (at scantling draft)	15,000
GT	11,374
Net tonnage:	4,780 t
Hull no.	AD0024
Design	Rolls-Royce Marine AS, type NVC 615 CT
Consumption 12 knots, 8.9 tonst LNG/Day	
Marine gas oil	610 cu. m.
Cargo tank capacity 98%	16.559 cu. m.
Ballast water tanks	6.636 cu. m.
LNG fuel storage tanks	630 cu. m.
Slop tanks	242 cu. m.
Tech fresh water tanks	325 cu. m.
Urea	52 cu. m.
Tank coating	MarineLine784
Cargo Pumps	Deepwell pumps type DW 200/250 multisuction. Frequency controlled 450 m3/h at 120 m.l.c.
Cargo Alarm & monitoring	Kongsberg Tank
Radar	K-Chief 600
BWT	Panasia GloEn-Patrol
Bowthruster	(1) 865 kW 60Hz.
Main Engine	Wärtsilä 5RT-flex 50 DF 5,850 kW 102 RPM 2-stroke, low pressure, LNG dual-fuel engine.
Fuel management	Kongsberg
AuxiliaryDiesel	3 x Mitsubishi MAS 850-S, 790 kW @ 1800rpm
Shaft Generator:	
The Switch Permanent Magnet Shaft Generator with Variable Frequency Drive to allow running the Engine/Propeller in Combinator mode for optimum efficiency. Rated output shaft generator PTO 780 kW / PTI 1000 kW	

Photos: Tärntank Ship Management AB

OPC: Making Naval History

In September, 2016, an U.S. shipyard and the Canadian design business of an Italian-owned Norwegian shipyard won the largest vessel procurement contract in U.S. Coast Guard history. Now, Eastern Shipbuilding will build nine — and possibly many more — Vard Marine designs in its Panama City, Fla., shipyard. Early impressions are of a unique vessel not so unlike comparable European designs by Vard Holdings or parent company Fincantieri. An oceangoing hull of clean, classic — some would say Canadian — lines are the platform for an electronics and weapons payload designed, in part, for (naval) task force command-and-control.

**By
William
Stoichevski**

There's much to do at Eastern Shipbuilding. Already, long-lead supply chain orders have gone out for the full nine cutters (one to start with options for eight more). It is understood that two more might be contracted out of a USCG goal of 25 offshore patrol cutters, or OPCs. The family owned Eastern and the globalized Vard Marine in Vancouver will first use the \$110.3 million award "to complete detail design" and start accommodating Coast Guard superintendents while perfecting drawings ahead of a building start in 2018. "Vard Marine will be responsible for the functional design of the hull structure and will retain control of the naval architecture aspects of the design through to completion of (the current) Phase II," Vard Marine president and CEO, Dave McMillan, tells Maritime Reporter. Vard and Eastern collaborated for two years to submit the USCG proposal. McMillan says there were "many components" that lead to success. His team was also tasked with the "consulting and proprietary design of the base vessel."

Eastern Vindication

For Vard Holdings, with offices in Canada and the United States, these are early returns for gaining a foothold in two North American markets with giant national shipbuilding programs underway. According to the Coast Guard, the full Phase II design-and-build award has a potential value of \$2.38 billion "if all options are exercised." Budget documents suggest that number is roughly evenly split between 2016 and 2017.

"It's the most prestigious offshore patrol project in the offshore patrol segment," said Vard executive vice-president for business development, Holger Dilling, taking time out in western Norway from Vard Holdings' financial reporting in Singapore, where they've recently listed. "We're happy with the position this gives us."

For Eastern, winning the tender is vindication for spending \$75 million dollars to upgrade and expand its fabricating capacity. The Florida builder with two shipyards in Panama City has worked with Vard Marine for a decade on successful commercial designs, especially offshore service vessels, or OSVs. For Eastern, the Coast Guard award ushers in a new era by preparing the slip for future commercial and public builds. Investments in new, modular construction has only

just added to Eastern's conventional ship assembly, tipping the scales for a Coast Guard that admittedly focused on "management". The cutter confirms Eastern facilities as "some of the most modern and efficient" in the country. Now, "Business is booming ... at never-before-seen heights," Eastern heralded in celebration. The yard has delivered 150, mostly mid-sized vessels of up to 433 ft. Their triumph comes at the expense of eight shipbuilders that provided draft OPC designs and, especially, of the shortlisted General Dynamics Bath Iron Works and Bollinger Shipyards, two veteran naval shipyards.

VARD 7 110

While Eastern has reportedly bolstered its engineering department in response to the order, Vard Holdings in Norway has hired "30 percent more naval architects and design engineers" this summer alone. Though partly cruise-ship driven, the Vard Group has delivered 300 vessels since 2000 and sees brighter days. Now with the detail design secured and the cutter project's delivery due in 2021, Dilling could safely say Vard is "entering" the offshore patrol vessel segment (OPVs).

When the list of competing designs was shortlisted to three early in 2016, the USCG said the winners would win on drawings, management, the vessel's "(re)producibility" and price. "The OPC is the most affordable way to meet the service's long-term need for cutters," United States Coast Guard Commandant Admiral Paul Zukunft is quoted as saying. Zukunft's list also included an ability to work with international players. Eastern, the commercial shipbuilder, has found partners in Vard Holdings and Fincantieri with a long CV of projects for world navies and coast guards, including the Irish, Italian, Maltese and U.A.E. McMillan said he looks forward to "supporting" Eastern in building another naval vessel, and Eastern has delivered at least one Vard Marine design every year for the past decade, a list that includes six support vessels for offshore oil and gas.

Shared Designs

Vard's McMillan confirms the VARD 7 110 OPC is the contract design selected to be the basis of the fleet, "However there is still room for changes to be made at the USCG's



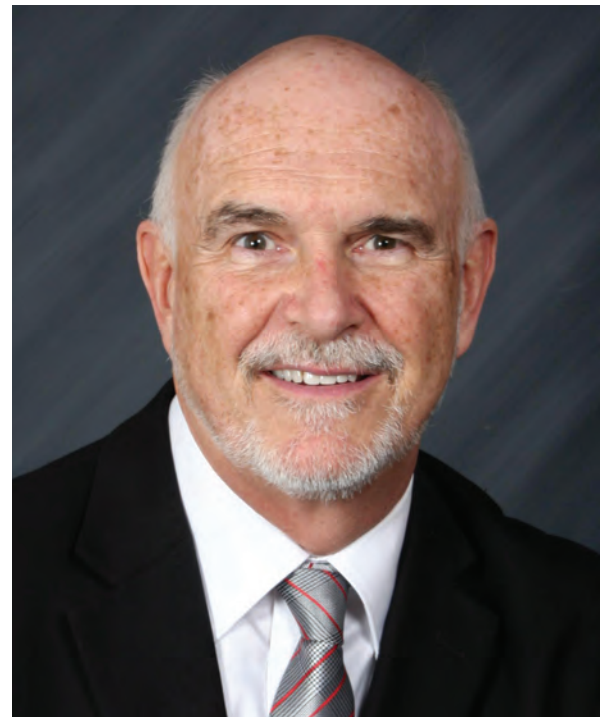
(Illustration: Courtesy Vard Holdings)



RIGHT: Winning Design: an early drawing of the USCG-select Vard 7 110 from Vard Marine and an updated version from the U.S. Coast Guard. **ABOVE: Arctic Versions:** the Canadian Navy is already studying the Vard 7 100 arctic OPV.



Photo: Dave McMillan, Vard Marine



Dave McMillan, CEO, Vard Marine

Proven Design: A Vard 7 090 with the Irish Naval Service.

discretion,” he adds. Yet, the basis of the winning design was the Vard 7 090 OPV, a 296 ft vessel capable of 23-knots and already in service with the Irish Naval Service. Three are in service and a fourth is under construction.

The Vard 7 090 does look a little more like the Vard 7 100, a 98-meter arctic OPV vessel design with serious (meter-thick ice) ice-breaking ability that makes 17 knots in open water. Zukunft’s budget suggests at least one cutter, or an immediate separate order, will be arctic capable, and Vard and Canadian engineering consultancy BMT Fleet are already understood to be working on project documents for a Canadian “arctic offshore patrol ship” of Vard 7 100 type.

Should the Coast Guard ask for specs or ideas that aid in criminal interdiction work, Vard parent Fincantieri’s own 180 ft. Diciotti and Dattilo-classes are regulars of migrant and criminal intercept work in the Mediterranean Sea. The USCG, however, wanted a helideck and place for three rubber inflatables. The Italian-built vessels only seem to accommodate one dingy and no helicopter. To compare, Zukunft’s cutters will be 360 ft. long; 54 ft. at the beam; have a 17-ft. draft; a range of 10,000 nautical miles at 14 knots; 60 days of endurance; two 16-volt marine diesel engines; two five-blade and controllable pitch propellers that’ll achieve a top speed of more than 22 knots. There’s plenty of room for a helicopter and three RIBs.

Supply Chain

Vard didn’t say what Vard equipment, if any, will be aboard the OPC, but the Coast Guard promises a robust capability. A “sophisticated combat system” and a C4ISR communication suite will be onboard, and this will allow the OPV to be brought into action together with other Coast Guard vessels or as part of a larger combat ship group.

“The offshore patrol cutter acquisition is the Coast Guard’s highest investment priority,” Admiral Zuku-

nft, has been quoted as saying. In addition to fighting “criminal networks off Central America” the Vard 7 110’s will also patrol the “increasingly accessible Arctic”, a theatre which might require a more closed superstructure, more akin to the Vard 7 100. U.S. “economic interests” will also be enforced with the new boat, a nod to all that goes on out in the nation’s 200-nautical-mile economic zone.

“The OPC will bridge the capabilities” of the 418-ft national security cutters and 154-foot fast response cutters by replacing the 270-foot and 210-foot medium endurance cutters, now up to 50 years old,” the Service says. A Coast Guard management unit called OPC PRO will oversee construction of the cutter from an on-site facility Eastern is expected to build during winter 2016-2017. All augers well for Eastern potentially replacing more of the 25 mid-water or “medium endurance” cutters with 25 Vard 7 110’s — and perhaps a Vard 7 100. The Canadian Navy is understood to be pursuing these vessels for its own cold-water patrols.

Nod to NATO

If Canadian and Norwegian design expertise was given the nod, then so too was Vard’s parent company Fincantieri.

Owned by the Italian state via Fintecna, Fincantieri doubled after its acquisition of Vard to become the fourth largest shipbuilder in the world and the largest in the Med. As we wrote these words, Fincantieri’s Trieste-based minds were making a friendly offer for the 44 percent of Vard they don’t own. It’s worth noting that in January 2009, Fincantieri bought Manitowoc Marine Group and its two yards in Wisconsin, including the Marinette Marine that built the first Freedom Class littoral combat ship. So, Eastern, it seems, has a rival and a friend in Fincantieri, another maker of mid-sized vessels for the U.S. Navy. So, who knows what may be next from U.S. military-industrial strategists keen to share financial resources with capable NATO allies while also creating jobs at home. For now, all eyes will be on those remaining OPVs.

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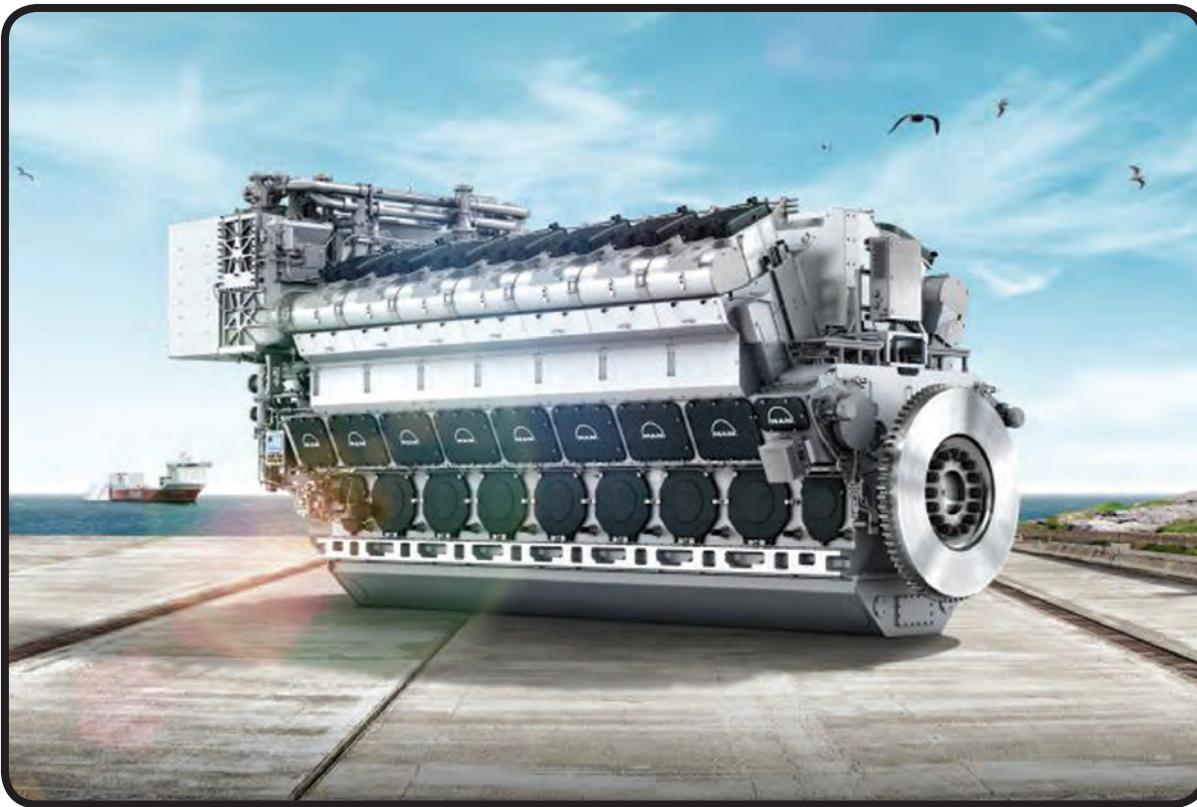


Image: MAN D&T



Images: MV Werften

2 x 200,000 gt ships @ 96,000 kW per

MAN power for “Global Class” Cruise Ships

MV Werften and MAN Diesel & Turbo concluded a contract to equip two “Global Class” cruise ships for Star Cruises.

With a gross tonnage of 200,000 gt each, the ships will be some of the largest on the market and will each be equipped with six type 48/60CR engines with a combined output of 96,000 kW. The ships are scheduled for delivery in 2020 and 2021. The customer and re-

cipient of these ships, which will operate in China and all over Asia, is the Star Cruises brand of Genting Hong Kong. Genting Hong Kong has been active in the cruise business for 23 years and recently launched its new luxury cruise line brand “Dream Cruises - The Most Luxury Asian Cruise Line” with two 150,000 gt ships – the “Genting Dream” delivered this month and the “World

Dream” to be delivered next year, both equipped with MAN engines. Genting Hong Kong also owns Crystal Cruises. This year, the company bought German shipyards in Wismar, Rostock and Stralsund and now operates them as the shipyard group MV Werften, a strategic step taken to secure the company’s expansion plans in the growth markets of South-East Asia and China and in the global

market for luxury cruise ships.

“The cruise business is globally experiencing strong growth,” said Tan Sri Lim Kok Thay, Chairman and CEO of the Genting Corporation. “This has led to very long lead times of up to 10 years for new large cruise ships.. We want to change this by having earlier delivery and incorporate the latest design as the ships are being built.”

Maersk Drilling to Pilot GE’s Marine Data Analytic Tools

GE and Maersk Drilling have partnered for a data analytic-driven pilot project that aims to increase Maersk’s drilling vessels’ productivity and reduce maintenance costs by up to 20 percent. The two companies have collaborated to deploy SeaStream Insight, GE’s latest innovation in marine asset performance management, powered by Predix. The pilot project will be carried out on one of Maersk Drilling’s XLE rigs and will last for 12 months. Currently, the project has reached its first milestone, with data collected from the rig currently being processed and analyzed online.

“Digital capability will be one of the key enablers for Maersk Drilling, and we embrace this industrial transition,” said Jesper Hansen, CIO, Maersk Drilling. “We are excited to collaborate with GE who is at the forefront of the digital revolution.”

Operational sensor data from critical equipment is connected to a historian, a specialized server that stores the data needed to model the blueprint of the drilling operation. By building this “digital twin,” the digital software can then help compare assets to assets and provide access to vessel performance against the ideal state. Big data is also translated into clear dashboards with a holistic view of a vessel, which can help operators make more informed decisions.



Image: GE

Thanks to advanced algorithms and a strong data-processing capability, SeaStream Insight will also be able to predict the future state of critical asset health, therefore spotting inefficiencies or detecting potential failure earlier, up to weeks ahead. Operators are given early warnings to mitigate potential problems in advance, which help reduce unplanned downtime and increase drilling productivity.

Wave Power **\$1.5m “Wave Energy Prize” Awarded**

While the wave energy industry is in its infancy, the U.S. Department of Energy sought to use the \$1.5m Wave Energy Prize as an impetus to kick it toward puberty, a contest which attracted 92 entrants and involved more than a year and a half of design, re-design, construction and testing.

In the end it was a duo from Portland, Ore., Alex Hagmuller and Max Ginsburg – together AquaHarmonics – were named the winners of the \$1.5 million grand prize for their AquaHarmonic-sWEC concept, a point absorber with latching/de-clutching control.

Though the contest officially kicked off in 2015, the team’s work together stretches about five years, when Hagmuller started to build small scale wave energy prototypes and enlisted Ginsburg, his friend from Oregon State University, to help design the electrical components and software. Together they built and tested several different wave energy prototypes, and the knowledge gained from each has led to many improvements and



(Photo: Wave Energy Prize)

The AquaHarmonics team, Alex Hagmuller and Max Ginsburg, stand with its 1/20th scale device.

changes in the design. “It’s been a project we’ve been working on since even before the Wave Energy Prize was announced,” Ginsburg said. “As we progressed towards the finals, it just got more and more exciting.” Over the course of the competition,

a panel of judges narrowed down the competition pool to nine finalists and two alternates, which were announced in March 2016. Each team received up to \$125,000 in seed funding to build scaled prototypes. With the support of the U.S. Navy, the finalist teams tested their pro-

totype devices at the Naval Surface Warfare Center’s Maneuvering and Seakeeping Basin at Carderock, Md.

“This competition set a difficult threshold of doubling the energy captured from ocean waves, and four teams surpassed that goal,” said Lynn Orr, DOE’s Under Secretary for Science and Energy. “AquaHarmonics’ technology leap incentivized by the Energy Department demonstrates how rapid innovation can be achieved in a public prize challenge.”

In the next year, the Energy Department will publish data from all the finalist teams’ test results to further accelerate advancement of this sector.

CalWave Power Technologies and Waveswing America were awarded second and third place, respectively, with \$500,000 and \$250,000 in cash prizes.

Flinders Ports Gets a COP

Saab has deployed its first Common Operating Picture (COP): an extension of its KleinPort port management information system (PMIS) that is designed to make ports more efficient and competitive. As of November 1, 2016, Flinders Ports in Australia began live utilization of the KleinPort COP. KleinPort COP gives all authorized port stakeholders an easily accessible, map-based overview of their port. The information is layered to allow users to select only the data relevant to their area of responsibility.

Business staff get a high-level port overview and operations staff can execute routine tasks directly from the COP user interface. From a security and safety perspective, this data can be viewed in real-time by all parties involved, allowing for response coordination through one common view in the event of an incident.

The Common Operating Picture couples the latest developments in Geographical Information System (GIS) technology with sophisticated KleinPort data to create its port overview interface. Data including detailed cargo information, vessel locations, vessel visit details, AIS transponder data, and emergency response vessel locations are just some examples of what can be shared and dynamically updated in COP.

The Common Operating Picture is an upgrade to the KleinPort port management information system that was previously deployed for Flinders Ports. Flinders are currently using KleinPort to manage and track vessel opera-



(Image Courtesy Saab)

tions, property, and cargo as well as to generate billing and execute reporting at seven different ports. Flinders also uses KleinMobile, Saab’s mobile pilot application, to communicate pilot orders and receive completed job reports.

“The Common Operating Picture gives us a seamless view of both land and sea operations. The technology’s in-built efficiencies have already boosted productivity and support our safety focus”, says Captain Carl Kavina, General Manager, Marine Operations, Flinders Ports. In addition to the seven ports that it operates, Flinders owns and operates the container terminal in place at Port Adelaide. Flinders Ports was established in 2001 when the South Australia state government privatized the South Australian Ports Corporation.



(Photo: Automated Ships Ltd.)

Hrönn

Unmanned Autonomous Boat for Offshore Ops

While talk of autonomous operations in the maritime sector have swirled for years, the talk becomes reality as Automated Ships Ltd. (an M Subs Ltd subsidiary) and Norway's Kongsberg Maritime signed a Memorandum of Understanding to build the world's first unmanned and fully-automated vessel for offshore operations.

In January 2017, Automated Ships Ltd will contract the 'Hrönn', which will be designed and built in Norway in cooperation with KONGSBERG. Sea trials will take place in Norway's newly designated automated vessel test bed in the Trondheim fjord and will be conducted under the auspices of DNV GL and the Norwegian Maritime Authority (NMA). The Hrönn will ultimately be classed and flagged, respectively.

Currently, only small unmanned boats are being used for near shore operations but there are no technical limitations to constructing large, unmanned and automated systems. The only impediments are regulatory, but

with the participation of DNV GL and the NMA, and Norwegian and UK companies and institutions, it will be possible to rapidly and at low-cost be the first to market with a full-size unmanned ship.

Meet Hrönn

Hrönn is a light-duty, offshore utility ship servicing the offshore energy, scientific/hydrographic and offshore fish-farming industries. Its intended uses include but are not limited to:

- Survey
- ROV and AUV Launch & Recovery
- Light intermodal cargo delivery and delivery to offshore installations, and
- Open-water fish farm support.

The vessel can also be used as a stand-by vessel, able to provide firefighting support to an offshore platform working in cooperation with manned vessels. Automated Ships Ltd is currently in discussion with several end-users that will act as early-adopters and to establish a base-rate for operations and secure contracts for Hrönn offshore, in

the near future.

Hrönn will initially operate and function primarily as a remotely piloted ship, in Man-in-the-Loop Control mode, but will transition to fully automated, and ultimately autonomous operations as the control algorithms are developed concurrently during remotely piloted operations.

Automated Ships Ltd will be the primary integrator, project manager and ship-owner of this world's first fully automated and unmanned ship for commercial use. The project will leverage existing technology to develop a robust, flexible and low-cost ship to become the market leader and offer not only a capable work-boat but provide an unparalleled R&D asset for the furtherance of this emerging industry sector.

Kongsberg's role in the project is to deliver all major marine equipment necessary for the design, construction and operation of Hrönn. The leading global maritime technology manufacturer will deliver all systems for dynamic positioning and navigation,

satellite and position reference, marine automation and communication. All vessel control systems including K-Pos dynamic positioning, K-Chief automation and K-Bridge ECDIS will be replicated at an Onshore Control Centre, allowing full remote operations of the Hrönn.

Hrönn is expected to be built by Fjellstrand AS, a Norwegian shipyard with a long history of building state-of-the-art aluminium fast ferries in addition to a number of steel offshore vessels and aluminium work boats. As the builder of the world's first battery driven car ferry, 'Ampere', Fjellstrand AS is well known for taking the lead in maritime innovation and green technology.

"Fjellstrand AS has for years worked within the high-end development of new vessels. To design and build future ships with autonomic technology will be an exciting challenge, and follows the path laid from the recent building of Ampere where technology is pushed forward in good cooperation with partners," said Morten Berhove, Technical Director, Fjellstrand AS.

Vessel Automation: Command & Control

BY CRAIG CABIRO

The marine industry is becoming increasingly competitive, with many looking to lower transportation costs while demanding the highest environmental and safety standards. Automating vessel operations and systems can significantly improve a vessel owner's competitive edge in the market, by reducing staffing requirements, improving asset management, maintenance costs, and minimizing risk of environmental incidents due to human error.

On a ship, there are many parameters that need to be controlled or monitored including: temperature, pressure, level, viscosity, flow control, position of vessel, speed, torque control, voltage, current, machinery status (on / off), and equipment status (open / closed). In addition to the abundant amount of incoming sensory information, a modern automation and control system also integrates many aspects of ship operations including the propulsion plant operation; power management operation on the auxiliary engines; auxiliary machinery operation; cargo on-and-off-loading operation; navigation and administration of maintenance; and purchasing of spares. Automatic control and monitoring systems meeting ABS periodically unmanned (ACCU) and unmanned (ABCU) requirements allow a vessel to operate safely within UMS (unattended machinery spaces).

It's not surprising, given the large push for reduced manpower requirements in the maritime industry, that vessel automation systems have taken on the larger role of remote control and monitoring of critical ship systems to meet ABS ACCU/ABCU requirements. Shipyards

and vessel owners alike often turn to a sole source vendor. The "one-stop-shop" approach reduces design, build, and commissioning cycles when tackling the prospect of interfacing with different equipment. However, this approach can come with compromises when the customer is forced to use equipment packages offered as the vendor may have an excellent main propulsion system to offer, but a mediocre bow thruster package.

This is where long-tenured and experienced companies such as Engine Monitor Inc. (EMI) can provide optimal solution for the ship designer. Automation solutions offered by EMI can integrate all onboard technical processes from a variety of manufacturers into a unified system and control the interactions with defined parameters. EMI's approach gives vessel owners flexibility to select manufacturers of various equipment and machinery that best suit their commercial or operational needs.

By leveraging more than 40 years of experience interfacing, monitoring, and controlling vast quantities of disparate equipment across just as many different communication protocols, EMI effectively becomes the 'go to' system integrator. EMI's in-house engineering and programming capability allows it to provide solutions that are customizable by taking input from client specified engines, gearboxes, thrusters, switchboards, and motor control systems and centralizing command and control for the captain and crew. EMI's easy-to-operate system overviews are integrated with subsystems via standardized interfaces. This gives vessels across the fleet a simi-

lar look and feel to the control screens and makes it easier for crews to move seamlessly between vessels. EMI's monitoring systems are PLC (programmable logic control) based and are scalable for future expansion. As equipment and systems on board vessels are upgraded, the modular design allows new data points to be added, giving users the flexibility to modernize their operations at a pace that is convenient and affordable.

Automation of vessel operations provides other benefits to operators as well. EMI's alarm and monitoring systems can be configured to capture and analyze data from equipment and machinery, thus providing vessel owners with a new level of transparency to optimize performance. This information can be captured as a log and sent ship-to-shore, providing the infrastructure for asset management to assist in planned maintenance and predictive failure analysis, consequently reducing failure incidents and downtime. Observing trends in differential pressure readings across a pump, for example, can indicate that a filter should be replaced. Similarly, unusual vibration detected in a generator or gearbox could mean bearings are worn.

The processes involved in a ship's operation are as complex as they are diverse. Using preset parameters and programming logic to provide notification to the bridge of current conditions on board, a modern automation and control system will allow the crew to make better-informed decisions. Ship operators will have full control of all processes allowing them to react quickly and appropriately in all situations.

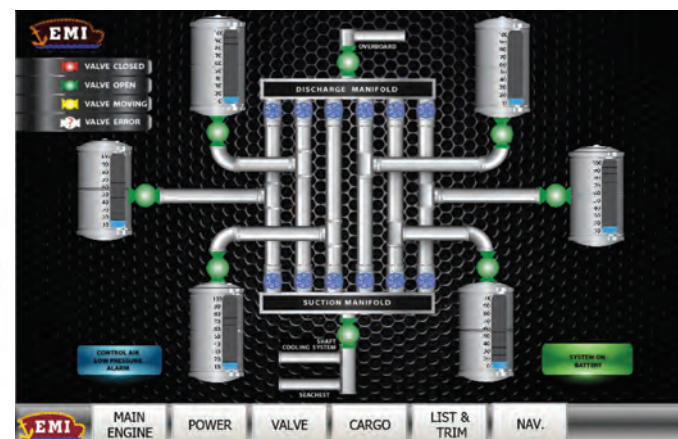
Optimal coordination can only be



About the Author

Craig Cabiro is the COO of Engine Monitor, Inc. a company of 41 years that designs, builds, and services steering, propulsion control, and monitoring systems for vessels in the inland and coastal marine markets. Craig recently joined EMI, relocating from Houston where he served as Operations Manager for the W&O Houston branch.

achieved by using an integrated and transparent control system, thereby ensuring profitability of the ship's operation. EMI's integrated automation solutions unlock this potential and eliminate sources of errors across all onboard processes. Possible operating errors are also minimized resulting in a reduction of risk to people, equipment, and the environment. With the advances in automation and communication technology, automating a ship, whether a newbuild or retrofit, is more affordable than ever before. Operating a modern, automated fleet of vessels provides owners with a competitive edge, offering their customers efficient, safe transport of products and improved reporting capabilities with real time data, while optimizing profitability of the fleet.



EMI's easy-to-operate system overviews are integrated with subsystems via standardized interfaces. This gives vessels across the fleet a similar look and feel to the control screens and makes it easier for crews to move seamlessly between vessels.

Marine Diesel Engine Directory

Anglo Belgian Corp. (ABC)

Wiedauwkaai 43, 9000 Ghent, Belgium
Phone: (+32) 09 267 00 00
Email: info@abcdiesel.be
Website: www.abcdiesel.be

Anglo Belgian Corporation with headquarters in Gent, Belgium has almost a century of engine-building expertise. The company was founded in 1912 by a group of Belgian entrepreneurs soon after building the first licensed Rudolf Diesel engine.

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Caterpillar Marine is working with 60 Cat Dealers and 20 MaK & EMD dealers globally. The product offering includes diesel & dual fuel propulsion and auxiliary marine engines, as well as complete marine generator sets. In addition to power generation, it offers after treatment solutions and complete Fuel Gas Handling Systems. To ensure maneuverability, propulsion and control throughout your vessel we offer Conventional Propeller Systems in a Controllable Pitch layout and Azimuth Propulsion Systems in Controllable and Fixed Pitch layouts as mechanical, electrical or hybrid driven solutions.

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Cummins is a corporation of complementary business segments that design, manufacture, distribute and service diesel and natural gas engines and related technologies, including fuel systems, controls, air handling, filtration, emission solutions and electrical power generation systems. Headquartered in Columbus, Indiana, Cummins employs approximately 55,000 people worldwide and serves customers in approximately 190 countries and territories through a network of approximately 600 company-owned and independent distributor locations and approximately 7,200 dealer locations.

Daihatsu Diesel

1-30, Oyodo Naka 1-Chome, Kita-ku, Osaka 531-0076 Japan
Phone: 81-6-6454-2346
Website: www.dhtd.co.jp/en

Electro-Motive Diesel

9301 W 55th Street, LaGrange, IL 60525, USA
Phone: 708-387-6081
Website: www.progressrail.com/powerproducts
Electro-Motive Diesel, Inc. (EMD) is a subsidiary of Progress Rail Services, a Caterpillar company.

Fairbanks Morse

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MAN Diesel & Turbo SE is a leading provider of large-bore diesel engines and turbomachinery for marine and stationary applications. It designs two-stroke and four-stroke engines that are manufactured both by the company and by its licensees. The engines have power outputs ranging from 450 kW to 87 MW. MAN Diesel & Turbo also designs and manufactures gas turbines of up to 30 MW, steam turbines of up to 150 MW and compressors with volume flows of up to 1.5 million m³/h and pressures of up to 1,000 bar. The product range is rounded off by turbochargers, propellers, gas engines and chemical reactors. MAN Diesel & Turbo's range of goods includes complete marine propulsion systems, turbomachinery units for the oil & gas as well as the process industries and complete power plant solutions.

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Rolls-Royce

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Website: www.rropowersystems.com

Rolls-Royce Power Systems, a division of Rolls-Royce plc., is a leader in engines and propulsion systems and distributed power generation plants. Under the MTU brand, it develops and produces high-speed engines and propulsion systems for ships and heavy land, rail and defence vehicles, as well as drive systems for use in the oil and gas industry and in power generation. Operating under the Rolls-Royce brand in Bergen, Norway, it also develops and produces medium-speed engines for marine and power generation applications.

Scania

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Website: www.scania.com

Scania is a part of Volkswagen Truck & Bus GmbH and one of the world's leading manufacturers of trucks and buses for heavy transport applications, as well as a leading provider of industrial and marine engines. Service-related products account for a growing proportion of the company's operations, assuring Scania customers of cost-effective transport solutions and maximum uptime. Scania also offers financial services. Employing about 44,000 people, the company operates in about 100 countries. Research and development activities are concentrated in Sweden, while production takes place in Europe and South America, with facilities for global interchange of both components and complete vehicles.

Steyr Motors

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Volvo Penta

Website: www.volvopenta.com

Volvo Penta, with 3,500 dealers in more than 130 countries, is a global manufacturer of engines for leisure boats and commercial vessels, as well as industrial applications. The propulsion program includes diesel and gasoline engines with power outputs between 10 and 900 horsepower. Volvo Penta is part of the Volvo Group, one of the world's leading manufacturers of heavy trucks, buses and construction equipment.

Wärtsilä

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Website: www.wartsila.com

Wärtsilä is a global leader in advanced technologies and complete lifecycle solutions for the marine and energy markets. By emphasizing sustainable innovation and total efficiency, Wärtsilä maximizes the environmental and economic performance of the vessels and power plants of its customers.

Winterthur Gas & Diesel

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WinGD is a leading developer of low-speed Gas and Diesel engines used for propulsion power in merchant shipping. These engines are utilized for the propulsion of all types of deep-sea ships world-wide, such as oil and product tankers, bulk carriers, car carriers, general cargo ships and container ships. The company continues the long tradition of the Sulzer Diesel Engine business founded in 1898. WinGD's headquarters is located in Winterthur, Switzerland. WinGD has extensive state-of-the-art research and training facilities at its Diesel Technology Center located in Oberwinterthur. WinGD is owned by China State Shipbuilding Corporation (CSSC).

Yanmar

530-0013, YANMAR FLYING-Y BUILDING, 1-32, Chayamachi, Kita-ku, Osaka, 530-8311, Japan
Phone: +81-6-6376-6211
Website: www.yanmar.com

YANMAR manufactures marine engines for pleasure boat use from 15 hp to 900 hp, marine transmissions and drives and commercial engines from 39 hp to 1,800 hp. These engines are designed for high performance and maximum engine life, and tested under extreme conditions to assure the YANMAR legendary reliability. YANMAR backs them up with a superior engine warranty and world class local support.

Choosing your BWM supplier

After 13 years, the International Ballast Water Management (BWM) Convention will enter into force on 8 September 2017, marking a landmark step towards halting the spread of invasive aquatic species worldwide. As a result of this ratification, ballast water enquires and interest for retrofits have dramatically increased. Besides having an efficient system installed, ship owners and operators must choose a supplier who can provide not just a system but a full suite of services and aftersales care worldwide.

Ship owners and operators need to consider the support their supplier can provide throughout the whole process of BWM installation and maintenance. Will my supplier support me throughout the process? What is my suppliers service reach globally? Can I receive service in key major ports worldwide? Which system is best suited for my vessel? (According to vessel type, size, operation & design). Furthermore, a key consideration for making a purchase decision needs to be based on the full ballast water management package the supplier provides. This package addresses the pre engineering, retrofit engineering, design and installation of a system. To be able to receive a whole package from a singular supplier is seen as a huge weight off of ship owner's shoulders.

In response to this, Evoqua have aligned themselves with a number of renowned global organizations, Venteville & Damen who are engaging in the design, engineering, installations and service of technical equipment. Drew Marine provides servicing and presence in 900 ports. Locally, Krosys in South Korea, Matsui in Japan & Hai Cheung

Trading in China provide systems, engineering, installation and support to the market.

Recognizing compliance is more than just superior equipment, competent global service providers, effective project life-cycle management, ensuring all the critical knowledge and expertise is applied at the right time, at the right place and by the best team. The suppliers ongoing commitment to the industry must be established to ensure support for the lifetime of their vessel. Additional potential compliance requirements may come into force in the future and it will be suppliers who will need to



SeaCURE® Ballast Water Treatment System (Compact Design)



Matt Granitto
Ballast Water Manager,
Evoqua Water Technologies

adapt offerings to provide compliant systems.

It's crucial that any BWMS issues are resolved as quickly as possible to avoid non-compliance. Additionally, it is essential to provide service support on a 24-hour basis, to ensure these issues are dealt with. Matt Granitto, business manager for Evoqua's ballast water business, states: "Installing a BWMS on board an existing vessel is a complex process which requires both extensive planning and expertise. Evoqua's combined full service offering will enable us to offer a complete ballast water solution to the shipping industry across the globe, to ease the headache of compliance. This joint offering is fully customer oriented, with the client able to pick and choose the elements of service they require".

These strategic agreements with respected global providers allows for effective project life-cycle management, ensuring all the critical knowledge and expertise is applied at the right time, at the right place and by the best team. This service offers ship owners peace of mind that they will be well-equipped to meet the technical challenges associated with compliance to ballast water regulations.



COMPLIANCE ASSURED, WHEREVER YOU ARE.

SeaCURE® BALLAST WATER MANAGEMENT SYSTEM

Evoqua offers a ballast water management system that provides a reliable, safe and environmentally sound solution designed to protect against the proliferation of aquatic invasive species.

The system is based on more than 50 years of proven experience and over 2,500 shipboard installations of Evoqua's well-known Chloropac® marine growth prevention system (MGPS).

LEARN MORE AT WWW.EVOQUA.COM/SEACURE

KEY BENEFITS OF THE SeaCURE® SYSTEM

- Operates anywhere
- Reduced OPEX & CAPEX
- Trusted, tested & safe system
- Simple & flexible installation
- Global service support

After the sale: OPEX of an Ecochlor BWTS

By Tom Perlich, Ecochlor founder and president

The sale and installation of an Ecochlor ballast water treatment system (BWTS) begins a relationship that will last for the life of the vessel. Ecochlor will maintain continuous interaction with the vessel in order to coordinate the re-supply of chemicals that will be schedule approximately every six months. If time allows, during the resupply activity a trained technician can review the system, identify and recommend any maintenance needed, and perform any preventative maintenance the system requires. Shipowners have stated that this frequent review by our technicians provides them with “regulatory piece of mind.”

Ecochlor’s experienced technicians are directly involved in the early operation of the system and training the crew on the treatment system. Also, we have started the process of developing video and web-based training.

The Ecochlor® BWTS is automated and simple to use. Shipboard engineers can verify that the system is working correctly through the use of the human machine interfaces (HMI) and programmable logic controllers (PLC) located in the control panels. The HMI allows the viewing of a series of screens that permits crew members to monitor the Ecochlor® BWTS operation. If operational parameters are not met prior to, or during system operation, warning and alarms are in place to indicate which parameters are not within

specification. If necessary, our engineers and technicians can access the system remotely in order to assist in fault diagnosis. However, ship owner cooperation and support is necessary to achieve this access.

The Ecochlor system requires very little periodic maintenance. During commissioning a preventative maintenance schedule is provided to the crew in the O&M Manual. Maintenance activities are scheduled on a frequency ranging from 18 to 60 months and involve routine inspection activities. It is recommended that the ship have some key spare parts on board, but they will also have the availability to get them in specific ports globally.

Through our Technical Service Agreement, an autho-

rized Ecochlor representative, will resupply the chemicals. Consequently, there is no crew involvement or any need to evacuate the vessel. The entire process is closed, using specially selected equipment and trained personnel with no direct human contact to chemicals. Additionally, we have signed an agreement with Drew Marine to assist us in providing logistics support for the resupply of our BWTS precursor chemicals at designated ports and harbors around the world.

Operational costs for the Ecochlor system are limited to the cost of the precursor chemicals and the cost of fuel. Precursor chemical pricing starts at \$0.08 per cubic meter of treated ballast water. The amount of fuel required is minimal and will depend on the flow rate and power requirements of the system, estimates based on typical operation range from about \$25 to \$200 USD in annual fuel costs.

Last year, Christian Johnsen, Chief Officer of the MV Moku Pahu shared his thoughts about using the Ecochlor BWTS onboard his vessel. He stated, “The Ecochlor system has worked well for us in that, it’s relatively small footprint was easily retrofitted into our existing ballast system, it uses an almost negligible amount of electrical power and works effectively in all water conditions, including the sediment filled, biologically saturated waters off Chittagong, Bangladesh. Ecochlor has shown their commitment to our system by reliably providing support, scheduled service and chemical resupply as needed.”



12 YEARS AT SEA

The Ecochlor® Ballast Water Treatment System: proven effective and reliable for over 12 years at sea. Meets or exceeds USCG and IMO standards. All USCG Type Approval testing is complete.



Ecochlor System: Simple operation, rugged construction, unique technology.

Visit us at CMA Shipping 2017 Booth # 29.
www.ecochlor.com

THE WORK TO COMPLY WITH BALLAST WATER TREATMENT BEGINS

Prepare, develop, execute – that’s the plan and the message for shipowners and operators when it comes to complying with the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, which was recently ratified with an Entry into Force (EIF) of September 8, 2017.

While much of the industry has been focused on the B-3 implementation schedule for Ballast Water Treatment Systems (BWTS), this is the final stage on the road to compliance that starts at EIF. The first stage of compliance is that each vessel must have a Ballast Water Management Plan (BWM Plan) approved by their administration onboard and implemented by the crew.

Getting With the Plan

Owners/operators, however, can advance their Ballast Water Management Plan by working with proven BWT manufacturers, particularly those that have shown their systems can be deployed efficiently, economically and across various vessel types.

With more than 100 retrofit installations already completed, Calgon Carbon UV Technologies LLC d/b/a Hyde Marine is no stranger to the unique challenges of installing systems in real-world scenarios. In fact, Hyde Marine’s ballast water treatment system has been tapped for more retrofit installations than any other in the world.

Hyde Marine has secured more than 460 orders for its ballast water treatment systems, including 300-plus vessels with fully installed, commissioned and working ballast water treatment systems.



Hyde GUARDIAN Gold® relies on a two-step method and uses no active substances (e.g., chemicals) to treat ballast water. The automatic-backwash filtration process removes sediment and large organisms from the ballast water before it is treated with high-intensity, medium pressure ultraviolet (UV) light to inactivate or kill remaining organisms.

It is ideal for retrofits as it provides the compact size required by owners/operators and it may be sized and configured for any type of vessel with models handling flow capacities in the range of 60 m³/hr to 6,000 m³/hr.

Working with Hyde Marine, operators/owners can develop a comprehensive and manageable ballast water checklist and avoid delays in implementation and installation. This includes careful consideration of the initial costs and the total life cycle cost of the equipment.

Visit www.hydemarine.com for more information.



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SO LITTLE TIME

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Marine**
Ballast Water Management Technology
A CALGON CARBON COMPANY

(Photo: General Dynamics NASSCO)



Fred Harris to Retire

General Dynamics said that effective January 1, 2017, the ubiquitous Frederick J. Harris will retire. Fulfilling his duties will be two executives. Dirk A. Lesko has been elected a vice president of the corporation and appointed as president of General Dynamics Bath Iron Works, and Kevin M. Graney has been elected a vice president of the corporation and appointed as president of General Dynamics NASSCO. These appointments are Lesko, 50, was named vice president and general manager for Bath Iron Works in August 2015. Previously, he was vice president, surface combatants, managing all programs. Lesko joined Bath Iron Works in 1990.

Graney, 52, was appointed vice president and general manager of NASSCO in November 2013. Previously, he held leadership positions in operations, programs and engineering. He joined NASSCO in 2006 from General Dynamics Electric Boat, where he started working in 1995.



ASRY
Shaw

Shaw to Lead ASRY

ASRY, a leading ship and rig repair yard in the Arabian Gulf, said that Andrew Shaw will be the new Chief Executive of the shipyard, effective early January 2017. He re-joins the company after previously holding the position of General Manager of the ASRY Offshore Services division from 2009 to 2014.

Shaw has more than 25 years experience in the global maritime industry. He was most recently Group Managing Director of a U.K. ship repair and conversion company. Prior to that he was General Manager of ASRY Offshore Services for almost five years. His previous career also includes time at Vickers Shipbuilding & Engineering Ltd (VSEL) and Vosper Thornycroft.

CLIA Taps Donald as Global Chair

Cruise Lines International Association (CLIA) Board of Directors has appointed Arnold Donald, CEO of Carnival Corporation & plc, as Global Chair, effective January 1, 2017. Donald succeeds Adam M. Goldstein, President and COO of Royal Caribbean Cruises Ltd., who has served as CLIA Global Chairman since January 2015.

SUNY Maritime To Honor McAllister

Capt. Brian McAllister will receive an honorary doctorate from SUNY Maritime College early next year. Capt. McAllister is the chairman of McAllister Towing, and has been with his family's company since 1959. He received a bachelor's degree in Marine Engineering and a U.S. Coast Guard third assistant engineer's license from SUNY Maritime in 1956.

After graduating from Maritime, Capt. McAllister served for two years in the Navy, rising to the rank of lieutenant, junior grade and executive officer aboard LST 880. Afterward, Capt. McAllister sailed aboard McAllister tugboats and ferries, ultimately obtaining a master's license with unlimited pilotage for many of the ports serviced by the company. In 1974, he and other members of the fourth generation purchased



Carnival Corp.
Donald

the company from the third generation of McAllisters. He became president of the company in 1984 and its sole owner in 1998. He has been chairman since 2013. The company celebrated its 150th anniversary in 2014, and today it is still family-owned and -operated, is one of the oldest and most diversified marine towing and transportation companies, operating an extensive fleet of tugs, ferries and barges.

Seaspan Marine Appoints Lister VP

Seaspan said that Peter Lister has joined Seaspan Marine as Vice President, Commercial Services. He brings more than 20 years of experience as a research and innovation leader in the forestry sector, and joins the company from FPInnovations where he served as Vice President, Forest Operations & Wood Products.

As a member of Seaspan Marine's senior leadership team, Peter has overall responsibility for Marketing, Sales and Customer Relations within the company's current customer base. He will develop and build effective marketing strategies, customer service quality control measures, customer service standards and account management processes.

Ludwig to Lead CGF

Susan P. Ludwig will replace Anne B. Brengle as president of the Coast Guard Foundation, a nonprofit organization committed to the education and welfare of all Coast Guard members and their families. Ludwig will assume her new position in January following Brengle's retirement this December.

LPG-Fueled Ferry Design Underway

GE Aviation's marine gas turbine business signed a memorandum of understanding (MOU) to cooperate in the joint development of LPG-fueled ferry design. The ferry will feature GE's Combined Gas Turbine, Electric and Steam (COGES) system for all ship power, including propulsion. Participating in the MOU signing were Youngsung Global CEO Bumsu Ku, DINTec



G. Trauthwein
McAllister



Seaspan
Lister

Director Hunsoo Ha, Korea LPG Industry Association Chairman Joonseok Hong, GE Aviation MSO Korea Leader Kirby Luke, Far East Ship Design & Engineering Co (FESDEC) CEO Jungkang In, and Cryos CEO Daesung Kim.

As this is the world's first LPG-fueled COGES ship, the LPG industry is actively taking part in this project. For instance, FESDEC is handling the ferry design, and Cryos brings extensive experience in designing and manufacturing LPG fuel tanks.

Crowley Honors Eisenhart, Hilburn

Crowley Maritime Corporation's Jeannie Eisenhart, director of talent acquisition and employee services, and Bleu Hilburn, director of logistics business development, have been honored with 2015 Thomas Crowley Awards, the company's highest honor for its employees.

Only 64 of the company's 5,000 employees have received the award since the program's inception in 1985. Chairman and CEO Tom Crowley Jr., grandson of the founder, presented the awards at the company's corporate office in Jacksonville, where both Eisenhart and Hilburn are based.

"My grandfather and family started this company almost 125 years ago. It's meaningful and wonderful that we have all been able to pull together and keep it going through a lot of hard work," said Crowley in presenting the trophies to the winners. "This award is about recognizing people in the organization, those who are great role models, who take the extra step and put in the extra effort, those that we all look up to and wish and work to be more like."

Eisenhart, who joined Crowley in 2005, has spearheaded technological advancements that improved the efficiency of travel and event planning essential for the entire company. With the in-house direction, the company estimates it saves \$500,000 each year through internal, streamlined travel services for mariners and employees.

Hilburn joined Crowley in 2012 after



Ludwig



From left: Eisenhart, Crowley and Hilburn



GTT's auditor examining Sveza plywood samples.

Yanmar
Groundbreaking

a career in the U.S. Army as a transportation and logistics officer. He retired after battalion command as a lieutenant colonel. He earned a bachelor's degree in marine transportation from the U.S. Merchant Marine Academy, a master's degree in business administration from Nova Southeastern University and a master's degree in military art and science from the United States Army Command and General Staff College.

"Since he has joined the company, Bleu has doubled down and has brought all his experience in the Army - the discipline and knowledge and the ability to take us to new places," Crowley said.

Hilburn led logistics support in 2015 that was critical to aid relief efforts as part of Operation United Assistance in West Africa during the Ebola virus crisis. Crowley supplied emergency shipping, warehousing, trucking, stevedoring, customs brokerage and other logistics services in partnership with the U.S. government, including support for 3,000 deployed troops and 17 treatment centers.

OSG Announces Key Appointments
Overseas Shipholding Group is pursuing

a spin-off of its international business and announced executive appointments for what will be an international crude and product tanker company, International Seaways, Inc. Lois K. Zabrocky will become president and CEO of International Seaways; Jeffrey D. Pribor will join International Seaways as CFO; and James D. Small III will become chief administrative officer, secretary and general counsel.

SVEZA to Supply Plywood for LNG Carriers

SVEZA Ust-Izhora plywood mill recently obtained the GTT (Gaztransport & Technigaz) Approval confirming compliance with specification of containment system for liquefied natural gas carriers. SVEZA Group is a leader in birch plywood production, and it reportedly has become the first Russian domestic producer certified to deliver to LNG-carriers manufacturers. The company's target is to gain at least a 30% share of the market with the estimated annual volume of 60,000 cubic meters of plywood. SVEZA Group has become the fourth company in the world certi-

fied by GTT. "With a 20% share of the global plywood market, we are expanding into new markets and segments. The Approval enabled us to enter LNG-carriers segment. From now on Russian plywood along with European will be used for modern vessels construction. A pilot batch of SVEZA plywood for LNG-carriers has undergone a thorough inspection and testing by GTT.

The first industrial batch was produced in April 2016 at SVEZA's mill in Saint-Petersburg," said Yulia Ermakova, the Head of Marketing and Client Service of SVEZA Group. SVEZA plywood samples have successfully passed all necessary strength tests, including thermal shock test. "SVEZA has shipped products for construction of two vessels in South Korea, and we are negotiating new deliveries.

The demand on liquefied natural gas is projected to increase, encouraging growth in LNG-carriers industry. GTT's order book consists of 91 vessels, and this creates new opportunities for development of all market participants," said Andrey Immoreev, Sales and Marketing Director.

YANMAR: New U.S. Training Center

On November 16, 2016 Yanmar broke ground on its new America Training and Experience Center located in Acworth, Ga. Yanmar America invested \$20m to acquire the 50-plus acres of land to build its 50,000 sq. ft. facility, which will feature hands-on training spaces for each of the business' product lines, office space, classrooms, a 200-seat auditorium and museum. Outside, YANMAR will be able to provide hands-on demos of its products.

MarineCFO Introduces Shipmate

Building on its workboat application Vessel365, MarineCFO plans to introduce the complimentary Shipmate Partner Network during the 2016 International Workboat Show in New Orleans. MarineCFO lauds Shipmate as a business advantage for maritime safety, security and engineering consultants. Maritime consultants participating as a Shipmate receive free access to and training for MarineCFO's suite of operational, safety, security and engineering solutions including the Vessel365 application and Endurance modules.

Collaboration: New Maritime Safety Research Center

The Maritime Safety Research Center (MSRC) is an industry-university partnership, involving Strathclyde's Department of Naval Architecture, Ocean & Marine Engineering, Royal Caribbean Cruises Ltd (RCCL) and DNV GL. The world's first center of its kind, the MSRC will aim to improve safety at sea through a collaboration between industry and academia.

The MSRC was officially opened recently by the IMO Secretary General Kitak Lim, who looked at how the MSRC could play a role in the shift of maritime safety from empirical to risk-informed legislation and goal-based standards. Lim was joined at the ceremony by Harri Kulovaara, Executive Vice President Maritime & Newbuilding, RCCL, Lanfranco Benedetti, EC DG Mobility & Transport, Maritime Safety, Professor Sir Jim McDonald, Principal and Vice-Chancellor, University of Strathclyde, and Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime.



The opening ceremony. From Left to Right: Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime, Professor Sir Jim McDonald, Principal and Vice-Chancellor, University of Strathclyde, Kitak Lim, IMO Secretary General, Professor Dracos Vassalos, Professor of Maritime Safety and acting director at the Maritime Safety Research Centre, and Harri Kulovaara – Executive VP of Maritime and Newbuilding RCCL.

JANUARY

AD CLOSE: DEC 21

The Ship Repair & Conversion Edition

Market: Fishing Vessel Quarterly
Technical: Marine Salvage & Recovery
Product: Ship Repair Tools
Design: Passenger Vessels: Ferries & Riverboats
Roundtable: Maritime Propulsion Directory & Guide
Special Report: Bunker Fuel
Region Report: The Pacific Northwest

BONUS DISTRIBUTION:

PVA Maritrends: Jan 29-Feb 1, Seattle, WA
 ASNE DAY: Feb 14-16, Crystal City, VA
 Euromaritime: Jan 31-Feb 2, Paris, France

FEBRUARY

AD CLOSE: JAN 24

The Cruise Industry Edition

Market: Shipbuilding: Cruise & Passenger
Technical: Satellite Communications
Design: Marine Pollution Mitigation
Roundtable: IoT: The Internet of Things
Special Report: Cruise Ports of Call
Product: Green Marine Fuels & Lubricants and Emission Technologies
Region Report: Vietnam

BONUS DISTRIBUTION:

Seatrade Cruise Global: Mar 13-16, Ft Lauderdale
 Intermodal Asia 2017: Mar 22-24, Shanghai, China
 Inland Waterways Conference: Mar 7-8, Cincinnati
 Green Ship Technology Conference: Mar 21-24, Copenhagen
 INMEX Vietnam: Mar 29-31, Ho Chi Min City, Vietnam

MARCH

AD CLOSE: FEB 21

The Green Marine Technology Edition

Market: U.S. Navy Quarterly
Market: Maritime Simulation Technologies
Technical: Energy Efficient Drives
Product: Marine Coatings & Corrosion Control
Design: Port & Ship: Loading and Unloading Technology & Equipment
Roundtable: Tanker Owners
Special Report: Ballast Water Technology
Region Report: Singapore

BONUS DISTRIBUTION:

CMA Shipping: Mar 20-22, Stamford, CT
 NACE Corrosion: Mar 26-30, New Orleans, LA
 Sea-Air-Space: Apr 3-5, National Harbor, MD
 Gastech Japan: Apr 4-7, Tokyo, Japan
 SeaAsia: Apr 25-27, Singapore
 Commerical Marine Expo: Apr 26-27, New Bedford, MA

APRIL

AD CLOSE: MAR 21

The Offshore Annual

Market: Fishing Vessel Quarterly
Technical: Fuels, Lubricants & Additives
Product: Deck Machinery, Winches and Ropes
Design: Workboat Design & Construction
Roundtable: Energy Port Focus
Special Report: Marine Medicine
Region Report: Japan

BONUS DISTRIBUTION:

Inland Marine Expo: May 22-24, St. Louis
 Tugology: May 23-24, Rotterdam, Netherlands
 Bari Ship 2017: May 25-27, Imbari, Japan
 NAVExpo: May 10-12, Lorient, France
 ASNE Intelligent Ships Symposium: May, Philadelphia
 Portsecure 2017: May

MAY

AD CLOSE: APR 21

The Marine Propulsion Edition

Market: Shipbuilding: Oceangoing Ships
Technical: Cyber Security
Design: Hybrid Drives
Product: Navigation: Electronics, Radar & ECDIS
Roundtable: RIB & Patrol Boat Report
Special Report: U.S. Coast Guard Annual
Region Report: Norway

BONUS DISTRIBUTION:

Norshipping: May 30-Jun 2, Oslo, Norway
 Electric & Hybrid Marine World Expo: Jun 6-8, Amsterdam
 MAST Asia: Jun 12-14, Tokyo, Japan
 SeaWork: Jun 13-15, Southampton, UK

JUNE

AD CLOSE: MAY 24

The Annual World Yearbook

Market: U.S. Navy Quarterly
Technical: Dredging
Design: Fire Safety Systems
Product: Pumps, Valves, Pipes & Insulation
Roundtable: Maritime Academies & Training Centers
Special Report: The Yachting Life (YachtingJournal.com)
Region Report: Greece

Special Section: Maritime Reporters Buyer's Guide

BONUS DISTRIBUTION:

Marine Money Week: Jun 20-22, New York, NY

2017 EDITORIAL CALENDAR

JULY

AD CLOSE: JUN 23

The Marine Communications Edition

Market: Fishing Vessel Quarterly
Market: Tugboat, Towboat & Barge
Technical: Oil Spill Response & Recovery
Product: Maritime Software Solutions
Design: Offshore Accommodation
Roundtable: Ship Management
Special Report: Marine Electronics Equipment & Supplier Guide (MarineElectronics.com)
Region Report: Europe

AUGUST

AD CLOSE: JUL 25

The Shipyard Edition

Market: Shipbuilding: The World Report
Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan
Product: Ballast Water Technologies
Design: Icebreakers
Roundtable: Big Data
Special Report: Cruising Europe
Region Report: Russia
BONUS DISTRIBUTION:
Seatrade Europe: Sep 6-8, Hamburg, Germany
NEVA 2017: Sep 19-22, St. Petersburg, Russia
Offshore Marine & Workboats: Sep 25-27 Abu Dhabi, UAE

SEPTEMBER

AD CLOSE: AUG 24

Maritime Port & Ship Security Edition

Market: U.S. Navy Quarterly
Technical: Drones
Product: Clean Water Technologies
Design: Interior Design: Onboard Amenities
Roundtable: Environmental
Special Report: Offshore Deepwater: Structures & Systems
Region Report: Denmark
BONUS DISTRIBUTION:
Shipping Insight
Danish Maritime Days: Copenhagen, Denmark
OTC Brazil: Oct 24-26, Rio de Janeiro, Brazil
KORMARINE: Oct 24-27, Busan, Korea

OCTOBER

AD CLOSE: SEP 22

The Marine Design Annual

Market: Fishing Vessel Quarterly
Technical: Marine Firefighting, Safety & Salvage
Product: Software Solutions: CAD/CAM
Design: Naval Architecture & Marine Engineering
Roundtable: Ship Classification Societies
Special Report: Propulsion, Thrusters & Gears
Region Report: The Netherlands
BONUS DISTRIBUTION:
SNAME: Oct 23-28, Houston, TX
Europort: Nov 7-10, Rotterdam, Netherlands
Marintec China: Dec 5-8, Shanghai, China

NOVEMBER

AD CLOSE: OCT 25

The Workboat Edition

Market: Shipbuilding: Workboats
Technical: Alternative Marine Fuels
Design: Offshore Wind Power
Roundtable: Marine Coatings & Rust Control
Special Report: Top 50 Marine Equipment Distributors
Product: Deck Machinery, Winches & Ropes
Region Report: U.S.A.
BONUS DISTRIBUTION:
Workboat Show: Nov, New Orleans, LA
Interferry 2017: Split, Croatia
Clean Gulf: Dec 4-7, Houston, TX

DECEMBER

AD CLOSE: NOV 22

The Great Ships of 2017

Market: U.S. Navy Quarterly
Technical: The Autonomous Ship
Design: Marine Engine Guide (MaritimePropulsion.com)
Roundtable: Ship Registries
Special Report: Prolific Ship Owners & Buyers
Product: Welding & Cutting Equipment
BONUS DISTRIBUTION:
Surface Navy Association 2018: Jan 2018, Crystal City, VA

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

ANCHORS & CHAINS

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

ANTI-CONDENSATION COATINGS

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

APPROVED U.S. COAST GUARD MARINE SANITATION DEVICES

Environmental Marine, Inc., 711 Colyer Rd., Bronson, KY, USA, tel:(606) 561-4697, bobkenison@aol.com

AUTOMATIC IDENTIFICATION SYSTEM

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

BALLAST MONITORING

KING-GAGE Systems / King Engineering (tank level & draft monitoring), 8019 Ohio River Blvd, Newell, WV, USA, tel:855-367-2494, marine@king-gage.com, www.king-gage.com

BARGE FABRICATION

McDonough Marine Services, 3500 Causeway Blvd., Suite 900 Metairie, LA 70002, tel:(504) 780-8100, fax:(504) 780-8200, dwalkowski@mcdonoughmarine.com

COATINGS/ CORROSION CONTROL/ PAINT

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

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

COMMUNICATIONS

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

CORDAGE

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

COUPLINGS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA, tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

CRANE - HOIST - DERRICK - WHIRLEYS

Essex Rental Corp., 1601 NE. Columbia Blvd. Portland, OR 97211

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

DRILLS

Haugen Inc., 3001 Hogan Drive Swartz Creek, MI 48473

DRIVESHAFTS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA, tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

Driveline Service of Portland, Inc., 9041 NE Vancouver Way, Portland, OR 97211, USA, tel:(503) 289-2264, fax:(503) 289-5838, info@driveshafts.com contact: Kevin McCaffrey, www.driveshafts.com

EDUCATION

San Jacinto College, 8060 Spencer Highway Pasadena, TX 77505

ENVIRONMENTAL SOLUTIONS

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

Evonik Resource Efficiency GmbH, Active Oxygens, Rodenbacher Chaussee 4, D-63457 Hanau, Germany, tel:+49 6181-59 5326, fax:+49 6181-59 75326, juergen.meier@evonik.com, www.evonik.com/peraclean-ocean

FILTERS/FILTER SYSTEMS

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

GAS GENERATION SYSTEMS

Generon, 16250 Tomball Parkway, Houston, TX, USA, tel:713-937-5200, jalford@generon.com

IGS Generon, 16250 TOMBALL PARKWAY highway 249 Houston, TX 77086

GROUNDING & EARTHING BRUSHES

Sohre Turbomachinery, Inc., 128 Main Street, Monson, MA, USA, tel:413-267-0590, fax:413-267-0592, tsohre@sohreturbo.com contact: Tom Sohre, www.sohreturbo.com

HOISTS

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

HYDRAULIC SYSTEMS

Jastram Engineering, 135 Riverside Drive, North Vancouver, BC, V7H 1T6 Canada, tel:Office: (604) 988-1111 Cell: (604) 808 - 6281, csimon@jastram.com

INTERIOR DESIGN

Metalcolour Sweden AB, Box 510, SE-372 25 Ronneby, Sweden, tel:+46 457 781 00, fax:+46 457 666 75, info@metalcolour.com, www.metalcolour.com

INTERIOR MATERIALS

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LIFESAVING EQUIPMENT

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

LIFT EQUIPMENT

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

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Marine Services Director

Kitsap Transit

Salary: \$ \$8,105 - \$10,899/mo, DOE. , Full Time , Executive

Category: Shoreside Operations

Req: BA in transp. mgt., business, public admin or planning & five yrs of inc. resp. passenger (preferably marine) trans. mgt. exp incl 3 yrs of program mgt and supervisory exp; or an equivalent combination of educ. & experience.

Description:

Kitsap Transit is excited to announce a new and exciting opportunity for a Marine Services Director!!! The person in this position will be responsible for starting up this new passenger-only ferry service. Once underway, this position will manage the day-to-day operation of this service primarily through contracting.

Engineer

New York Trans Harbor, LLC

Full Time , Engineer

Category: Shoreside Operations

Skills:

- High School Diploma or equivalent
- 5-7 years of marine engineering experience
- Knowledge of tools, materials, methods and practices used in repair of maritime vessels
- Thorough understanding of operation of diesel internal combustion engines, associated cooling systems, both A/C and D/C electrical systems, hydraulic systems, fresh and seawater plumbing systems and marine electronics
- Ability to work independently
- Ability to effectively interact with passengers, guests, and fellow employees.
- Ability to work in fast-paced, quickly-changing environment
- Excellent troubleshooting and analytical skills regarding mechanical, hydraulic and electrical failures
- Detailed-oriented, able to motivate coworkers
- Physical ability to climb ladders, lift up to 100lbs. on a regular basis, enter and operate in confined spaces, operate power tools
- Ability to work with exposure to elements such as odor, noise, dust, heat, cold, or chemicals

Description:

The Engineer is primarily responsible for the cosmetic and functional repair of all vessels.

- Execute assigned maintenance, repair and construction tasks; oversee the work of the assistant engineers when required
- Adhere to routine maintenance schedule in order to minimize the disruption to fleet operations
- Paint, repair, clean, and generally improve facilities, vessels and equipment as required by Marine Management
- Assist with inventory management and control
- Efficient and proper utilization of power tools to ac-

complish designated tasks

- Ensure that vessels are maintained in accordance with U.S. Coast Guard standards to ensure compliance with applicable laws and regulations
- Appropriate use of approved Hazmat required for paints, solvents & cleaning agents
- Comply with safety regulations and maintain clean and orderly work area
- Perform other related duties as required and assigned

Sr. Administrator, Marine Recruiting

Crowley Maritime Corporation

Salary: \$ DOE , Full Time

Category: HR / Recruitment

Job Location: 9487 Regency Square Blvd. Jacksonville, FL, 32225 USA

Email: WCResumes@crowley.com

EDUCATION: Bachelor's degree in Human Resources or related field or Bachelor's degree from a maritime academy or equivalent maritime work experience.

EXPERIENCE: 3 – 5 years in an administrative support and/or customer service environment; knowledge of the commercial marine industry required.

TECHNICAL PROFICIENCY: Proficient in Microsoft Office products, including Word, Outlook, Excel and Access.

COMPETENCIES: Ability to communicate verbally and in writing. Ability to establish and maintain effective working relationships. Ability to prioritize, organize and perform multiple work assignments simultaneously while meeting assigned deadlines. Ability to effectively manage projects that may vary in nature and scope. Ability to foster trusted relationships with employees at all levels and with outside resources. Ability to use excellent judgment, decision making, critical thinking and solid analytical skills. Knowledge of Federal and State employment laws. Knowledge of mariner credentialing and applicable USCG regulations. Knowledge of maritime unions and affiliations.

OTHER: Willing to travel and work long hours to meet project deadlines.

Description:

Jacksonville-based Crowley Maritime Corporation, founded in San Francisco in 1892, is a privately held family and employee-owned company that provides diversified transportation and logistics services in domestic and international markets by means of six operating lines of business: Puerto Rico/Caribbean Liner Services, Latin America Liner Services, Logistics Services, Petroleum Services, Marine Services and Technical Services. Offered within these operating lines of business are the following services: liner container shipping, logistics, contract towing and transportation; ship assist and escort; energy support; salvage and emergency response; vessel management; vessel construction and naval architecture; government services, and petroleum and chemical transportation, distribution and sales.

We are a family and employee owned company that was founded over 100 years ago. Crowley encourages its employees to grow and develop within the company and believes our diverse workforce contributes tremendously to our success.

We are currently seeking a **Sr. Administrator, Marine Recruiting**, for our Jacksonville Regency office.

This position is primarily responsible for providing administrative and technical support to the Marine Development and Compliance Department by assisting marine recruiting and administering marine recruiting programs.

Other responsibilities include (but are not limited to): Under limited supervision, provides administrative and technical support to the Marine Development and Compliance Department by coordinating marine recruiting programs and assisting recruiting for marine crew members.

Increases the effectiveness of Marine Recruiting by furthering relationships with internal and external customers.

Facilitates relationships with operations leaders in each business unit to create and maintain hiring standards and strategies.

Collects, compiles, and analyzes data for inclusion in reports and presentation materials.

Exercises independent judgment within department guidelines for recruiting mariners and administering recruiting programs.

Resolves discrepancies and communicates with mariners and external customers.

Responsible for understanding and communicating the technical requirements of marine recruiting and marine recruiting programs to employees and customers.

May provide support by attending recruiting events, which include career fairs and other industry related events.

Conducts collateral duties as assigned.

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Must have VPDS

Must have a valid USCG MMC

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Crewing Manager

Email: tony@transatlanticlines.com

Work Phone: Fax # (504)328-0470

Cell Phone: (504)909-4770

6 Lincoln Avenue Greenwich, CT, 06830 USA

Skills:

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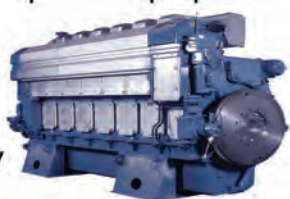


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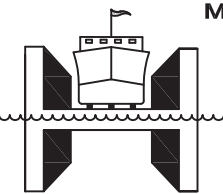
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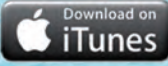

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