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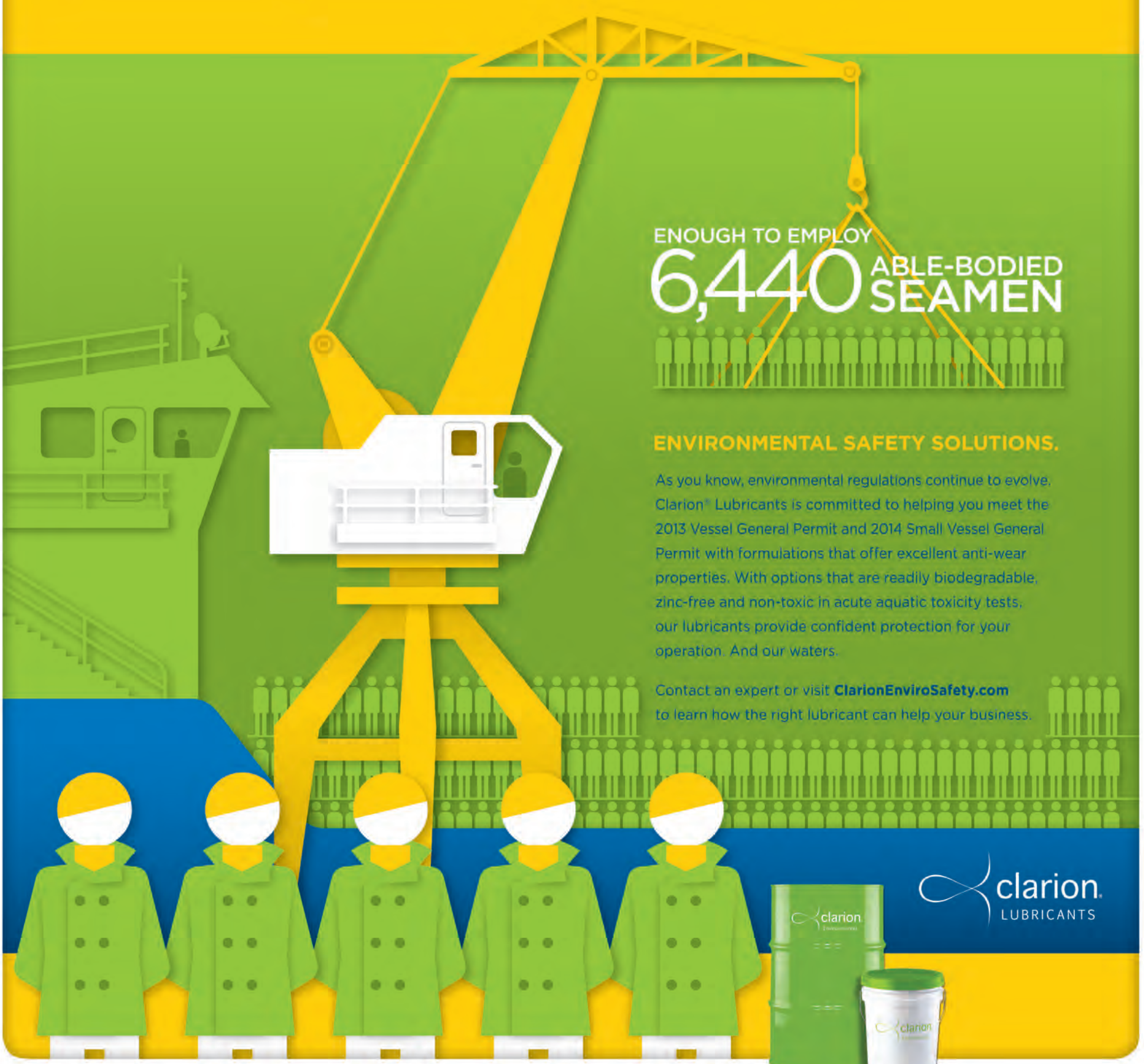

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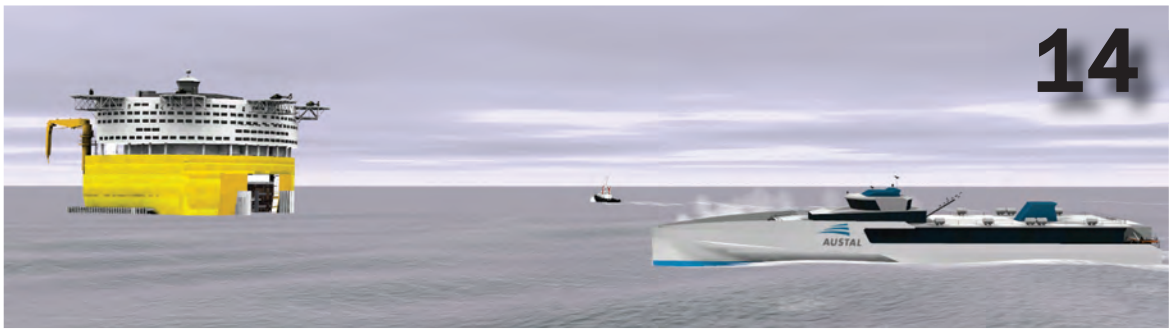

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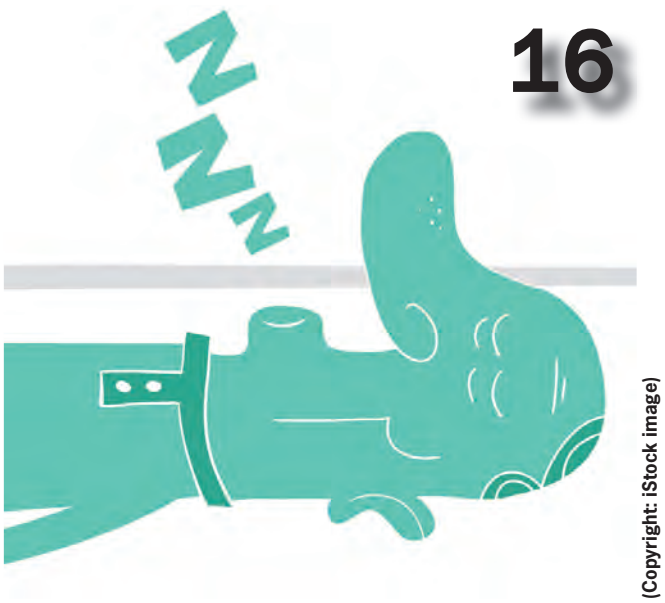

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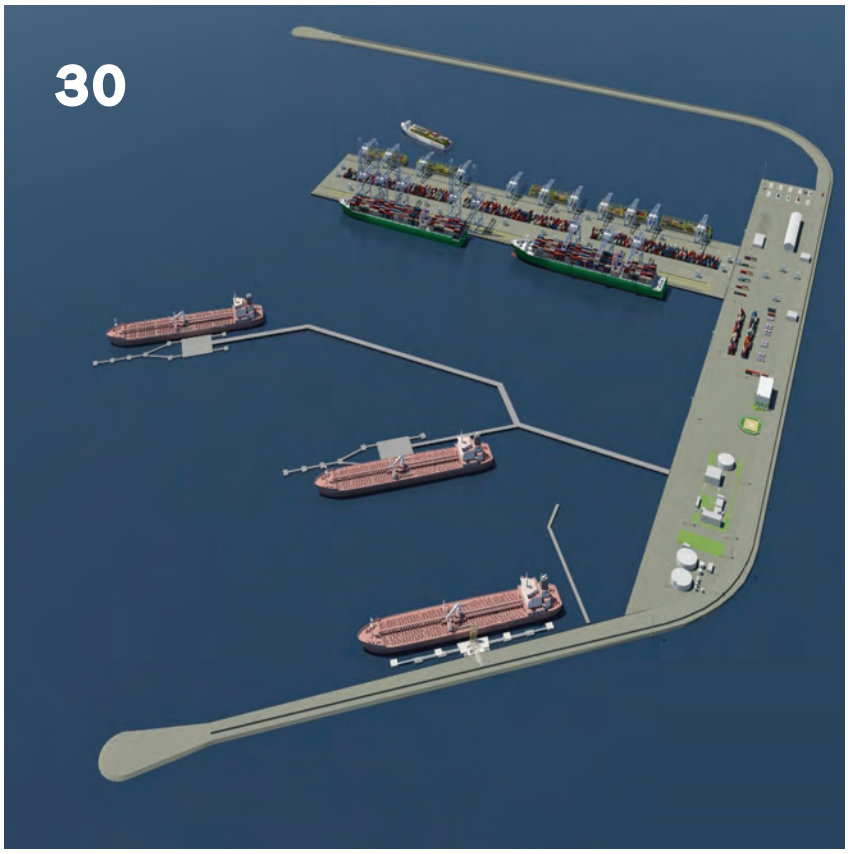

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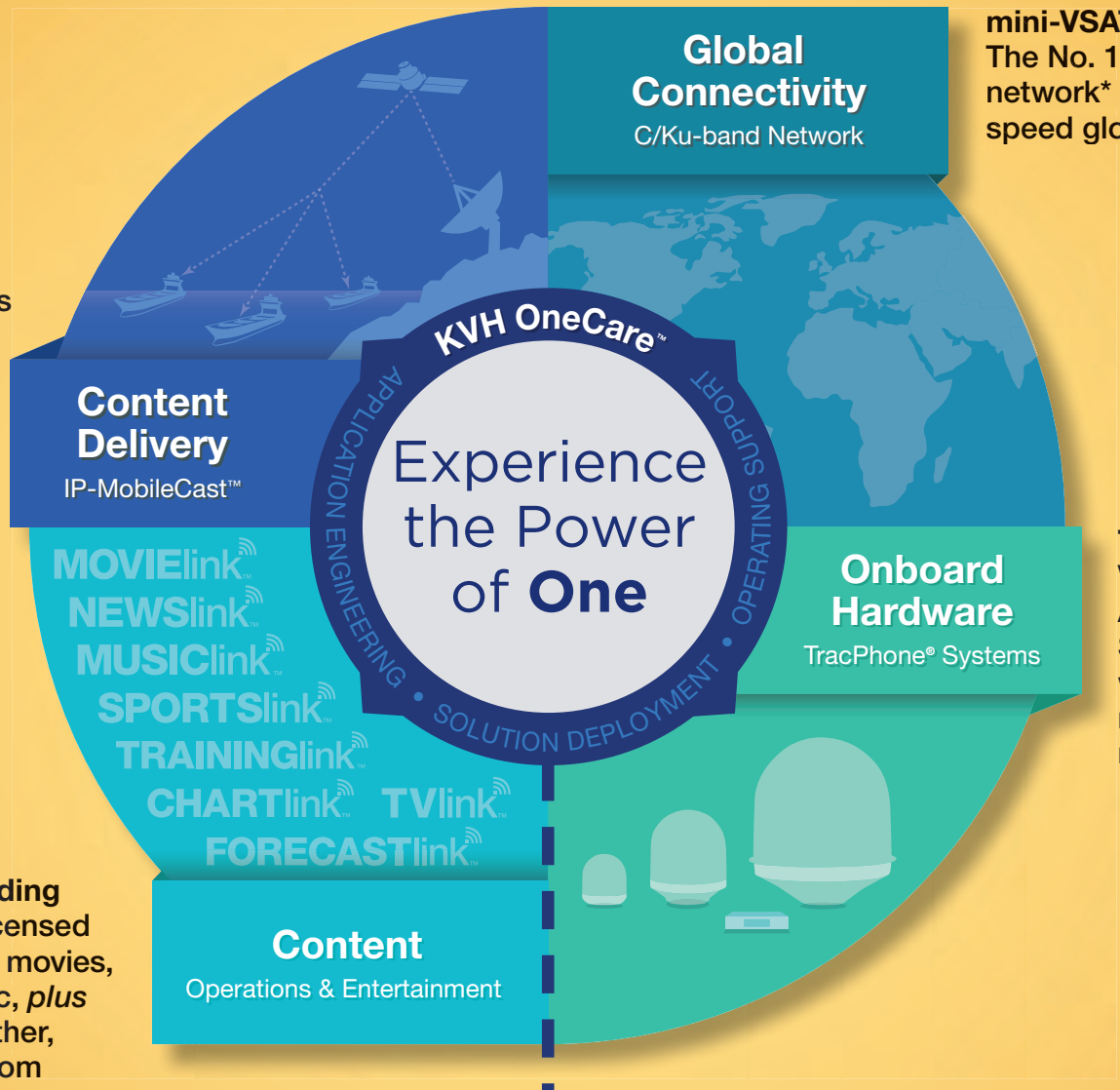

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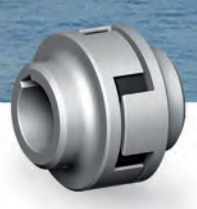

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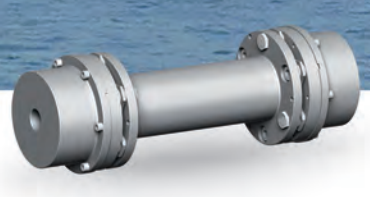

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Offshore Energy ... down, not out ...

GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

Stumbles in the global energy markets have created a gloomy near-term for several offshore energy and maritime sectors, but anyone who is a serious contributor to either realizes the cyclical nature of the business. While the axiom that the offshore energy business will undoubtedly rise high again, this provides little solace to companies that must make painful and sharp near term financial and personnel decisions, not to mention the maritime and offshore professionals who are freshly searching for work. For most companies the rise of the energy market has nothing to do with "if" and everything to do with "when."

This month we attack the energy markets from multiple angles, starting with our "Eye on Design" on page 14 which documents the efforts of SSP Offshore to create an innovative crew boat docking tunnel that runs straight through the center of a big round floater, helping to save on costly helicopter crew transport. MARIN in The Netherlands was instrumental in putting the concept to effective test, using CFD, fast-time simulation and intensive bridge simulator testing.

Continuing on page 18 is guest columnist Joan Bondareff from Blank Rome who examines the proliferation of renewable energy projects. When one says "offshore renewable energy" initial thoughts immediately turn to offshore wind. But Bondareff looks at the development of wave and tidal power projects, looking at the funding and potential for contribution in the near and long term.

Oslo-based contributor William Stoichevski files a pair of reports this month, the first examining the exclusive, high value and infant FLNG market starting on page 36, and the FPSO market on page 42. The latter is of particular interest in tough economic times, as it is a "Guide to Life Extension" of FPSO's, topical today as it provides the most cost effective means to continue developing offshore oil fields.

Starting on page 59 we look at an amazing new heavy lift ship and capability from Dockwise, the Dockwise Vanguard, a unique vessel which has made the transport of massive offshore structures and systems efficient and fast.

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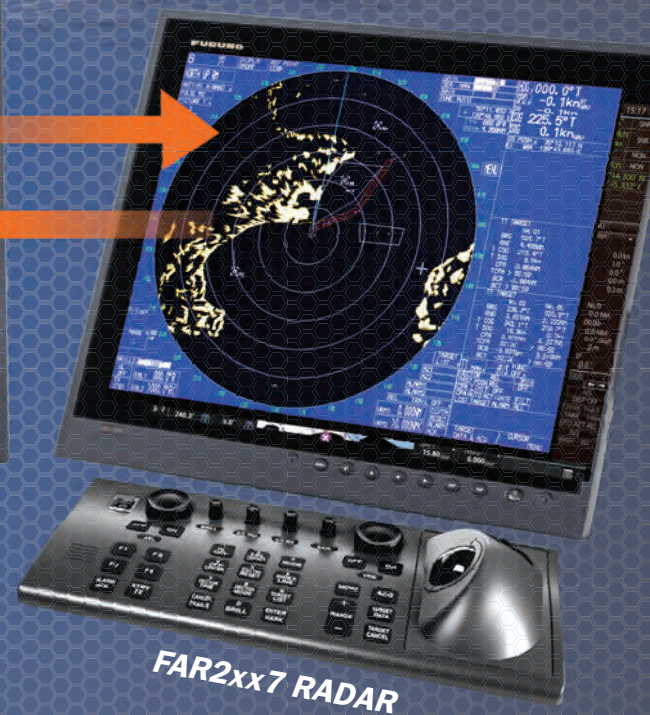

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Keeping up with the Jones (Act)

Joseph Keefe is the lead commentator of MaritimeProfessional.com.

Puerto Rico's money woes have nothing to do with the Jones Act. Arguably, the U.S. island would be worse off without it.

In the late 1980's, I was toiling for a small maritime consulting group, traveling probably 20 days per month, following oil tankers around the globe as they lifted and discharged various cargoes for oil traders and multi-national refining groups. It was wonderfully satisfying work, typically conducted at 3 AM in a sweaty tank farm while swatting mosquitoes large enough to carry away small pets with a single bite. And it involved other pleasant tasks such as making telephone calls to Wharton-educated oil traders who resented having their afternoon squash match interrupted by a perspiring surveyor who had bad news about the dog-of-a-ship they had chartered 45 days prior, at a huge discount, in the hopes of increasing the margins on a less-than-savvy crude oil lifting.

As it turned out, one of the places I was dispatched – on a regular basis – was the island of Puerto Rico. In fact, I spent the better part of two years traveling back and forth to the island, often staying 10 days or more at a whack before fleeing back to the mainland. Hence, I know a little bit more than most about ocean shipping in and out of the island. I'm embarrassed to say that, given the amount of time I spent there, my conversational Spanish skills should be a lot better. On the other hand, my experiences there give me a unique perspective that others perhaps do not.

For the most part, I was assigned to attend marine petroleum custody transfers for all manners of liquid cargoes; crude oils, condensate and refined products. Along the way, I vetted ships for suitability and safety, maintained loss accounting records and looked for ways to increase efficiencies for my local, refining and trading clients. It didn't always go well for the client here, and at one point, I was asked to do a full evaluation – paper and physical infrastructure – of their primary facilities. When I was done, the reasons why became fully evident.

I walked every pipeline in that terminal, located and recorded every valve and its position, and when I was done, I presented my report to the client. Their physical and paper losses were likely to continue, I said, unless they began to employ fully independent and competent security, 24 hours per day, 365 days per year. That's because it didn't take a genius to see that unlocked gates at supposedly inactive truck racks, where mysterious tank trucks would show up at odd hours and idle for predictable periods of time, were eating into the profits. Alleged custody transfer losses, in theory of the ship-to-shore kind, were largely paper-generated, and a function of what was happening ashore.

Interestingly, the vast majority of the countless vessels that I boarded and surveyed during my time spent on the island were foreign registered vessels, with U.S. flag product tankers arriving only to haul refined products to the U.S. East Coast. Sometimes, the client might even get a Jones Act waiver when no U.S. flag asset was available. Jones Act trade was actually quite a small percentage of the overall marine traffic in and out that port, and in the end, had little to do with economic success or failure of the operations ashore.

Eventually, I moved on to another job, which took me to other exotic and equally grimy tank farm terminals, and so I understand, the facility in Puerto Rico also eventually closed its doors. To be fair, what I saw and experienced there could happen just about anywhere, but from my bird's eye perspective, the basis for a prosperous and successful local economy – built on local industry, ocean trade and tourism – were always present, but never fully realized. At the time, a low mileage rental car at San Juan's International Airport was defined as anything with less than 30,000 miles on the odometer and the local infrastructure was crumbling and dangerous. It was a tough place to work then, and based on what is being reported today about the island's economy and so-called debt crisis, I'm guessing that it hasn't gotten any better. Again, that's got nothing to do with the Jones Act.

Local Debt & Ocean Shipping: Apples & Oranges

Claims of a causal link between the costs associated with U.S. domestic maritime policies and the reported $72 billion debt crisis facing the Commonwealth are being bandied about by local pundits as an example of what can happen when the Jones Act holds a particular geographic economy hostage. One such account, a report commissioned by the government of Puerto Rico, holds that all islands suffer from high transportation costs. And, the report claims, Puerto Rico "does so disproportionately, with import costs at least twice as high as in neighboring islands on account of the Jones Act, which forces all shipping to and from U.S. Ports to be conducted with U.S. Vessels and crews." In contrast, a 2013 study of the Jones Act in Puerto Rico by the U.S. Government Accountability Office (GAO) doesn't necessarily agree.

One of the primary advantages to Jones Act rules, according to GAO, is the nature of the just-in-time service that regular liner routes provide. If replaced by foreign flag tonnage, the report insists, the likelihood of dedicated liner service to the island would be substantially reduced, and the quality and timeliness of freight service impacted. Beyond this, GAO reported that in 2011, at least two-thirds of the ships serving Puerto Rico were foreign registered, representing as many as 55 different foreign flag carriers. Apparently, then, there is plenty of competition to deliver low cost freight to Puerto Rico.

Correctly pointing out that most developed trading nations have cabotage laws applied to various modes of domestic commerce, the GAO study also says that foreign-flag ships are not subject to U.S. taxation, U.S. immigration, and other U.S. laws. Faced with those impediments to the bottom line, the report goes on to say, the perceived gap in transport costs would largely evaporate.

As I write this blog, a massive, domestic, multi-shipper capital improvement program is underway for carriers in the Puerto Rico trades.

The U.S. built vessels that will soon join this freight corridor will be among the best, most environmentally correct of any operating anywhere else on the planet. All of that investment brings me around to a larger point, and question: What do we tell U.S. flag operators who collectively operate 40,000 domestically built hulls that the Jones Act is no longer valid? And, don't tell me that you can selectively eliminate the cabotage rules in one locale (Puerto Rico, for example), but not another. It's like being a little bit pregnant.

Actually, the most articulate response to Jones Act naysayers I've heard in the past 10 years came from U.S. flag operator Morton Bouchard III, who told *MarineNews* magazine back in November of 2014, "The continuous failed attempts by companies to circumvent the Jones Act are amazing to me. This legislation will not change. From our inception, Bouchard has invested well over five billion dollars in vessels built in the United States, crewed by United States seamen and owned by the Bouchard family.

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Henry Every
The King of Pirates

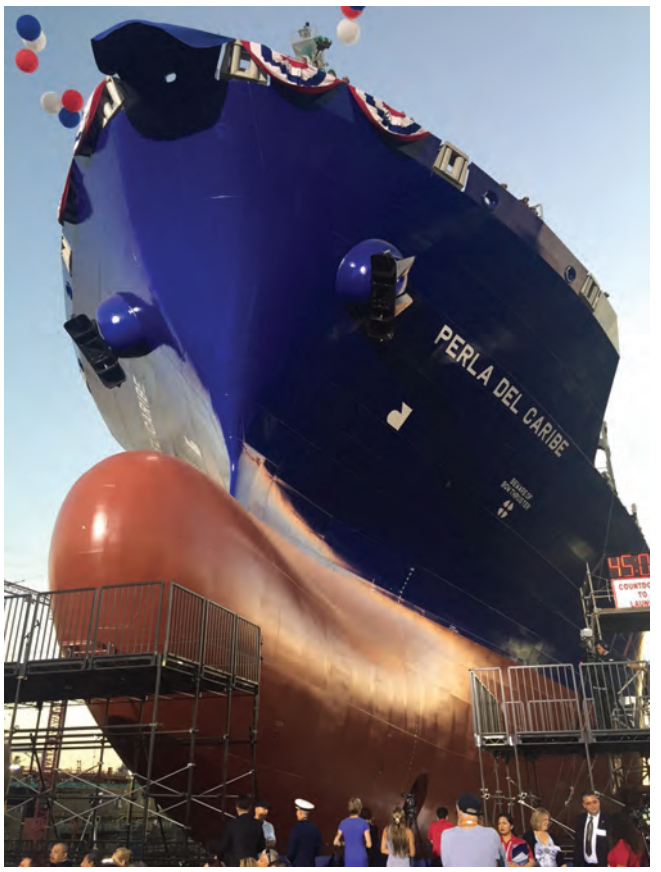
Henry Every (or Avery) is remembered for capturing the richest pirate prize ever and also for apparently being wise enough to retire from the business and enjoy his ill-gotten gains. He was born in the West Country of England, famous for providing England with a large percentage of its seafarers. He served briefly in the Royal Navy, and then moved on to the slave trade, where the pay was better although dishonorable. In 1693, he was serving as first mate on the Spanish privateer Charles II when the crew became disgruntled and mutinied. The ship was renamed Fancy and Every was elected captain. After plundering ships off West Africa, they moved into the Indian Ocean. In 1695, the Fancy had reached the Red Sea and joined up with a number of other pirates. They launched an uncoordinated attack on the Mughal treasure fleet that included the main treasure ship Ganj-i-sawai and the smaller Fateh Muhammed. Thomas Tew, commanding the pirate sloop Amity, was killed in an attack on the Fateh Muhammed. The Mughal ship, though, had incurred significant damage from that attack and was unable to withstand a second attack by Every on the heavily-armed Fancy. Every then turned his attention to the even larger Ganj-i-sawai, capturing it also. The pirate crew was incensed by the damage inflicted by the Indian vessels and promptly tortured and killed most of the Indian sailors and soldiers on board. They also attacked the Indian women on board, many of whom committed suicide to escape their fate. The treasure on the two Indian ships was enormous, with an estimated value of £600,000. Every's share made him the richest pirate in history. Because Britain was seeking good relations with the Mughal Empire, it launched a worldwide manhunt for Every and his crew. They had fled to the Bahamas, where they divided the treasure and split up. Many, though, were eventually captured, tried, convicted, and hung. Henry Every was never heard of again. Rumors circulated that he had changed his identity and assumed a quiet life back home in the West Country, but there was no evidence to support the story.

– Dennis Bryant, MarPro

(Continued from page 8)

Keeping up with the Jones (Act)

During the past few years, Bouchard has again invested well over one billion dollars in new equipment. This investment could have certainly been cheaper if built in foreign shipyards. However, consider all the jobs that were created and the taxes that Bouchard and the shipyard paid, again, in compliance with existing regulations, which gets back to my first issue in managing Bouchard – it all comes full circle. And as for the oil industry's complaint that rates are too high, I didn't hear them complaining years ago when owners were losing money. The Jones Act was fine then."



Self-Inflicted Wounds

When the United States government decided that it no longer needed the Naval Base at Roosevelt roads, Puerto Rico, back in 2004, it also signaled the end of an era for the local island economy which took a massive hit when the federal money dried up. As a young Third Mate sailing for the U.S. Navy's Military Sealift Command, I visited the port and base more than once in the early 1980's. It was a vibrant operation then, supporting not only the important training of military aviators, but also accounting for as much as 75 percent of the money flowing into local businesses. Nevertheless, the Navy no longer had any need for the base after it halted test bombing of the island of Vieques following years of protests.

Local Puerto Rico officials are still bitter about the base closure, some of whom believe that the U.S. government was punishing them for the loss of their training areas. In truth, it was merely a savvy financial decision (our government does makes them once in a while) to withdraw from the island. Shortsighted local activists (arguably) got exactly what they deserved when they failed to comprehend that the end of the training also signaled the end to the need to operate from the remote location. The impact on the local economy continues to this day, and reverberates all over the rest of the island. In many respects, the drama reminds me of what happened in the Philippines when the U.S. Navy pulled out of Subic Bay when the local government there wanted too much in return for the extension of local leases on the port land. But, I'm moving off point here again.

Bottom Line

The other usual Jones Act defense arguments also apply, including the need to maintain a robust shipyard industrial base and trained mariners to support the U.S. military and protect our shores during times of peace and war. Circling back to Puerto Rico, a $72 billion debt crisis has many causes, but to blame the Jones Act for the island's woes is simply shortsighted, and frankly, a misguided effort to point fingers elsewhere when the real problems exist much closer to home. U.S. flag shipping has provided reliable and regular service to the island for many years. That's not going to change, and, in reality, it may be one of the things that help the island to recover. In May, for example, Crowley Puerto Rico Services announced that it had executed a $48.5 million construction contract for a new pier at its Isla Grande Terminal in San Juan, Puerto Rico, further solidifying its commitment to the region. In conjunction with the investment, the company and the Puerto Rico Ports Authority (PRPA) also concluded a 30-year lease extension for the Isla Grande property. That kind of investment – and local commitment – is exactly what is likely to create jobs and prosperity, with associated tax revenues. What about simple, one-off port calls from a low cost flag of convenience carrier? Not so much. Let's keep our eye on the ball here.

For Puerto Rico, keeping up with the Jones family also means keeping the Jones Act intact.

– MarPro

Investment in Puerto Rican Trade

Pictured above is Perla del Caribe, the second of two LNG-fueled Marlin Class ships built by General Dynamics NASSCO for Tote, was launched at NASSCO's yard in San Diego. The 764-foot-long Perla del Caribe and sister ship, christened Isla Bella, are Jones Act vessels built for the Puerto Rican trade for TOTE Shipholdings and will be operated by TOTE subsidiary Sea Star Line out of Jacksonville, Fla.

(Photo: General Dynamics NASSCO)

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Bart Otten

President, United Technologies Corp. Fire & Security EMEA

Maritime Reporter talks with Bart Otten, President, United Technologies Corporation Fire & Security EMEA, at this year's biggest maritime trade show, the Nor-Shipping Exhibition, regarding the company's Joint Maritime Approach.

By Henrik Segercrantz

Bart Otten heads the Fire and Security Business Unit of UTC in Europe, Middle-East and Africa both for the land and marine business sides. He is also in charge of United Technologies' entire Marine business initiative. Based in the Europe head office in Brussels, Otten, a Dutch citizen himself, has worked within the UTC Group since 2007.

United Technologies Corporation provides a broad range of high-technology products and services to the global aerospace and building system industries. Listed on The New York Stock Exchange net sales of UTC in 2014 were $65.1 billion. UTC employs more than 212,000 people. In 2013 Thomson Reuters listed UTC among the world's 100 most innovative companies, and UTC ranks number 45 on Fortune Magazine's list of 500 largest U.S. companies. UTC is well known for its aerospace and defense products, among them Pratt & Whitney propulsion systems. It recently received much media coverage through the sales of the Sikorsky Aircraft business to Lockheed Martin Corp.

UTC Building & Industrial Systems business is the world's largest provider of building technologies with some 118,000 people, 77 factories, 48 R&D centers, and some 2,500 branch offices around the world, and representing approximately 45% of consolidated sales. Otten heads the global marine businesses development initiative of UTC which includes the marine business of the well known Otis elevators, Carrier air conditioning and heating systems, Autronica Fire & Security and Marioff, two other companies well known to the maritime industry. "UTC is a 65 billion dollar business globally. If you look into the individual brands I would say Autronica, Marioff and Carrier are leading brands within the marine segment. In quite a number of cases we have a very strong position in the marine segment," Otten tells Maritime Reporter at UTC's exhibition stand at Nor-Shipping. "I have been working in the fire and security industry for 27 years. Our Fire and Security business goes from a simple extinguisher to the entire fire suppression system of Marioff and detection systems by Autronica but includes also video cameras and access control."

We talk about the history of Otis, which has been in business for more than 160 years, and which delivered its first marine elevator to the U.S. Navy in 1915. "With Otis elevators we are re-entering into the marine space." UTC acquired the Spanish Enor marine elevator company in 2012, to re-enforce its marine elevator applications. "Here we are not in a leadership position from the market segment point of view, but I would say we are more and more in a leadership position from the technology point." Also the other companies have a long history.

Carrier was established in 1902. It supplied the first ocean liner HVAC system ever, to S.S. Normandie. Today Carrier Marine & Offshore operates globally.

Autronica Fire & Security has supplied fire and gas safety systems since 1957 and has, as Marioff, references onboard thousands of vessels. Marioff, the originally Finnish company that invented the HI-FOG high pressure water mist fire suppression system, was acquired by UTC in 2007. Other well known brands and companies owned by UTC include, among others – Automated Logic, Chubb, Kidde, Lenel, and Onity.

Maritime Reporter learned that UTC is today focusing more on a joint approach in its sales to the maritime industry. "The companies have an individual approach towards the customer, but if we are negotiating some big projects with the large shipyards or ship owners, we will see more and more a joint large-scale UTC approach towards these customers. We say – Hey, we do not only offer Autronica or Marioff but we also offer Otis elevators and Carrier and what

"The companies have an individual approach towards the customer, but if we are negotiating some big projects with the large shipyards or ship owners, we will see more and more a joint large-scale UTC approach towards these customers. We say – 'Hey, we do not only offer **Autronica** or **Marioff** but we also offer **Otis** elevators and **Carrier**."

is important here, we can do a good level of technology integration for the benefit of you as a client," Otten said.

"We are taking a joint approach to the marine segment, so you will see us not only run exhibition stands with all the marine businesses joining, but we will be utilizing our global network and the specialized expertise in each individual brand in developing our global marine services," Otten said. He also wants to highlight the technical developments taking place. "It is important that we work more and more on technology integration of the systems and solutions that we offer to the marine industry. You will soon see integrated solutions by UTC onboard ships."

As an example he mentions Autronica's ISEMS emergency management and evacuation system already working together with Marioff's HI-FOG suppression system but there is a lot more of integration possibilities.

Otten does not want to reveal much about their future plans regarding acquisitions.

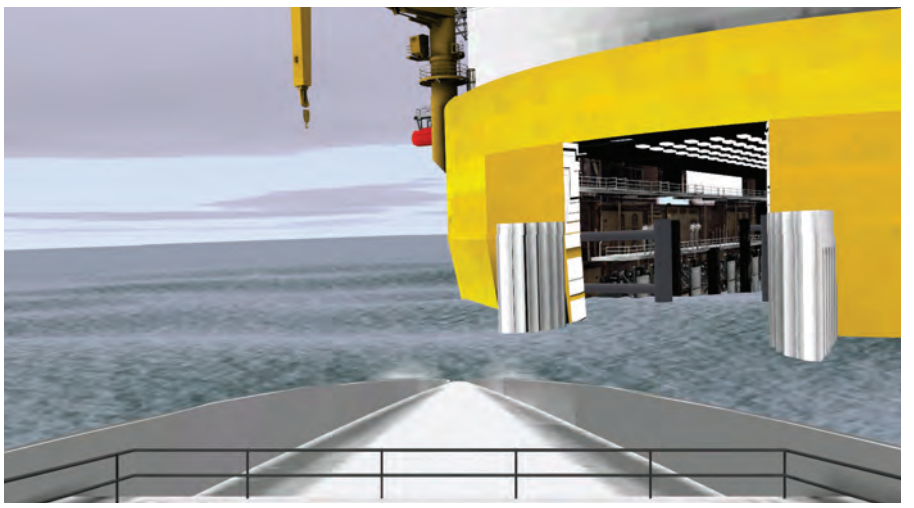
"I think that if you look into the marine segment, I would say, we have a pretty solid coverage today, but we always look out for opportunities that are complimentary to our product lines."

"I think the marine segment offers for UTC a significant opportunity for growth, especially the cruise ship segment. I think if you look at the cruise vessel segment everyone recognizes that it has been a successful industry that is fast growing, when you look at the number of cruise vessel orders. That is outstanding. It is an attractive hi-tech segment where we have a lot to offer. Looking outside of cruise vessels we are also in the other ship and offshore segments too, so marine is a very relevant industry for UTC where we invest a lot. Half of Marioff's business is within the marine segment and that of Autronica is some 35 percent. We have dedicated Carrier and Otis teams for the marine segment so we consider marine as attractive and important."

CFD to Assess SSP's Crew Boat Docking Tunnel

BY JOOP HELDER

MARIN combined CFD with fast-time simulations and intensive testing on its bridge simulator to explore the full potential of the new SSP HUB.



To save on costly helicopter crew transport, SSP Offshore took a good look at its SSP Plus design and decided to add a large crew boat docking tunnel, running straight through the center of the big round floater. The tunnel allows fast sailing crew boats to dock inside the HUB, thereby cutting out helicopter transfers. MARIN was put to work testing the HUB design to make sure a safe crew boat entry into the unit was possible under extreme operational conditions. A multi-stage campaign was required, ranging from CFD calculations to determine the complex interaction of the HUB's exceptional design with the environment, to intensive simulation exercises on the bridge simulator with experts from SSP, Austal and MARIN.

To be located offshore Brazil, the SSP HUB features an omni-directional shape and the ability to rotate, thereby redirecting its tunnel position depending on the environmental conditions. If beneficial, the tunnel can be closed by weather tight doors on the wave-ward side of the unit.

Safe Crew Bboat Entry

One of the key questions SSP needed answering was whether the HUB was able to accommodate safe crew boat entry in the harsh environmental conditions of the Santos Basin. For this, the unique design of the shallow docking tunnel running through the floater could be a determining factor. Waves typically change their height, length and direction when travelling over a sudden transition from deep to shallow water, and could thereby hamper the crew boat pilot during entry into the tunnel. Current and wind travelling around the HUB, and possibly through the tunnel, could further restrict the approach and docking operation. By using a combination of CFD tools, MARIN set out to study the complex wave, wind and current flow phenomena that occur around the entrance of the HUB tunnel. As these flows are driven by non-linear effects, conventional linear potential flow tools are simply not capable of capturing the flow details with enough accuracy.

Environmental Conditions

Wind and current velocities inside and outside the HUB were computed using ReFRESCO, for both a completely open tunnel and a tunnel that was closed on the side affected by the environment. For a range of environmental conditions flow fields could be visualized in detail and showed recirculation, shielding and intensification zones. The results will allow SSP to anticipate environmental directions, for which the CFD predicted strong cross flows at the entrance of the tunnel, by using the rotating capabilities of HUB.

To get a better understanding of the wave patterns inside the docking tunnel, unsteady wave simulations were performed using ComFLOW. Special attention was paid to possible resonant wave modes inside the tunnel. The results of the CFD provided SSP with critical wave amplification factors inside the tunnel, together with the environmental conditions for which these amplifications occur. With this knowledge, SSP can set criteria for redirecting the HUB, using the weather tight tunnel doors and possibly other mitigation means to avoid large water motions inside the tunnel.

Simulation Study

To provide SSP with the answers it is looking for, the knowledge obtained from the CFD simulations were only half of the equation. The capabilities of the Austal Trimaran crew boat and captain also had to be taken into account. To that end, a realistic and fast-time simulation model of the HUB, environment and crew boat was developed and put to the test on MARIN's bridge simulator. To achieve realistic simulation exercises, the environmental conditions on the simulator were tuned using the CFD simulations and a detailed model of the interior of the tunnel was made including moveable fenders that guide the vessel into the tunnel. An accurate maneuvering model of the trimaran was created in cooperation with Austal. With the use of the CFD results the HUB's rotational capabilities and weather tight doors were exploited to the maximum to create the optimum entry condition for any given environment.

In the end, a week of extensive simulations found that the SSP HUB was indeed able to accommodate a safe entry in the harshest environments – a conclusion made possible by a unique combination of CFD analysis, real-time simulations and comprehensive simulator exercise.

The Author

Joop Helder is Project Manager of the Offshore Department of MARIN. MARIN offers simulation, model testing, full-scale measurements and training programs, to the shipbuilding and offshore industry and governments.

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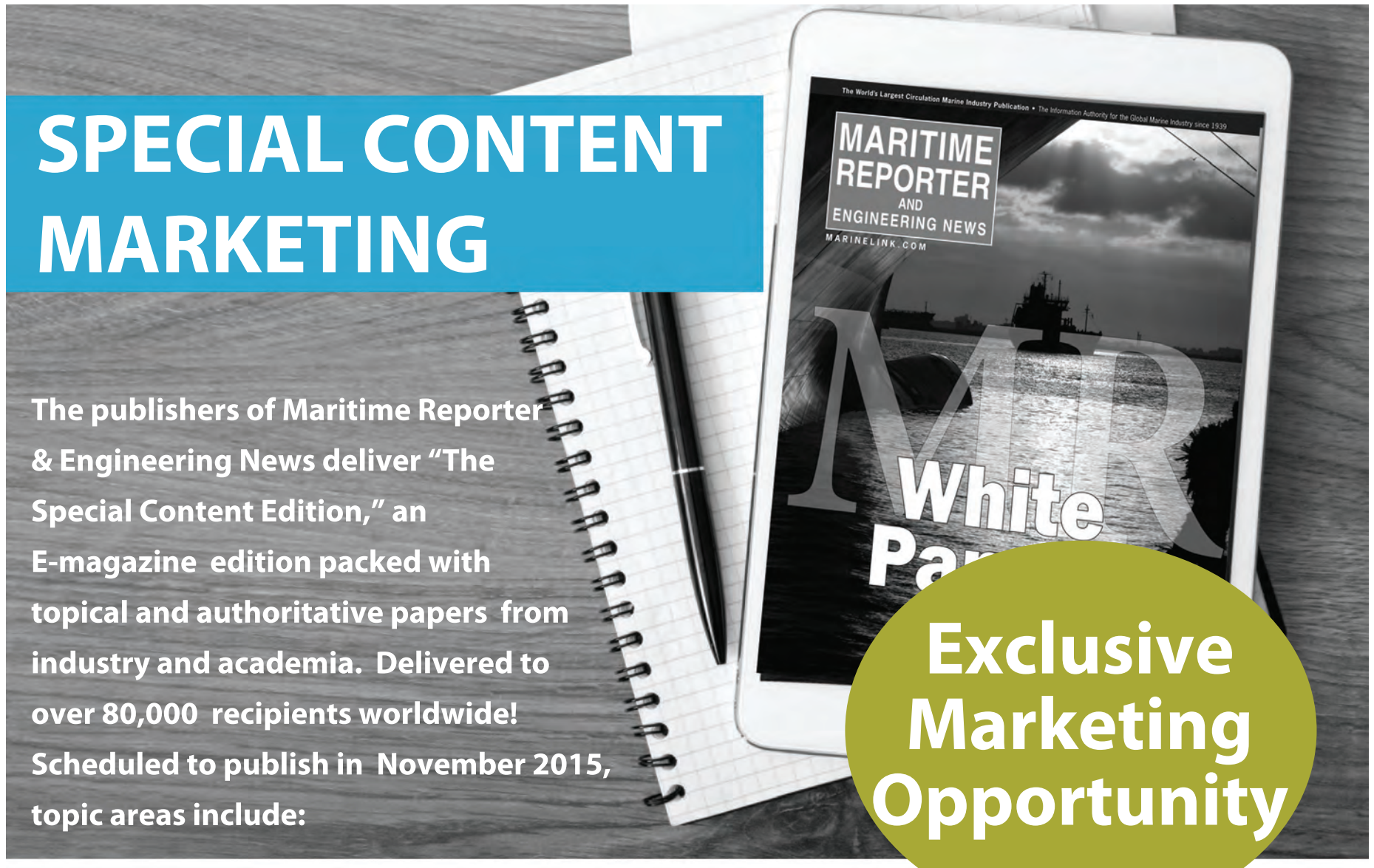

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Sleep Apnea

BY DENNIS BRYANT

On June 23, 1995, the cruise ship Star Princess, carrying 1,568 passengers and 639 crew, grounded on charted and marked Poundstone Rock in the Lynn Canal of Alaska. Although there were no deaths or injuries, the ship's bottom was ripped open. Repairs cost $21.16 million. The National Transportation Safety Board (NTSB) determined that the probable cause was the pilot's poor performance, which may have been exacerbated by chronic fatigue caused by sleep apnea. Among other things, the NTSB recommended that the U.S. Coast Guard advise pilots about sleeping disorders such as sleep apnea and review its medical standards, guidelines, and examination forms to ensure that they require disclosure and appropriate evaluation of the history or presence of any medical conditions, symptoms, or medication use that would affect an individual's fitness for duty as a pilot.

On 23 January 2010, the tanker Eagle Otome was inbound in the Sabine-Neches Canal en route Beaumont, Texas. The general cargo vessel Gull Arrow was docked at a facility on the Canal unloading cargo. The outbound towboat Dixie Vengeance was pushing two barges, the tank barge Kirby 30406 being the forward barge. The tanker experienced several unintended diversions, culminating in it striking the moored cargo vessel. Despite the towboat putting its engines full astern, a collision between the tanker and the forward barge of the tow ensued. There were no deaths or injuries, but there was a significant oil spill and significant damage to the vessels involved. The NTSB determined that the primary cause of the casualty was the failure of the pilot on the tanker to correct the shearing motions that began as a result of the late initiation of a turn at a mild bend in the waterway. Contributing to the casualty was the pilot's fatigue, caused by his untreated obstructive sleep apnea and his work schedule.

The Coast Guard recently announced a proposed change to its policy regarding specific medical conditions, including obstructive sleep apnea, which it would consider in determining whether a medical waiver is warranted for merchant mariners applying for new or renewed merchant mariner credentials (MMCs). The proposal, particularly with regard to sleep apnea, has received strong support from the NTSB and the American Academy of Sleep Medicine and qualified support from the American Pilots Association (APA).

Definition

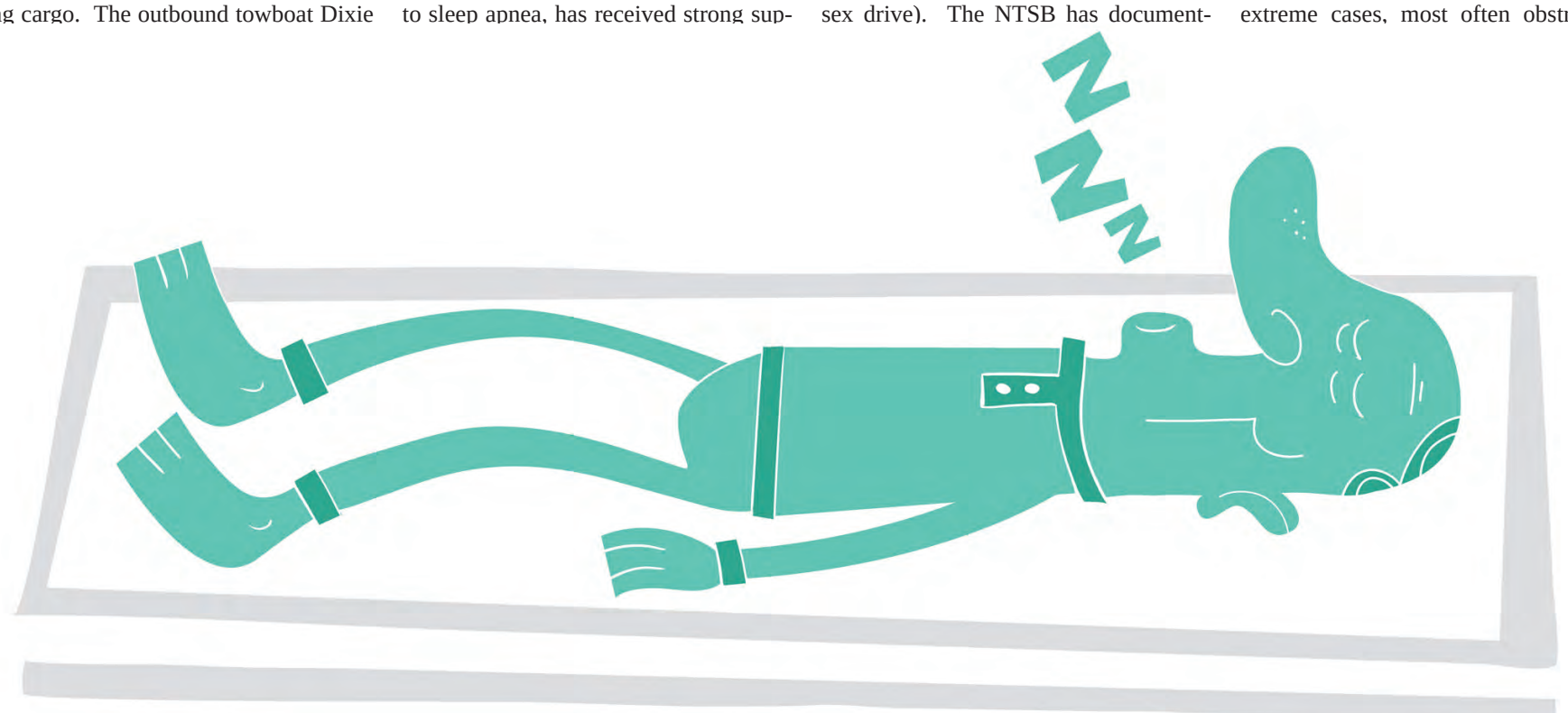
The Mayo Clinic describes sleep apnea as "a potentially serious sleep disorder in which breathing repeatedly stops and starts." The most common type is obstructive sleep apnea in which the throat muscles relax while the individual sleeps, blocking the airway. This leads to a deprivation of oxygen (hypoxia) in the blood stream and an excess of carbon dioxide (hypercapnia). In extreme cases, which are rare, this may result in death. Commonly though, sleep apnea interrupts normal sleep (even if the individual is unaware of the interruption, as is quite common), making sleep less restful. The individual has issues with excessive daytime sleepiness and impaired alertness, slower reaction times, and vision problems. Sleep apnea increases one's risk of driving accidents and work-related accidents. It can also exacerbate moodiness, belligerence, as well as decreasing drive (including the sex drive). The NTSB has documented numerous transportation accidents, across all modes, where sleep apnea was the leading or contributory cause.

Diagnosis

The medical professional may suspect that an individual suffers from sleep apnea based on existing symptoms, such as excessive daytime sleepiness and fatigue. A formal sleep study is then undertaken. This study, normally performed in a clinical setting, establishes an objective diagnosis indicator linked to the number of apneic (interrupted) events per hour of sleep. Mild obstructive sleep apnea (OSA) is generally considered to have between 5 and 15 events per hour, moderate OSA has between 15 and 30 events per hour, and severe OSA has in excess of 30 per hour. An apneic event generally is defined as a minimum ten-second interval between breaths, with either a neurological arousal (a three-second or greater shift in EEG frequency) or a blood oxygen desaturation of 3% or greater, or both.

What can be done?

While surgery may be called for in extreme cases, most often obstructive



(Copyright: iStock image)

sleep apnea can be effectively managed with continuous positive airway pressure (CPAP) or automatic positive airway pressure (APAP). The individual wears a plastic facial mask while sleeping. The mask is connected by a flexible tube to a small bedside CPAP or APAP machine. The CPAP machine generates a predetermined air pressure to keep the individual's airways open during sleep, eliminating the interruption of normal respiration during sleep. The APAP machine uses a sensor to adjust the air pressure so as to maintain the appropriate level. Although such therapy has proven extremely effective and is less expensive than other options, some individuals find it quite uncomfortable, causing chest discomfort, skin or nose irritation, and a feeling of being trapped. Tests are underway on neurostimulation techniques that sense respiration and apply mild electrical stimulation during inhalation, which pushes the tongue slightly forward so as to open the airway. Medication is being tested for central sleep apnea (which is relatively rare), but none has been identified yet for OSA. Low doses of oxygen has been tested as a treatment, but is discouraged due to side effects. Dentists can fabricate an oral appliance, called a mandibular advancement splint, which shifts the lower jaw forward and opens the bite slightly. Such a device has proven successful in individuals with mild to moderate OSA.

It is estimated that more than 6% of Americans suffer from at least moderate sleep apnea. Risk factors include sex (males have a higher risk than females); excess weight; large neck size (having more tissue in the neck to press against the airway); enlarged tonsils or tongue; small lower jaw bone; gastroesophageal reflux (commonly called heartburn); allergies; sinus problems; a family history of sleep apnea; or a deviated septum. Other factors include smoking; excess use of alcohol, sedatives, or tranquilizers; and age.

Sleep apnea is increasingly recognized as a threat to maritime and transportation safety. What is unclear is the level of this threat and the appropriate response. The severity of sleep apnea varies greatly. Thus, its impact on maritime safety varies greatly. Recognition that sleep apnea presents a threat to maritime safety is the first step to addressing the problem, but only the first step in a complex process. Further data must be gathered to determine how to structure an appropriate approach for addressing each individual mariner's situation. This will require the combined efforts of the U.S. Coast Guard, the medical community, the maritime industry, and individual merchant mariners.

The Author

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Riding Waves & Tides to a Cleaner Energy Future

BY JOAN BONDAREFF

When one thinks of offshore renewable energy, one usually thinks of offshore wind. For the first time progress is being made in the U.S. to develop offshore wind resources. The first steel foundation jacket has been placed in the ocean floor to support the Deepwater Wind project off the coast of Block Island, Rhode Island. (See www.dwwind.com/press/#/1). But recently, progress is also being made in the development of tidal and wave energy resources closer to shore, which are known as marine hydrokinetic or MHK resources. MHK projects generate electricity from waves or directly from the flow of water in ocean currents, tides, or inland waterways. Ocean thermal energy is also part of the MHK equation but has not been actively pursued in recent years.

MHK Potential

The Department of Energy (DoE) has reported the following available MHK resources close to the U.S. coastline:

1.) The technically recoverable resource for electric generation from waves is approximately 1,170 terawatt-hours (TWh) per year which is almost one-third of the 4,000 TWh of electricity used in the U.S. each year. Approximately 85,000 homes can be powered by 1 TWh/year.

2.) The technical resource potential for tidal generation is estimated to be 250 TWh/year. Alaska has the most locations with high kinetic power density, followed by Maine, Washington, Oregon, California, New Hampshire, Massachusetts, New York, New Jersey, North Carolina, South Carolina, Georgia, and Florida.

3.) The technical resource potential for electric generation from ocean thermal resources is estimated at 576 TWh/year in U.S. coastal waters, including all 50 states, Puerto Rico, and the Virgin Islands.

With support from the federal and state governments and industry, these resources could provide an excellent source of renewable energy for generations to come.

Funding Availability, Projects, and Permitting of MHK Resources

Funding to support the development of MHK technology is available from both DoE and the Navy, and the two agencies often combine their resources to promote this new energy resource.

The Navy has its own test site for wave energy in Kaneohe Bay on the island of Oahu, Hawaii. Last year, the Navy awarded $8 million to the University of Washington to develop marine renewable energy for use at the Navy's facilities worldwide. This is intended to help the Navy meet its commitment to get one-half of its energy from renewable sources by the year 2020. (http://www.washington.edu/news/2014/10/24/u-s-navy-awards-8-million-to-develop-wave-tidal-energy-technology/).

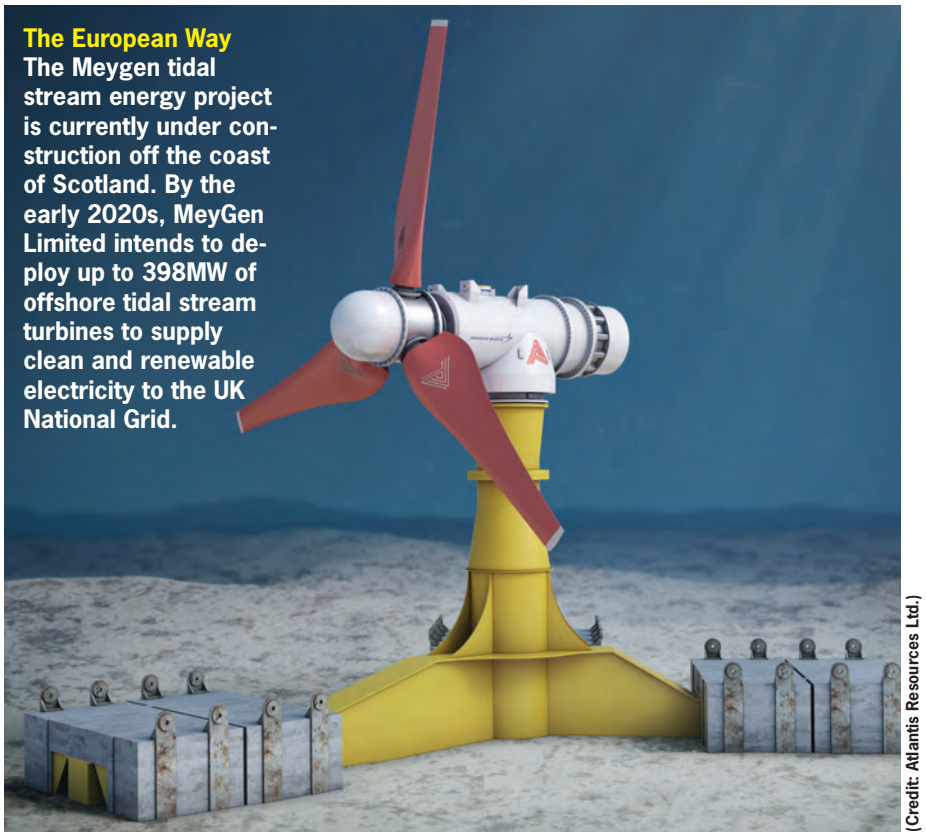
In July 2015, the Office of Energy Efficiency & Renewable Energy of the DoE announced that a prototype wave energy device, called Azura, developed by Northwest Energy Innovations of Portland, Oregon, has advanced successfully from initial concept to grid-connected, open-sea pilot testing. Azura was recently launched and installed in a 30-meter test berth at the Navy's Wave Energy Test Site in Hawaii. The test will allow researchers at the University of Hawaii to evaluate the long-term performance of the nation's first grid-connected wave energy converter device. The device will also be feeding renewable electricity to Marine Corps Base Hawaii. (http://energy.gov.eere/articles/innovative-wave-power-device-starts-producing-clean-power-Hawaii/).

Other wave energy device tests, supported by a total of $10 million in funding from DoE in 2014, include an Ocean Energy Buoy developed by Ocean Energy USA of Sacramento, CA. (http://energy.gov/eere/articles/energy-department-announces-10-million-full-scale-wave-energy-device-testing).

Just last month, DoE awarded an additional $7.4 million to develop advanced components for wave and tidal energy systems, including awards to Virginia Tech and Penn State University. The purpose of the funding is to help improve the performance and reduce the cost of MHK technologies. (http://energy.gov/eere/articles/energy-department-awards-74-million-develop-advanced-components-wave-and-tidal-energy.)

If a MHK project is located in state waters, permitting is provided by the Federal Energy Regulatory Commission (FERC). FERC's authority to regulate MHK projects in state waters is derived from Part I of the Federal Power Act (16 U.S.C. 791a et seq.). A user-friendly guide to FERC's licensing procedures is available at: www.ferc.gov/industries/hydropower/gen-info/licensing/hydrokinetics.asp. MHK development in federal waters is regulated by the Department of the Interior's Bureau of Ocean Energy Management (BOEM), but no projects have yet emerged in federal waters.

As of July 10, 2015, FERC had issued eight preliminary permits – two tidal, three wave and four inland MHK projects; four licenses for tidal pilot projects; and four projects were in the pre-filing stage. The eight preliminary permits include two projects in the Niagara River; three in Alaska (Kvichak River, Cook Inlet, and the Gulf of Alaska); two in Morro Bay, CA; and one in Ft. Pierce Inlet, FL. The fully licensed projects include Verdant Power's tidal project in the East River, NY; a project in Admiralty Inlet, Puget Sound, WA; ORPC Maine's tidal project in Cobscook Bay, ME; and Whitestone Power's tidal project in the Tanana River, Alaska.



The European Way
The Meygen tidal stream energy project is currently under construction off the coast of Scotland. By the early 2020s, MeyGen Limited intends to deploy up to 398MW of offshore tidal stream turbines to supply clean and renewable electricity to the UK National Grid.

(Credit: Atlantis Resources Ltd.)

Impediments to and Future Development of MHK Technologies

The President's budget for FY'16 requested $40.8 million for these programs, a decrease of $300K from FY'15. As of this writing, the House has appropriated only $21.8 million for MHK, but the Senate has increased the budget for MHK support to $42 million. The Senate funding includes $20 million for a balanced portfolio of competitive private sector-led research, development and demonstrations and $5 million for an open water, fully grid-connected wave test facility. Unfortunately, it is likely that Congress will adopt a Continuing Resolution or CR for at least part of FY'16 and perhaps even all of the fiscal year which will hamper any new program starts and could limit grant opportunities.

Some states have provided support for MHK projects but this is, understandably, largely dependent on their location and proximity to tides and waves. For example, the NYS Energy Research and Development Authority (NYSERDA) has actively supported Verdant's Roosevelt Island tidal project at Roosevelt Island in the East River, NYC. (www.nyserda.ny.gov/Partners-and-Investors/Clean-Energy-Startups/NYSERDA-Catalyzes-Investments/2012-07-02-Verdant-Power). Alaska has been supportive of the tidal power being developed in Cook Inlet, which is estimated by ORPC of Alaska to have 90% of the U.S. total tidal power potential. (www.orpc.co/content/aspx?p=Yojopy2b9VQ%3D).

Maine has been supportive of ORPC Maine's tidal energy project in the Bay of Fundy. (www.orpc.co/content.aspx?p=h3jCHHn6gcg%ed). This project alone has been estimated to have injected $21 million into the Maine economy and supported more than 100 jobs in 13 Maine counties. (http://www.3degreesinc.com/projects/renewable-energy-projects/maine-tidal-energy).

The recently-reported Senate Energy Policy Modernization Act of 2015 has a separate section to promote the development of MHK resources through the establishment of new demonstration centers, and an increase in the authorization levels for these programs. (Sections 3013-3016.) But, of course, it remains to be seen what funds are actually appropriated.

The FERC permitting process, while thorough, has perhaps been slower than some applicants might like; however, the agency has issued a number of licenses for pilot projects. In summary, companies are left largely on their own to develop, fund and promote MHK technologies with limited federal and state support. However, with the expected progress for wave power in Hawaii at the Navy's test site, and reasonable progress in NYSERDA, Maine and Alaska for tidal power, perhaps we will see other companies enter the fray and produce more innovative and cost-effective technologies. These resources can certainly complement the growth in wind and solar that the U.S. has experienced in recent years. They can also play a role in helping states with wave and tidal power potential to implement the new Clean Power Plan that President Obama announced on August 3, 2015.

The Author

Blank Rome of Counsel Joan Bondareff focuses her practice on marine transportation, environmental, and legislative issues.

To Scrub or not to Scrub

... that tis the Question

On January 1, 2015, the IMO Annex VI, ECA zone requirements came into effect. Ship owners and operators are now faced with having to decide between switching to a lower sulfur fuel or embracing alternate solutions such as exhaust gas cleaning systems (Scrubbers) and LNG. Worldwide, about 300 scrubbing systems have already been sold to date for marine applications. Many of these have been sold for vessels operating in the North European ECA and many for the global cruise/ferry industry (both in the US and Europe). The U.S. based non-cruise segments have taken a wait and see attitude with only a few opting for alternate technologies (primarily in the Great Lakes). Since the general belief is that the cost differential between low and high sulfur fuels will most likely increase as the low sulfur fuel demand increases, the question begs: why is everyone waiting? One possible reason is that the general shipping industry knowledge of scrubbers is minimal and therefore contributing to the slow implementation of this option. However, with each day costing the industry millions of dollars in additional fuel costs, is waiting a wise decision? In a shipping industry where small incremental savings could mean the difference between being competitive or losing money, the scrubber alternative could make a big difference.

This article aims to provide up-to-date information about the regulations and about the scrubber technology option. Demystifying this option should help ship owners in their evaluation of the available options.

Regulations

On January 1, 2015, the IMO Annex VI, ECA zone requirements came into effect. Ship owners operating in these areas are now faced with having to decide between switching to a 0.1% Sulfur fuel or adopt alternate solutions such as exhaust gas cleaning systems (also known as "Scrubbers") or LNG. Annex VI also set January 2020 as the start of a global 0.5% Sulfur cap for all areas other than those covered by the 0.1% Sulfur ECAs (this 2020 sulfur cap is subject to a review and confirmation in 2018). Additional emission restrictions are being considered for Mexico, the Mediterranean, the Norwegian Sea, Singapore and Hong Kong. Although LNG is considered a promising alternative to low sulfur fuel, it's high initial cost, global availability, and present bunkering capabilities have not allowed it to grow as fast as the scrubber alternative.

The Scrubber Alternative

The cruise and ferry industries account for the majority of the reported 300 scrubber installations, as the industry has seemingly embraced scrubbing technology as a solution to the ECA requirement. Other shipping segments have also installed scrubbers but not to the same extent. Many seem to be taking a "wait and see" attitude. While the recent reduction in fuel costs has given the industry a financial break, the net price differential between low sulfur and high sulfur fuels has not decreased.

Forecasting the shipping industry's need for scrubbing systems, several marine equipment companies developed their scrubber design and entered that market. Other companies, such as CR Ocean Engineering (CROE), modified its proven designs to incorporate the requirements of the maritime industry. Most scrubber companies provide full guarantees and warranties allowing ship

An up-flow configuration such as the CROE Scrubber Design shown to the left is designed to require less space than the side-entry designs.

The Author

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BY NICHOLAS CONFUORTO

owners to feel confident that they can continue using the lower cost high sulfur fuel oil even in the Environmental Controlled Areas (ECA).

A properly designed marine scrubbing system includes certain features. It has to be light weight, relatively small in both diameter and height, highly efficient and it must be cost effective. It also has to have low backpressure and all metal construction. It shall be used as a silencer when wet or dry and it shall not require a bypass. The system shall also include the required wash-water treatment equipment and all required monitoring and control equipment. An upflow configuration seems to be preferred by many ship owners because it requires less space than the side-entry designs.

Scrubbing Systems are available in Open Loop (a once trough design using seawater to neutralize the collected sulfur emissions), Closed Loop (using a freshwater solution with an alkaline solution to neutralize the collected sulfur compounds) or Hybrid configurations (deigned to be both Open Loop and Closed loop and able to switch from one configuration to the other on demand). Specific selection is based on ship routing or owner's preference.

The Open Loop Design

An Open Loop system is one where the scrubber uses seawater in and out on a once-through basis, a design that uses less equipment and fewer controls. However, because seawater is not as good a neutralizing agent as caustic (NaOH), it will require larger piping and larger pumps. For the same reason, it is constructed using higher grade alloys to allow for the lower pH environment. The pH in the system is adjusted by the amount of seawater used. The pumped seawater is distributed within the scrubber vessel by strategically located nozzles.

Each nozzle is designed to optimize the droplet size, distribution and droplet residence time to allow for the maximum contact between seawater and flue gas SO2. The SO2 is absorbed into the droplets. The absorbed SO2 reacts with water to form sulfurous acid. Sulfurous acid dissociates into bisulfite. The bisulfite further dissociates to sulfite and sulfates. The sweater pH is then used to neutralize the acidity of this discharge water in order to meet the pH requirements set up by IMO. CROE and various other scrubber suppliers have provided several of these open loop systems to ship-owners globally.

The Closed Loop Design

For ship-owners who travel in fresh or very low alkalinity waters, or wish to keep the scrubber water discharge on board (in a tank) for a period of time, the Closed Loop scrubber design could be the preferred configuration.

The scrubber features used in a closed loop operation are the same as those used in open loop or hybrid. However, the pH in the system is controlled by the amount of caustic added to the circulating loop. A Closed Loop system uses a solution of fresh water and caustic as the reagent to remove SO2 from the exhaust gas stream. This design earns its name from the closed loop used to circulate the caustic solution between tank and scrubber. Because the caustic solution is much more efficient in removing the SO2 than seawater, much less water is circulated a closed loop system than in an open loop system. This means that the piping, valves and the pumps used for a closed loop system are smaller and require less power.

Unfortunately the circulating solution in a closed loop system cannot circulate untouched for a long time because the sulfates/sulfites/bisulfites and sludge content in the circulating solution continue to build up (due to continued capture of SO2 and particulates). Should the concentration of these collected pollutants exceed a predetermined maximum level, the scrubbing efficiency in the scrubber will decrease significantly and

the system will eventually stop scrubbing. To avoid that excessive buildup, a closed loop system incorporates a small continuous bleed (a slip stream) from the circulation loop. That stream is continuously replaced by fresh water to keep the system in balance. Additional fresh water is also added to replace the water that is evaporated by contact with the hot exhaust gas. Since the untreated discharge water from a closed loop system has much higher pollutant content due to the normal build-up that occurs in the closed circulation, additional water cleaning equipment is required prior to discharge at sea. The typical water cleaning equipment used in closed loop operation is a centrifuge or some type of positive filtration. As with the open loop system, the closed loop system will also include all monitoring and control equipment. Additionally, it will require caustic storage and feed system as well as purge water storage tank if desired. One major advantage of a closed loop system is that is can be constructed of typical stainless materials because the pH levels are easily controlled by caustic. Of course chloride levels may affect the ability to use stainless steel materials and therefore a proper review of the water and caustic used is required to make sure that the maximum chloride levels are not exceeded in the circulating solution.

The Hybrid Design

A hybrid design is a combination of an open lop and a closed loop system. As such a hybrid scrubber will be the most expensive but the most flexible solution. A hybrid system will have all the additional equipment associate with a closed loop system but will also circulate more water and be constructed of higher grade alloys as the open loop system (because of the use of seawater in open loop operation).

The advantage of a hybrid system is that it can be switched from open loop to closed loop operation on command. One can operate in closed loop mode when in port of fresh water and then switch to open loop when in open seas. This will minimize the amount of caustic used and in long run save operating money. Each ship with a hybrid scrubber installation will be able to optimize their operation based on route and local port state requirements.

Stack Monitoring Equipment

The stack emissions are monitored by a Continuous Emission Monitoring system (CEM). The CEM sensor is located in the stack above the scrubber unit. The CEM unit will measure SO2 and CO2. The emission data collected by this unit is displayed on the CEM control panel screen. The exhaust gas emission data is also archived in the CEM panel along with the wash-water monitoring data (PAH, pH and turbidity) and the ship GPS.

Water Monitoring Equipment

Per the IMO guideline for exhaust gas cleaning systems, the effluent water from the scrubber shall be monitored for pH, turbidity, and PAH. The data collected by these sensors is displayed on the wash-water monitoring control panel screen and is also archived on the CEM control panel. Since IMO has set the turbidity and PAH as increased levels from the normal surrounding waters, it may be a good precaution to install turbidity and PAH monitors on the water intake as well as the water discharge points to better define the differential between inlet and outlet. This may be very useful in proving compliance even when the normal water intake levels of turbidity and PAH exceed the required IMO established values.

Conclusion

Scrubbers work. Many scrubbers are now in operation and many others in design and installation phases. Because of this initial problem some suppliers, the Exhaust Gas Cleaning Systems Association (EGCSA) was established and all members vowed to a very strict code of ethics. EGCSA member companies work very hard at maintaining a high standard of design and reputable sales and marketing approach. Additionally they are supporting the shipping industry in working with IMO in clarifying and simplifying some of IMO's requirements.

All EGCSA member companies have presently provided scrubbers to the shipping industry and have had significant successes. As an example, CR Ocean Engineering (CROE) has several on board units in successful operation and many others in the design and fabrication stage for some very reputable shipping/cruising companies. Having had more than 60 years of successful scrubbing systems design under its belt, CROE's success in the marine industry started with it's first installations on a Great Lakes bulk carrier.

The moral of the story is that scrubbing systems can save significant money if a ship operates in an ECA for more than about 40 % of the time. Risks can be managed by contracting with a known and reputable company with proven scrubbing system design experience (using EGCSA member companies is one way to minimize risk). In the end all parties want a successful system operation for many decades and all can benefit by this IMO established equivalency.

"Blue" Economy

Ocean Industries & the next 50 Years

BY PAUL HOLTHUS

Chemical tanker leaving Cape Town.

"Sustainable development" has gone from buzz word to business imperative in the two decades since the initial Earth Summit in Rio de Janeiro in 1992. Companies are increasingly evaluated on how well they address sustainability as a critical measure of their commitment to the triple bottom line – people, planet and profit.

Stakeholders expect companies to develop sustainability and corporate responsibility programs and reporting as part of efforts to take up civil society concerns and maintain the social license to operate. The world's governments are poised to endorse a set of Sustainable Development Goals (SDGs) at a UN Summit in New York in September 2015. These SDGs are intended to define the aspirations and targets to guide governments, society - and business - for the next 15 years. One of the SDGs specifically focused on the ocean, with targets to address use levels, planning impacts and environmental protection. Many of the other SDGs have goals with significant implications for businesses worldwide, including the maritime industries.

To all this, the ocean business community can now add a new term - the "Blue Economy" - that that you will be hearing more and more. Broadly speaking, the Blue Economy is being defined as:

A sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy.

What does all this mean for the people and companies providing ocean goods and services are fundamental to the future of the ocean?

The future of the ocean health and the concept of a Blue Economy are inextricably intertwined with the more fundamental, long-standing and ongoing reality of the ocean economy – the broad range of commercial activity undertaken for centuries by a diverse ocean business community that provides society with the ocean-related goods and services it demands.

This ocean economy depends on millions of people around the world who work on, under and around the sea every day to bring us ocean goods and services to support humanity. These men and women know the ocean better than most everyone else on the planet and care about the ocean that their kids and grandkids will inherit. Although much of the vast and diverse ocean economy is "out of sight and out of mind" for most, the people, companies and their activities that make up the ocean economy are the essential starting point and long term basis for any consideration of ocean sustainable development and a Blue Economy.

What is this ocean economy?

It is an estimated $4-10 trillion dollars/year in economic activity, including:

- 90% of international trade through cost- and carbon-efficient delivery via 50,000+ merchant ships criss-crossing the globe;
- Healthy protein from fisheries, from about 1.3 million fishing vessels, and from fish farms, with aquaculture growing 7% per year the past decades and now producing 50% of seafood;
- Growing offshore energy sources that supply about 30% of hydrocarbons, a rapidly increasing amount wind energy, and major wave and current energy potential;
- 98% of international telecommunications, carried on more than one million km of submarine cables;
- Recreation and tourism options for every ocean interest, with cruise tourism growing at 8.5 % per year in recent decades;
- Desalinated seawater to live in our booming coastal cities, with desalination supplying 90% of the freshwater in some countries;
- Innovation and technology to discover and document the deepest darkest corners, furthest reaches and extreme conditions of planet ocean;
- Ports and coastal infrastructure that all countries depend on for trade and growth; and
- Much else that sustains our modern life, booming population and growing expectations.

However, our use of ocean space and resources is affecting ocean health and sustainability. These effects of sea-based activities are also accompanied by often much more significant land-based sources of impacts, such as municipal wastes, agricultural runoff and plastics.

Ocean industries operate in a fluid, three-dimensional, interconnected ocean. This means industry's activities, responsbilities, and impacts are also interconnected – as must be industry sustainable developmnet efforts. The best efforts by a single company or even a whole industry sector will not be enough to secure ocean health and productivity into the future.

This creates a compelling business case for industry leadership and collaboration in tackling ocean sustainability, stewardship and science. Fortunately, there are many good, smart people in good, smart companies who do their best to understand and address ocean sustainable development. These leadership companies conduct their business in a manner that is compatible with the balanced environmental and economic needs of the communities in which they operate.

To further enhance responsible operations throughout different ocean industry sectors, a group of companies banded together to form the World Ocean Council (WOC) – the international, multi-industry business leadership alliance for "Corporate Ocean Responsibility". This collaboration helps identify sustainability risks, gaps and practical cross-sectoral, science-based solutions.

Cross-sectoral WOC teams are putting this unique industry alliance to work on a range of topics, such as ocean policy and governance; marine spatial planning/

ocean zoning; invasive species; marine debris/port reception facilities; marine sound; and improved ocean data collection. Robust data-sets, peer-reviewed published science, risk assessments, and use of the best available technologies are essential to these efforts.

An increasing number and range of ocean industry companies from around the world are distinguishing themselves as leaders in "Corporate Ocean Responsibility" by joining the WOC and are collaborating to achieve the "Blue Economy" - a balance of responsible ocean use and sustained ocean health.

How does all this relate to the future of the ocean? What are the projections for ocean industry activity in the coming decades? What opportunities and risks will future ocean use create for each sector, for the collective ocean business community, for the ocean economy overall, and for the ocean itself?

The diverse ocean business community will gather in Singapore (9-11 November 2015) at the 3rd WOC Sustainable Ocean Summit (SOS) to tackle these fundamental questions with a focus on "Sustainable Development and Growing the Blue Economy - the Next 50 Years."

The SOS 2015 theme recognizes the contribution of the ocean economy to the food, energy, transport, communications and other needs of society and the role of the ocean business community over the next 50 years in:

- Ensuring the health, productivity and sustainable development of the ocean.
- Advancing responsible ocean economic activity that contributes income, jobs, goods and services in support of societal needs.
- Addressing how ocean industries can advance their leadership, collaboration and commitment to sustaining the interconnected ocean environment, people and economy.
- Planning for the next 50 years of Blue Growth, sustainable ocean economic development and responsible ocean business opportunities.
- Determining how ocean industries relate to the UN Sustainable Development Goals (SDGs).

The "Ocean + 50" plenary at the SOS 2015 will in particular be an unprecedented look into the future of ocean use around the world and across the sectors. Expert presentations will cover shipping, oil and gas, fisheries, aquaculture, renewable energy, cruise tourism, marine mining and submarine cables in this first-ever comprehensive platform on the future of ocean industries. The session will address the trends, geographies, assumptions, opportunities, and risks for each sector over the coming 50 years. The session will focus especially on 2015-2030, the time frame for the Sustainable Development Goals (SDGs) soon to be adopted by the U.N.

To learn more about the WOC and the SOS 2015, visit http://www.oceancouncil.org/site/summit_2015/

The Author

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Event Planner

The Sustainable Ocean Summit 2015

November 9-11, 2015, Singapore

The Sustainable Ocean Summit (SOS) is the only global, multi-sectoral platform for leadership companies and organizations to advance the development and implementation of industry-driven solutions to ocean sustainability challenges. With Singapore celebrating its 50th anniversary in 2015 and continuing to advance its significant role in the global maritime economy, SOS 2015 will bring together the diverse ocean business community to plan for the next 50 years of Blue Growth, a sustainable ocean economy and responsible ocean business opportunities.

www.oceancouncil.org/site/summit_2015/

Keeping a Watchful Eye

Maritime Surveillance Technique & Technology in the New Millennium

By Marianne Molchan

In 2014, Forbes Associate Director for Maritime Services at Control Risks stated that maritime risks are on the rise. Mariners and ship owner/operators experienced a 26% spike in maritime piracy and armed robbery since 2014 and the North Sea Oil Industry admitted that it had been targeted and thwarted cyber attacks, attacks that if successful could have caused untold financial and logistical damage. While most of us see these security incidents in news snippets, consider:

- Tankers are still being hijacked and emptied at sea;
- A plot to bomb the Suez Canal was revealed in 2015;
- Oil companies are installing surveillance equipment protecting rigs in response to perceived threats;
- Within the last decade, plans to attack a cruise ship in a major U.S. port were revealed.

Maritime surveillance systems play a key role monitoring sea lanes and ports while supporting worldwide maritime safety and security.

Situational Awareness & Operational Effectiveness

The ability to operate effectively and securely in any environment (air, land or sea) depends on an acute awareness and understanding of the surrounding elements. Military, law enforcement and port security specialists pride themselves in maintaining a high level of situational awareness (SA). Their lives depend on the ability to accurately predict the status of the surrounding elements within a measurement of time and space. Today's Port security officials, naval personnel, and U.S. Coast Guard Ship Captains and Sector Commanders all use an electronic display of data and sensor information providing real-time situational awareness. The source data supporting these maritime surveillance systems may include cameras, radars, sonars, Automated Identification Systems (AIS) and real-time crowd sourcing data. An excellent surveillance system offers data clarity within a common operating picture supporting operations and appropriate security responses in emergency situations. This article provides clear guidance to companies in the process of seeing though the clutter in the development or selection of an operationally effective coastal surveillance system and sensor integrator.

Challenges in Developing Maritime Surveillance Systems

Making multiple sensors form one cohesive situational awareness picture is not just about the sensors. The genesis of an effective SA system begins with clearly identifying the problem(s) that need solving. A clear definition of the problem and performance requirements for the system is the first challenge. Once the end user has defined the Concept of Operations (CONOPS) the experienced integrator will choose appropriate sensors based on a number of factors, including but not limited to:

- Area of Coverage (sectors, 360 degrees, land, sea, air, distance from shore, overlap, blind spots)
- Environmental Factors (weather, marine life, sea and land clutter, water temperature, salinity)
- Duration of Coverage (day, night, months, years)
- Restrictions (power, staff, passive vs active sensors)
- Target Behavior (speed, track, medium, distance)
- Sensor Limitations (side lobes, signal strength, data storage, bandwidth, range)

Some of the challenges are as basic as getting the sensor feeds to literally plug into one another and play well together. Cross correlation of multiple sensors is an art form. Once a target is identified on one sensor, it may or may not be seen on other sensor types depending on the sensor settings, time of day, sensor capability and vulnerability etc. Determining the most appropriate sensors and sensor placement for the surveillance system requires seasoned sensor integrators. In order to get reliable and consistent target identification under a variety of conditions, multiple types of sensors may be required. Sensors typically have certain conditions under which they perform optimally. For example, infrared cameras provide a reliable tracking of "warm" targets in no or low light conditions where a daylight camera may not.

Many first and second generation maritime surveillance systems are in need of upgrades. During the lifetime of a surveillance system, legacy sensors may need to be merged or work in conjunction with new sensors. The modernization of the USCG Fleet C2 sensors mentioned later in this article is a perfect example.

A surveillance system secure from interceptors, or cyberattacks is paramount. In an effort to underscore the importance of cybersecurity within maritime environment in June 2015 the USCG published a document entitled Cyber Strategy which outlines the defense of cyberspace, enabling operations and protecting infrastructure. While cyberattacks are a known threat and some protections are available and in place, it is the author's opinion that more attention could be paid to securing integrated sensor systems.

In designing and evaluating a multi-sensor SA systems objectives include but are not limited to:

- Scalability and interoperability meeting future expansion while leveraging existing systems
- Flexible sensor solutions for a variety of platforms, environments and data links
- Sensors with complementary capabilities and limitations
- Abstracting specific sensors behavior and characteristics from the end-user (providing illusion of Plug & Play)
- Consistent / accurate performance in all weather conditions
- Filtering raw data and information; displaying what's pertinent to the mission
- Multi-sensor track processing and correlation
- Reliable target information supporting operator decision making
- Real-time anomaly detection / alerting for operator incident recognition
- Capability for sharing information with other systems.
- User friendly operation and maintenance
- Ongoing customer support and open feedback loops

Examples of Sensor Integration

Core system capabilities that tie the sensors to the user display are often developed and maintained by agile sensor integrators. SSR Engineering Inc. is considered by many in the defense and maritime surveillance industry to be a prime example of a capable, responsive sensor integrator providing everything from portable stand-alone systems using non-terrestrial communications to large scale multi-site sensor installations. SSR Engineering's personal computer based radar processor (PCRP) is an example of a "black box" that is the functional backbone of multiple national and international maritime and shipboard surveillance systems, port security, offshore platforms and range safety systems. Used by both military and civilian clients, the value in the PCRP lies in the fact that it seamlessly interfaces with most modern and legacy radars and Identification Friend or Foe (IFF) systems.

Following are some prime examples of how the design and customer feedback loop to a SA system creates optimal performance.

MLEIN: Maritime Law Enforcement Information Network

Maryland's Department of Natural Resources uses SSR Engineering's surveillance system to protect valuable oyster beds in the Chesapeake. Land based radars, shipboard cameras, and portable sensor systems are monitored by the Natural Resources Police. The network uses 4G, Wi-Fi, Microwave and terrestrial data links providing target data, AIS and Blue Force tracking in a cohesive track picture. The sensor rich system covers the Chesapeake Bay from the Susquehanna River to the Virginia state line.

SSR provides lifetime customer support to the MLEIN owner/operators. Ongoing customer support generates a valuable feedback loop. The experienced MLEIN operators continue to provide system improvement requests that contribute to tailored system enhancements.

Small Target Detection

Based on small boat attack tactics navies worldwide have been paying close attention to small boat behavior within a port. The Port of Long Beach determined they needed additional sensors to provide this key missing component to their Port Security System. SSR Engineering created a system supporting multiple missions simultaneously through a set of processing and display filters used specifically for the purposes of tracking small vessels. This provided

port security personnel much needed mission specific information. Existing radar sensors were monitoring and tracking the larger vessel entering and exiting the port but the new radar system provided a second layer of security supporting ongoing patrols by the USCG and Long Beach Marine Police. The combination of additional radars and radar processors feeds vital information into the port security operators, C2 Center and Jacobsen Pilots.

This system includes a centralized alarming capability that monitors the small boat tracks and provides a real-time alerting function. These alerts include geo-fences, closest point of approach, proximity zones, loitering zones and anchor watch.

Modernization of the USCG Fleet

USCG shipboard C2 systems incorporate SSR Engineering technologies allowing operators to use the ARPA interface augmented with tactical features and functions.

As a result, the C2 system is scalable, interoperable and suitable for future expansion while leveraging the existing systems. Because of SSR Engineering enhancements, the USCG installed their radars of choice without worrying about prohibitive integration issues. The system includes an identification friend or foe transponder, an Automatic Identification System (AIS), electro-optical / infrared sensor system, surface search radar and air search radar. Depending on the mission at hand, these technologies allow operators to quickly identify threats, violators, or distressed vessels and coordinate joint response operations.

Securing Offshore Platforms- 360 degree Integrated Sensor Surveillance, Detection and Alerting Systems for Mobile Operators

With a worldwide movement towards minimal manning and the need to provide 360 degree protection for vessels and offshore platforms, the future in maritime security systems lies in sophisticated alerting capabilities. SSR Engineering technologies provide sensor solutions for a variety of platforms, environments and data links creating an interconnected set of patrol boats and platforms. The platform acts as the command center which is capable of sharing radar and track information with patrol boats.

SSR's surveillance systems include custom alerting capabilities delivering alarms and threat alerts via email, Short Message Service (SMS), Multi-Media Messaging Service (MMS) and Simple Network Management Protocol (SNMP) to assist operators working with mobile devices. They have incorporated alerting systems such as Long Range Acoustic Devices (LRAD) and AIS with their Radar, Camera and Sonar surveillance systems. With the use of AIS and LRAD, the operator can provide direct notification or warning to the target. The SSR Composite Tracker correlates target information from multiple sensors providing an accurate track picture while alarm zones based on proximity and pre-determined characteristics detect and trigger events like slewing cameras or LRADs towards the threat and send out a warning.

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Monitoring for Efficiency, Safety

Ferry masters operating off the west coast of Scotland traditionally would have to sail to a port and on arrival visually assess the weather and tide conditions before deciding whether it was safe to berth alongside the pier or quayside: a process which wasted time and fuel, and frustrating the paying passengers. The berthing of ferries is a high skill job, particularly during bad weather, and the decision on whether a specific ferry can safely berth at a specific port is subjective and ultimately can only be taken by the ferry Master, and includes considerations of not only those onboard, but shoreside personnel aiding with mooring operations.

With multiple sites in island locations, remote access to accurate local data providing live information on tide level and key climatic conditions could facilitate substantial improvements to the service by aiding the Masters to make a more informed decision at an earlier stage in the voyage – in some instances even before departing the previous port or harbor.

Caledonian Maritime Assets Limited (CMAL), which owns many of the ferries, ports and harbors in the region, procured a network of 15 tide and weather stations from OTT Hydrometry. The new monitoring equipment provides live data on port conditions to enable the ferry Masters to make better informed decisions at an earlier stage, potentially saving time, fuel and costs. Emphasizing the growing need for data, McHardie said: "In recent years, severe weather events appear to have become more frequent and they seem to develop faster; ferry sailing decisions to be made in a timely manner.

"OTT installed the first monitoring station in August 2014 and the network is now almost complete with sensors providing data every 1 minute via UHF radio to 'gateways' in the ferry offices, which then submit the data via the internet to a central server, which can be remotely accessed by authorized users," said David McHardie, CMAL Harbor Master. "We have a regulatory requirement to monitor the tide level in our statutory harbors, but this system also provides essential weather information for our ports. In the past, these measurements were taken manually, so the availability of continuous multiparameter data is an enormous improvement – not just in the quality and value of the information, but also in the safety benefits for harbor operations staff, that this provides."

Live Data

The availability of live data on port conditions theoretically enables the ferry Masters to make better informed decisions at an earlier stage, potentially saving time, fuel and costs. Emphasizing the growing need for data, McHardie said: "In recent years, severe weather events appear to have become more frequent and they seem to develop faster; for example, since the monitoring network was installed, we have recorded a sudden drop in temperature of 8°C in just 5 minutes at the port of Armadale on the Isle of Skye, and a maximum wind gust of 96 knots at Castlebay on the Isle of Barra. These conditions represent a rapid deterioration of conditions and the monitoring network enables us to respond quickly and effectively."

Each monitor is located adjacent to the main berthing area on the pier with a lockable GRP control box. The system is comprised of: an OTT radar level sensor; a Lüfft ultrasonic weather monitor measuring wind speed, gust and direction, air temperature and barometric pressure; an Adcon radio unit with back-up batteries and a marine grade antenna. The radar tide level sensor is an OTT

GOST Marine Security Video Recording Device

GOST (Global Ocean Security Technologies) released its next generation security video solution, the GOST Watch HD Internet Video Recorder (IVR). The new video recording system features a four terabyte hard drive – designed to capture and store video on a modern yacht – that is capable of continuously recording and storing 90 days of video from up to six cameras. The GOST Watch HD IVR system supports the highest resolution video recording from any GOST or third party analog cameras connected to the GOST Watch HD Analog-to-Digital Gateway (GWHD-A/D Gateway). Footage can be accessed locally on board the boat for viewing and downloading to a computer or USB thumb drive, or remotely via the GOST Watch HD password-protected website. The secure GOST Watch HD web portal offers navigation aids with quick review, locate and calendar-lookup tools; time and date stamped video; as well as an easy-to-use file export utility. It includes a newly designed interface for accessing stored video footage quickly and easily. If Internet connectivity is lost or interrupted, users can also review footage via HDMI or VGA outputs on a boat's TVs or multifunction displays (MFD).

Video files are stored on the GOST Watch HD IVR system at the highest resolution produced – VGA RES (640 X 480) at up to 20 FPS using custom H.264/MJPEG dual codec decoding compression. For a maximum of six cameras, the frame rate can be reduced slightly to ensure required capacity. In cases where there is little activity in view of the camera being recorded, the maximum storage may be increased due to the use of H.264 compression. Connected directly, the GOST Watch HD IVR will collect video without using the bandwidth from onboard cellular or satellite-based Internet connections.

www.gostglobal.com

"... since the monitoring network was installed, we have recorded a sudden drop in temperature of 8°C in just 5 minutes at the port of Armadale on the Isle of Skye, and a maximum **wind gust of 96 knots** at Castlebay on the Isle of Barra."

RLS, a non-contact sensor employing pulse radar technology with a large 35m measurement range.

Both the RLS and the weather sensors, which have no moving parts, have extremely low power consumption, which is vitally important for installations at remote sites. At two locations it was not possible to install a radar sensor so an OTT CBS (bubbler sensor) was installed providing comparable levels of accuracy and reliability.

Now that the CMAL monitoring system is installed, McHardie is looking for ways to leverage the value of the data. For example, radio data transmission works well over water, so it should be possible to fit the same technology on ferries so that the ferry Masters can access the data directly, instead of having to call the port office for a verbal update. The OTT monitoring network also incorporates an email alert system, and whilst this has not yet been configured, it will be possible in the future for ferry masters to receive email alerts warning them when pre-specified port conditions arise.

"We would also like to eventually make the data available to the public as part of an enhanced harbors information system," McHardie said. "However, when a ferry has berthed, with the monitoring system being located on the pier, the vessel can cause a wind shadow; which means the wind data during that period can be potentially misleading. It has to be remembered that this system remains only an aid to navigation."

(Continued from page 27)

Remote monitoring and control capability sending sensor data and control messages over low-bandwidth radio and satellite links provide owner/operators of platforms an additional surveillance capability.

Conclusion

A primary goal of a robust SA system is to sharpen the operator's perception of the surrounding environmental elements with respect to time and/or space. Experienced operators of robust SA systems find them essential to surveillance, detection, classification, identification and potentially prosecution of a target. Engineering companies that provide software that produces organized data fusion from multiple sources essentially create a reduced operator workload, enhanced decision-making and essential mission management.

Essential concepts for developing a maritime surveillance system are provided in this article. A review of some of the key points are provided below:

- The first challenge in developing maritime surveillance systems is understanding and defining the customer's problem and performance requirements.
- Determining the most appropriate sensors and sensor placement for the surveillance system requires seasoned sensor integrators.
- Each sensor has specific capabilities and limitations. The multi-type sensor approach will achieve consistent performance under all conditions.
- A surveillance system secure from interceptors, or cyber attacks is paramount.
- Ongoing customer support generates a valuable feedback loop. Experienced operators can provide SA system improvement requests contributing to tailored system enhancements.
- Multi-mission support capability using a set of processing and display filters allow each operator to see the pertinent information they have requested for their mission.
- With a worldwide movement towards minimal manning and the need to provide 360 degree protection for vessels and offshore platforms, the future in maritime security systems lies in sophisticated alerting capabilities.

The Author

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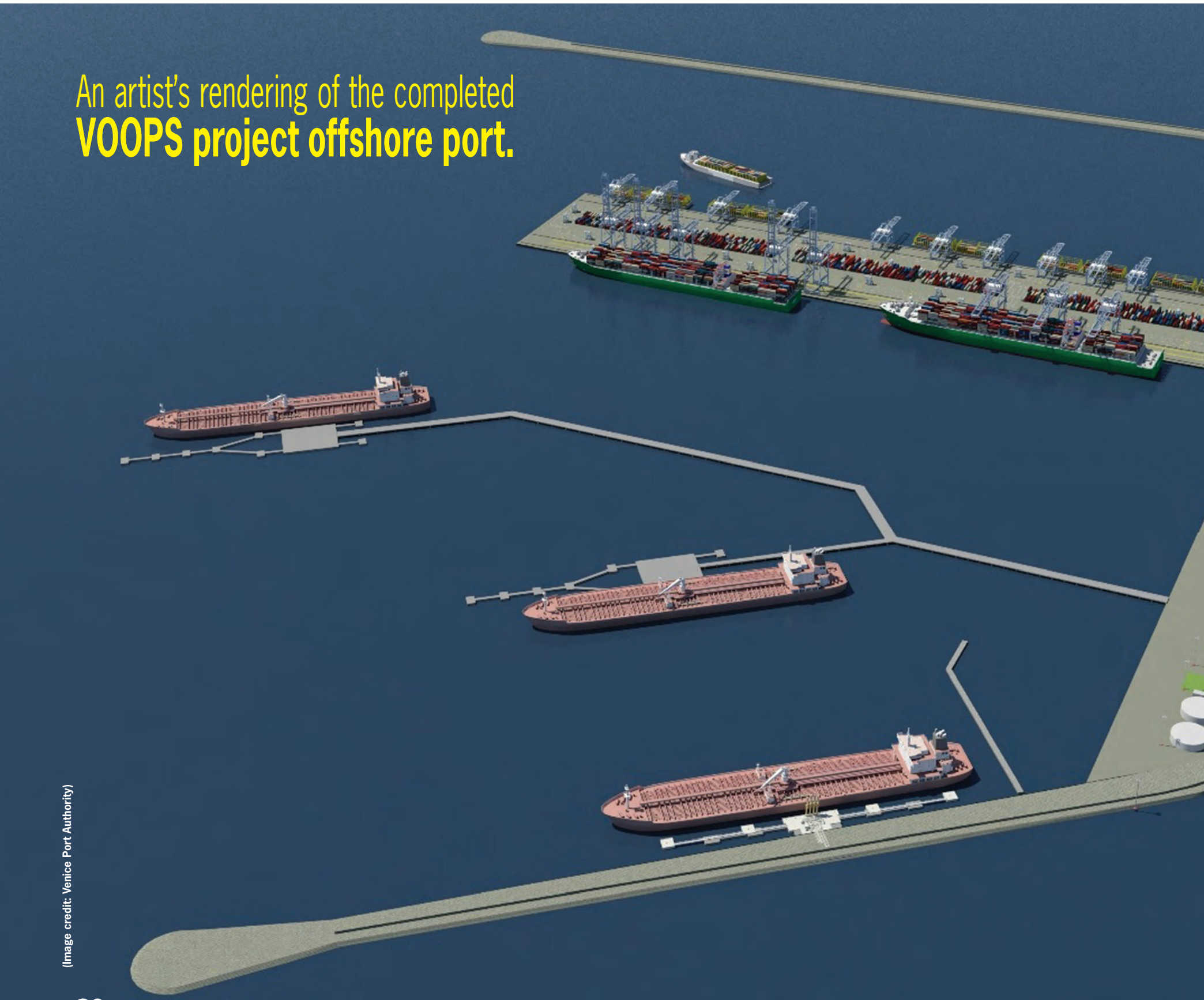
VOOPS

Venice Offshore Onshore Port System

Building the Venice Offshore Port

By Josh Keefe

An artist's rendering of the completed **VOOPS project offshore port.**



(Image credit: Venice Port Authority)

The *New York Times* once called Venice "undoubtedly the most beautiful city built by man." But as beautiful as Venice might be, it is still a port city struggling to compete in a global economy, and beauty doesn't attract Ultra Large Container Vessels (UCLV). Port of Venice authorities hope that its ambitious new offshore-onshore port project might do just that.

The Venice Offshore Onshore Port System (VOOPS) was born out of necessity. The Venetian government made it a goal to remove all oil tanker traffic from the Venice Lagoon in the eighties and last year the city banned cruise ships (although a court overturned the ban earlier this year). Venice exists in a lagoon, a lagoon the city has in interest in protecting, both for environmental reasons and for self-preservation. Venice is literally sinking at the same time that water levels are rising. The city is constructing an integrated system of mobile gates capable of separating the lagoon from the

Adriatic, a system known as the MoSe project.

Construction began in 2003 and was originally scheduled to be completed in 2012. After a series of controversies, including the arrest of the city's mayor on corruption charges associated with the project, MoSe is now scheduled to be operational in 2016. Isolating the city from the ocean might be the way to save the city from rising tides and increasingly tempestuous weather, but it would hardly help the local economy and the Port of Venice.

VOOPS 2020

Venice Port Authority and the Venice Water Authority have adopted plans to not only move oil tanker traffic out of the lagoon, but expand the port's container ship capacity and revitalize the entire North Adriatic as a gateway to central European markets in the process. The VOOPS might not just change the Port of Venice when it begins operations in 2020, it could also serve as a model for ports worldwide struggling with accommodating massive container ships, protecting local environments, and maintaining port security.

Part of the MoSe project was the construction of a lock at the Malamocco inlet that was compatible with an offshore port. The advent of 16,000 to 18,000 TEU container vessels led authorities to realize that they could effectively kill two birds with one stone: expand the port's capacity and eliminate tanker traffic in the lagoon. They could accomplish this by building an offshore port capable of handling both oil shipments and the berthing of ULCVs. The project was formally presented to the International Maritime Organization in June by Paolo Costa, President of the Venice Port Authority, Dimitris Pachakis from Royal Haskoning, and Jim Knott from BMT Triton in London. Construction is set to begin in 2016.

The project is essentially two subprojects: one is the construction of an energy terminal, the other a container terminal. Both will be protected by the same 4.2km long breakwater and will be built eight nautical miles offshore where the ocean depth is 20 meters. The container terminal will eventually be able to

An artist's rendering of the VOOPS offshore container terminal.

(Image credit: Venice Port Authority)

accommodate three ULCVs simultaneously. (Currently, the Port of Venice has 12m sea beds only capable of handling vessels of up to 7,000 TEUs in size).

Building two terminals eight miles into the ocean is certainly its own technical challenge, but it is the method that Royal Haskoning DHV devised to transport cargo containers that makes the project truly innovative.

Venice Port Authority calls the system a continuous conveyor belt, one that will transfer cargo from the offshore terminal to Porto Marghera and Porto Chioggia, which are inside the Venice Lagoon, as well as Porto Levante and inland river ports. The first part of the system is the container terminal, which will have a berth length of 1000 meters and a berth depth of 20 meters (a size large enough to ensure that even if the explosion in container vessel size continues, the Port of Venice will still be able to accommodate the world's largest ships).

> The advent of 16,000 to 18,000 TEU container vessels led authorities to realize that they could effectively kill two birds with one stone: expand the port's capacity and eliminate tanker traffic in the lagoon.

"Mama" Knows Best

The terminal is projected to move 1 to 1.3 million TEUs per year when opera-

tional. This terminal will use automated straddle carriers working with remotely operated STS and barge cranes to load and unload containers onto barges capable of holding 384 TEUs. These class-v barges will then be loaded onto semi-submersible vessels, dubbed "Mama vessels," designed by BMT Triton.

Watching an animation of the Mama vessels in action makes it clear how they got their name: two barges move inside the Mama vessels and the Mamas, pregnant with the barges floating inside of them, then travel at a rate of 12 knots, generating a wave of less than .5 meters, which will help to ensure safer Lagoon navigation. (For a look at the video, visit: https://www.youtube.com/watch?v=QNeGfeq9D3M&list=UUY29bF0T-h4lFhitYvYVYIg&index=15)

The Mama ships will feature three Schottel azimuthing thrusters for maneuverability, and the ballasting operation to allow the docking of barges will take only 15 minutes to complete. The barges are then capable of inland navigation once they arrive on shore.

Economic Impact

The VOOPS project, which will have a 2.1 billion euro basis cost for an international tender, will be fully operational by 2023. But the economic benefits to the region will start long before that. Price-waterhouse Cooper estimates that the construction phase alone will create 943 jobs and impact the local economy to the tune of 703 million euros. The operation of the system will create 1,925 jobs by 2025. Venice also already has a large and underused rail infrastructure that is capable of accommodating expanded cargo volumes. The project will also convert disused areas of Porto Marghera, which will be the first land terminal to receive containers in the VOOPS system, to port industrial and logistical uses. Port Marghera is located in the Montesyndial area, a section of disused industrial areas that were once operated by Montefibre and Syndial. This area was purchased by the Port Authority in 2010 and has since been part of an ongoing reclamation project. Currently 32 hectares out of 90 are available for port and industrial use.

The benefits of Venice's offshore port project will extend far beyond Venice. The project is part of a larger effort to revitalize the Northern Adriatic. Look at a map and draw a straight line from the Suez Canal the heart of Europe and you'll notice that Venice, and the Northern Adriatic, are the first thing you hit on the European mainland.

The European Union has recently invested three million euro into studying the Northern Adriatic as part of its Trans-European Transport Network (Ten-T) program. The opportunities are there, but the infrastructure, as of now, is not.

The overall throughput of all NAPA (Northern Adriatic Ports Association) ports was 1.8 million TEU last year, or about 110 million tons, which is only a quarter of Rotterdam's throughput. NAPA has set a goal of increasing its

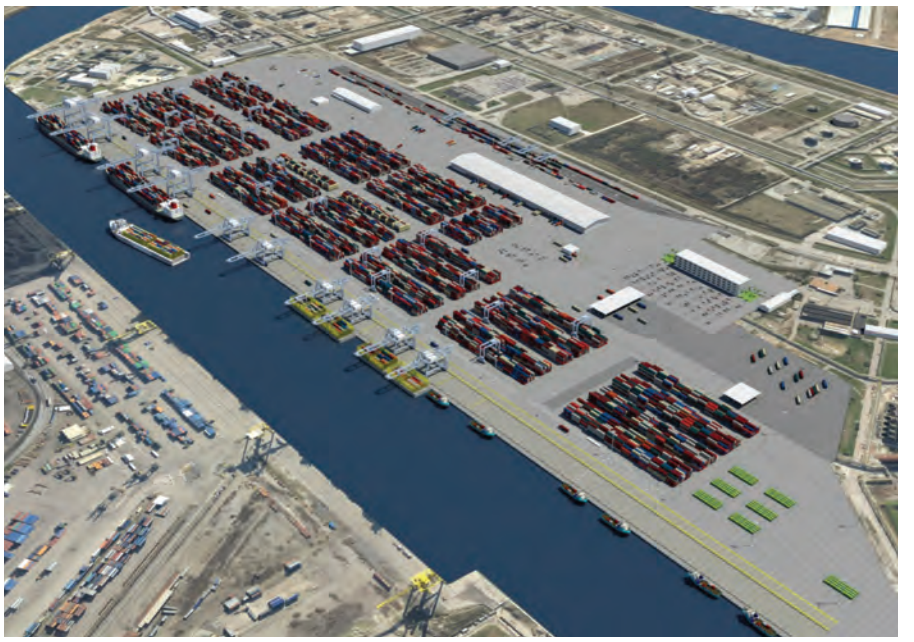
The container terminal at Porto Marghera.

throughput to 6 million TEUs by 2030, and while the VOOPS project is the star of that effort, NAPA ports like Trieste, Rijeka, and Koper are planning, or have already started, major port infrastructure projects.

It's possible that the biggest impact VOOPS makes isn't just in Venice, or the Northern Adriatic, but on how governments think about ports and their relationships to cities.

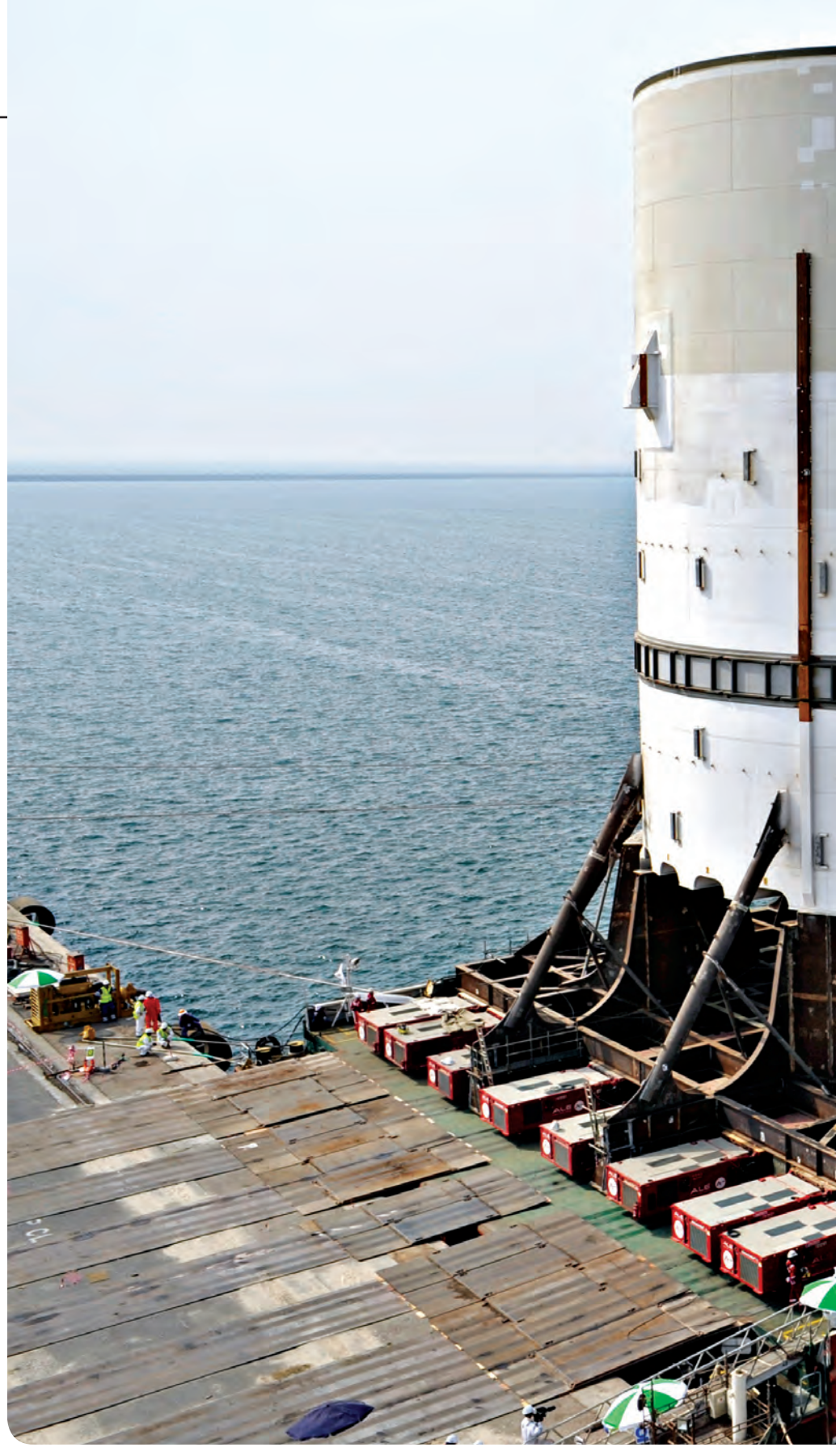
The advantages of offshore ports in a variety of areas, including environmental, volume and security, have long been recognized. Cargill launched an offshore port off the coast of Jamnagar, India in 1998 and Abu Dhabi opened its Khalifa Port, an artificial island, in 2012. But VOOPS might be the model for the offshore ports of the future. The project was shortlisted for the 2014 OECD International Transport Forum's "Innovation in Transport Award" and received a special mention for its "replicability around the world."

That replication might happen soon. Experts have cited the U.S. and Africa as key markets that would be best served by offshore ports. The U.S. government is investigating offshore port concepts through its Portinus project at the Lawrence Livermore National Laboratory (LLNL). And Bechtel said earlier this year that it is in discussions with U.S. government agencies about the development of an offshore port on the East Coast.



FLNG

Birth of a Market



By William Stoichevski

FLNG deal-making has been sporadic since Woodside Petroleum at the end of 2013 delayed a final investment decision for the giant Browse FLNG project off Northwest Australia. The previous year had seen go-aheads for most of the floating liquefied natural gas projects (FLNG) underway today, including Shell's Prelude FLNG — Woodside's choice, it seems, of a liquefaction solution for fields 200 kilometers offshore. Yet Prelude, "the first project out", might not be first to produce. The speed to market and scalability of "rival" FLNG ideas offers options for the revenue-hungry and a new market for marine and offshore early movers. Browse FLNG, too, is "on-track" for front-end engineering later in 2015.

Floating oil production might be decades old, but floating liquefied natural gas is so new that technology patents are still vulnerable. Classification societies can't say for certain that they've given their full blessing to projects from top to bottom. Few projects are sanctioned — in Australia, Cameroon, Canada, Indonesia, Malaysia, Mozambique and the United States. Sixteen others offer a chance for contractors to plan their contracts now.

Competing for the mid-term opportunities to unlock stranded gas offered by new liquefaction solutions from Britain, Japan and Norway is tried and tested technology from Germany and the United States. FLNG is developing in such lurches and spurts that consortia of former rival contractors are collaborating on front-end engineering and design (FEED) and engineering procurement and construction (EPC) bids together to make sure they're in on what comes next. The focus is on Asia, where gas and people abound, but where a maritime continent lacks Europe's interlocking pipelines. In Asia, shipyards anticipate FLNG orders with investments in the largest dry docks, cranes and quays ever seen. The mantra "A FEED and an Asian yard" suits FLNG well. Though still

Largest Ever
The Prelude FLNG project's turrent module leaves Dubai for the Asia.
(Courtesy Shell)

"pegged" to oil, gas prices have become increasingly regional and are nowhere stronger than in Asia, while liquefying remote African gas looks set to transform the "center" of a worldwide industry. Imperceptibly in most places, spot gas prices are showing signs of life, even if LNG carrier rates have plummeted since 2012. Against this backdrop, clutches of engineers are keen to build strength in LNG by building FLNG, which has half the price tag of land-based LNG if still pricier than piped gas.

Liquefaction Vessels

One early mover is nimble-minded Golar LNG. Against the backdrop of Browse, Prelude and Exmar's barge-like Caribbean LNG (built) for Colombia, Golar in 2014 and again in January 2015 brought in Korean shipyard Keppel and U.S. floating liquefaction expert Black & Veatch to convert the midstream Hilli and Gimi Moss-type LNG carriers into 125,000-cubic-metre offshore FLNG vessels able to produce 1.2 million tons per annum (MMta) of LNG. The Gimi conversion is nearly half built, and the design reveals two sponsons bearing FLNG plant. Both conversions are EPC contract wins for Black & Veatch and the U.S. contractor's veteran PRICO technology was chosen for its smaller vendor list and reliability, as well as for the targeted "clean" well stream. The PRICO kit is already key to this burgeoning FLNG market of new and old LNG players.

"The scale and speed in which we secured the contract for the GIMI is a testament of the industry's confidence in FLNG conversion solutions," company VP and Executive Director for EPC projects, Hoe Wai Cheong says in a 2015 statement. Golar and Keppel are "spearheading" an FLNG industry of "substantial potential".

Two Golar FLNG contracts in short order provided upwards of $900 million each in shipyard, topsides and liquefaction work. Woodside had planned to use three FLNG vessels using Shell's own liquefaction technology at Browse before twice delaying "decision gate", some say to allow Australia's enormous supplier costs lead to narrow. Meanwhile, PRICO liquefaction's simplified plant, with fewer vendors needed, has in short order transformed an LNG ship owner into a gas producer. Rapid start-up, a reliable record and choice of size are Black & Veatch's offering to the FLNG business. Golar and Exmar's Carribbean FLNG (0.6 MMta) show the

Stranded gas
Carribean LNG was to be the first.
Photo: Courtesy Black & Veatch

Pioneer
ExxonMobil's FLNG design offshore Australia
Courtesy ExxonMobil

value and speed of scaling. The Carribbean FLNG nearshore vessel was set to produce first, when operator Pacific Rubiales decided to hold off for financial reasons. As in Western Canada, where 18 LNG projects have been submitted, smaller projects have been first to pass through environmental assessment and into financial decision-making.

Sevan Circles

While the PRICO solution might have "the lowest capital cost of all competing technologies" plus "simplified control systems" and has been reliable in at least 25 projects, relative newbies are also fostering a market with an increasingly dedicated supply chain. Modec, Kanfa Aragon (nearly 50-50 Sevan and Technip), Hi-Load LNG (Sevan) and the cylindrical floating production contractor Sevan Marine itself are all creating a stir around the promise of FLNG to recover stranded gas ahead of costlier platforms and without coastal construction (like jetties, pipeline and dredging).

Like Shell with Prelude (3.6 MMtpa, now out of dry dock) — the world's largest floating structure — Sevan Marine has had to wade through cyclone testing to present a weather-safe FLNG design, even going the joint industry project route for permanent mooring in cyclonic conditions in preparation for a "10,000-year wave" off Northwest Australia, the South China Sea or the Gulf of Mexico. Company vice president for technology, Fredrik Major, can boast production turret designs and speaks for a company capable of getting 60,000-ton topsides aboard a cylindrically hulled floating producer.

Major says floating production sizing is the big challenge. A key design feature of the Sevan cylindrical FPSO is risers concealed behind the outer hull, so there's no turret and "delicate" swivel mooring system. Once the darling design candidate of the postponed Russian Shtokman gas field in the Arctic, the Sevan FLNG design still seems to offer extreme open-ocean advantages with its compartments of condensate tanks on top and LNG offloading to standard carriers.

"It gives you access to the market," Major says of FLNG to a gathering of his peers. Sevan Marine also owns the impressive HiLoad LNG business with its offloading system — a towering DP docking unit that connects to an LNG carrier with LNG and vapor return hoses.

Back to Liquefaction

One of the handful of FLNG projects being built, Petronas's PLFNG 2 facility offshore Sabeh Malaysia is already attracting a trail of suppliers through its JGC Corp (Japan) and Samsung Heavy Industries (South Korea) engineering consortium.

Automation giant Yokogawa Electric's controls business in Malaysia is among a growing number of suppliers connecting to the FLNG consortia. Yokogawa will deliver equipment to manage the liquefaction and storage tanks aboard Petronas's floater for the deep-water Rotan field.

"FLNG is a market with great potential," ABB process automation president, Peter Terwiesch, said at the time. ABB had just won a $50 million job to provide PLFNG 2's electrical systems. Like other managers coming to grips to FLNG, Terwiesch pointed to the Douglas-Westwood report that estimates the FLNG market to be worth $64 billion from now to 2020. The container-ship-like PLFLNG 2 is — at 1.5 MMtpa of LNG — a smallish producer, but it's yet another win for scalability.

Spread-moored

While FLNG is eking out new business for marine suppliers and liquefaction outfits, it's also inspiring them to new business models. FPSO heavyweight SBM Offshore, which designed the mooring turret system for Prelude, has built its own FLNG concept. Together with German refrigeration expert Linde Engineering, it now has a "mid-scale FLNG option" called Twin Hull which "converts existing LNG tankers into FLNG facilities". The company recently finished the FEED for a Brazilian LNG floater and together with Linde Engineering has designed a concept for Thai PTTEP. "In the future, SBM Offshore will focus mainly on FLNG projects where it can add most value by acting as a main contractor, as it does successfully for the FPSO market," the company says in its earnings report, adding that medium-sized projects of "up to 2 MMtpa" will be its focus.

Marine Links

Rolls-Royce, too, is entering the FLNG fray. It'll deliver gas engines for onboard

Still topical
An LNG FPSO from Hoegh LNG, 2008.

Load LNG hooks up offshore to any LNG carrier

Courtesy Sevan Marine

power aboard one of Golar's Keppel-built FLNG vessels, or FLNGVs.

With energy consumption paramount aboard an FLNG — with extra compression, separation and refrigeration to service (plus ship and crew power needs) — the Rolls-Royce Bergen motors won out for energy use described as "low". The Golar Hilli's engines are due to be fitted in 2015.

Its conversion into an FLNGV will be finished by 2017, with the Gimi following. Golar says it will focus on "low-cost, rapid deployment" using its LNG carriers.

Gas projects "requiring minimal processing" (dry, clean gas or associated gas usually flared).

"Floating infrastructure has and will fundamentally alter LNG market dynamics," says Golar chief exec Doug Arnell. He confirms Golar FLNGVs will be used as early FPSOs were — in the doldrums of the world, or "Located offshore in benign to moderate met-ocean conditions." Golar FLNGVs will target projects of up to 2.8 mtpa.

Support Vessels

Even the large, multiple-process projects like Prelude and, perhaps, Browse, are set to help niche suppliers find new markets.

Perth-based KT Maritime Services Australia cut steel at the end of 2014 for the first of three infield support vessels, or ISVs, to support Shell's Prelude FLNG project.

The vessels became business for Singapore yard ASL.

The award marked another joint venture of suppliers, with Shell's blessing, as a need for an ISV concept became apparent with Prelude. KT, propulsion expert Kotug International and Teekay Shipping Australia formed the JV in 2012 with an eye to Prelude.

The three, planned Browse FLNGs will, if they are built, also need ISVs to service the FLNGV's LNG, LPG and condensate equipment, while also training for responder and evacuation roles.

FLNG Project Pipeline

A number of FLNG FEEDs and pre-FEEDs since 2008 contemplate new equipment designs, and a contest — if not a conflict — is unfolding among liquefaction factions. This game already bodes well for the supply chain.

There's Cameroon LNG, where Golar LNG Ltd. has since New Year 2015 been partnered with Societe Nationale de Hydrocarbures and Perenco (of Cameroon) to give the Golar Hilli — to be re-named GoFLNG — new work exporting 500 billion cubic feet of gas from the offshore Kribi fields to world markets. For eight years, Golar will earn a tariff on the 1.2 MMtpa of LNG produced. That's smallish by LNG standards, but not for FLNG or the Cameroonian economy.

"The project will be the first floating LNG export project in Africa and will see Cameroon joining the small number of LNG exporting nations," a Golar communiqué states.

Another FLNG first. As the northern spring turned to summer, Rosneft, Russia's third-largest gas producer, signed a pact with Golar for two more tariff-earning FLNG projects for unnamed projects in the oil company's Latin American portfolio.

Air-conditioning

So far, a fairly long list of consortia that include liquefaction contractors and vessel owners have had success with a tiny number of LNG processes.

Like the Kanfa Aragon dual nitrogen expander process, the MODEC, Toyo Engineering and Nippon Kaiji Kyokai FLNG liquefaction solution LiBro (for lithium bromide) is scalable and efficient in warm climes (doldrums). Unlike plant that might use propane to cool gas to LNG, LiBro uses the power plant's own exhaust to cool the cargo, a safe and efficient variant sure be popular in the world's dangerous oil provinces. Applying nitrogen as a refrigerant is not new for liquefaction technology.

What is using lithium bromide heat absorption and chilled water to pre-cool (condense away water) and cool (liquefaction) natural gas by first circulating waste heat from turbine exhaust to cool refrigerants.

It sounds brilliant.

As for reliability — lithium bromide absorption is the stuff of land-based air-conditioning.

The company's involvement in Petronas' PFLNG 2 and the consortium of JGC Corp and Samsung is a sign this compact solution has a future.

For now, Malaysians will marvel at another FLNG first in PFLNG 1. It'll be Asia's first FLNG.

Easy loading
The Sevan FLNG concept with HiLoad.

Courtesy Sevan Marine

Easy cool
Modec's liquefaction concept is based on efficient "air-conditioning"

Courtesy Modec

FLNG's Share

of 110 mtpa of LNG export capacity from 30 LNG trains forecast to come online 2018

Carribbean FLNG	0.5 mpta	Q2 2015
PFLNG 1 Kanowit	1.2 mpta	Q1 2016
Prelude FLNG	3.6 mpta	Q1 2017
GoFLNG Hilli	-	(1/3-built, delivery Feb.'17)
GoFLNG Gimi	-	(newbuild deliver Q1 '18)
P FLNG-2 Sabah	1.5 mpta	Q1 2018

Source: WorldEnergyReports/Golar LNG

FPSO

Guide to Life Extension

By William Stoichevski

There are new-builds, and there are conversions. In lean times, there's also "life-extension" for FPSOs increasingly seen as the best hope of developing oilfields too pricy as platform projects. Life extension is about making first-time money, cutting costs or continuing to earn when a field or floater enters a new stage. It's also about safety. Life extension involves major, multiyear considerations for operators and FPSO contractors, and for all approaches to longer life, history is the great decider.

"Inspect, never expect," urges Ketil Hox, Teekay Petrojarl's FPSO start-up manager for the North Sea. The chemical engineer with two decades of Kvaerner (Aker Solutions) process experience oversees production units as they become producers. A major area of concern for Hox is also "safe late-life", which in the language of the NORSOK, the Norwegian contract standard, means managing "barriers" to disaster. Good safety strictures, good equipment, good people and a sea-safe vessel are all "barriers".

Backing up Hox is Shell's Penguins FPSO lead, Ali Anaturk, a respected industry voice. He explains how safety barriers might be compromised from the get-go if start-up happens to involve a late-life FPSO or someone's field life-extension project. Three decades of experience on four continents — at Bonga, the new-build FPSO Bonga South West, Penguins and others — has taught him that danger lurks in all life-extension propositions. He's put that experience into print, writing voluminously about FPSO design, hydrodynamics and offshore structures. When he speaks, slowly at first and under intense nearby lighting, it's about the unnerving evidence he's seen from the burdensome legal standpoint of an operator examining a life-extension candidate.

With the average life of the world FPSO fleet between 15 and 20 years, "Some are fast approaching their design life," Anaturk says. Of the 164 FP-

Under the weather
Process kit aboard the Norne FPSO

Photo: Harald Pettersen Statoil ASA

SOs in the world as of January 2015, he says most are "owner-operated, custom-built is the tendency for large volumes, (while) leased, life-extended, deep-water and getting old are also the trend".

Classification societies require appearances in dry dock for some, but "ad-hoc solutions are being found" for others that might be permanently moored or tethered and or even looked at for the first time as "docks" by some, as in discussions in Indonesia, according to a source. Moreover, class only provides guidance for the hull, not topsides, and class rules and shipbuilding norms have guided FPSO design, just as uncertainty on rules and late-life standards begin to arise. He says that reliance on class early on might in late-life be providing a false sense of security. Though FPSOs might be aging, there jacketed cousins the oil platforms are older. It's a nice point of sales for the vessels option. Anaturk says there's a similar number of shallow-water FPSOs in service now as there were when the oil price last was at today's levels, back in 2005. Most new FPSOs have been "deep-water-only", yet they, too, are only as ubiquitous as they were in 2005. So there's been some FPSO attrition.

Of the world numbers, no disconnectable FPSOs is over 20, and that's a good thing, since they could take six months to two years to disconnect and overhaul for a new project. "Disconnectible" vessels are dry docked at five years, so these vessels alone are today's life-extension and modifications market.

Seaborne Norne

That life-extension market is divided by philosophies on savings and value over the question of whether to repair, modify and overhaul in dry dock or at sea. The latter is a Norwegian favorite, it turns out.

Stately Norwegian operator Statoil announced this winter that the world's most northerly placed ship-shaped production vessel, the Norne FPSO in the Norwegian Sea, could live another 15 years on hull life-extension work and process modifications for increased oil recovery amid the varying, high-pressure, high-temperature and hydrate-prone well stream of local hydrocarbon finds.

The Norne FPSO was to shut down this year but after an excellent 18-year data collection program, studies at Polarkonsult in Harstad, northwest Norway, and at Aker Solutions carried out at sea show the hull can still stand up to punishing waves as high as 10 meters until 2036.

"The studies conclude by showing the hull structure is robust and that the great likelihood is that the lifetime can be extended," says Statoil Norne boss Kristin Westvik.

"We can do the necessary modifications without taking the production ship to land for a long period." The vessel serves an astonishing 15 subsea templates.

Asset Integrity

Studies are part of life-extension and not unique to the North Sea area. Most

Safe stroll
Crew aboard the Maersk Peregrino FPSO off Brazil.
Photo: Oeyvind Hagen Statoil

FPSO contractors agree years of cataloging maintenance helps decide whether life-extension is possible. A cursory look just won't do, regardless of where in the world the vessel might be from.

"The North Sea have their share of marine fatigue issues, too," Anaturk says, pointing to a long list of possible stoppers to life-extension. In his A-to-Z of dangers, anodes attached to hinder corrosion can be lost when a newly refurbished FSPO or candidate is towed to location. The resulting rust leads to eventual structural failure. Coatings failures at riser supports are now believed to be more common than thought, and failure where phase-carrying riser is festooned to a hull can be catastrophic. Corrosion at coating gaps in general can affect large areas that then become "the first to go". "Anodes are not good enough when coatings fail," Anaturk says, adding, "The areas can be quite large. Fatigue cracks are common in all ship-shaped hulls save, perhaps, the Sevan-designed "cylindrical" FPSOs and are caused by the endless flexing of a long structure atop the waves. "Uncertainties in fatigue," Anaturk calls it, a nod to his buyer side need for certainty.

Green and white water on deck due to storms creates structural erosion and impact damage, and so the trend is to install custom bulwarks to bows and decks. Sea chests housing moving parts and tools are prone to water leaks: firewater systems are housed in these enclosures at the stern, and Anaturk advises they be avoided in vessel designs, since "it's not double hull in these equipment holds," and they cause "uncontrolled weight increases" when they fill with water.

Other marine-only issues facing operators and contractors considering life-extension projects include "marine life" in ballast tanks and on external caissons. Class approves hull, but not topsides or mooring or

FPSO First
Modec converted the Whakaaropai in 1996
Photo: Modec

risers in production. This class insufficiency might be behind the Norne decision to study, inspect and overhaul at sea despite the omnipresence of class in Norway.

Atypical for class are issues like external riser damage and corrosion in mooring suction piles. Anchor cracks … "They're not really inspected for fatigue," says Anaturk. His other life-extension pointers include making sure offloading buoys get modern floating hoses. "It's the most vulnerable part of the FPSO," he says, and it's highest on his chart of costly consequences. Topsides and hull corrosion, too, come in at the top of the dangerous items list. Finally, he recommends decoupling schedules for flow lines and FPSO start-up or first oil might have to wait several months, as is understood to have happened at Bonga.

Repair or Replace

Top of the "expensive" list of fixable items are the rotating equipment pressure declines that often seen just as life-extension is being contemplated. Cavitation, which is damage caused by the formation and implosion of vapor in pump systems, can also cause disruption. David Arnold of Weir Services has been called in at times to repair or remove a turbine rotor only to find that the turbine blades alone were damaged, a specialty repair for Weir crews. His workshops ID the material or part — both of which might no longer be in production — then reverse engineer using the scanned data of a laser "pen" scanner. For owners or contractors facing turbine problems in power, injectors, compressors or pumps, speedy repair could in itself mean a life extended. He warns that the savings that might be found in repairs alone for life-extension shouldn't be the only parameters used. "If you change service provider on cost alone you'll be taking a great chance," says Arnold.

Optimum Life

Marco Beenen, Senior Vice President for BW Offshore's West Africa Fleet, is a proponent of life-extension taken to sea. "Most units have significant remaining technical life," says Beenen, a veteran of four FPSO life-extensions: Petrolea Nautipa, now 14 years beyond contract; Espoir Ivoirien (14 years); Sendje Berge (seven years) and the Abo (13 years).

"FPSO replacement is rarely a viable option for the client," says Beenen, pointing to a BW record he says speaks of extra contract value. "You can come up with your own numbers, but the BW view is that life-extension can reach 20 to 30 years," he says, adding that some have been BW Offshore "signature modifications" that last two to five years, as on some models afloat in the Gulf of Mexico, Brazil, the North Sea, New Zealand and West Africa.

Beenen reveals the company bought several 1970s (single-hull) tankers and converted them into FPSOs with smaller, isolated total holds to measure up to today's double hull safety.

"Tankers built in '76 are actually in fantastic condition. They show signs of having been built better than some modern tankers," he says.

Beenen says, "in-situ modifications are often the best choice" for the client, and he points to one West African example where life-extension was made possible by life-saving repairs. A metal-eating bacteria peculiar to Africa had infected a bulkhead in the Berge Helena and had

Majestic
The FPSO Fluminense (2003)
Photo: Sembcorp

Maersk Peregrino FPSO off Brazil.
Photo: Oeyvind Hagen Statoil

Tall ship
Norne will be life-extended
Photo: Anne-Mette Fjærli, Statoil

First Oil 2007:
The Modec-maintained Stybarrow Venture MV16
Photo: Modec

eaten away steel plating. For a cost of $500 million, 300 tons of replacement steel was ordered to rebuild the weakened hull, and lightly damaged areas were sandblasted. Though performed at sea, the Berge Helena life-extension showed the merit of BW's approach of continuing production while a project team is assembled to head offshore. "At this stage, (the life extension) becomes a project," and in the ensuing repairs and modifications, existing vessel and production crews stay clear and perform no extra duties. Despite the apparent production win-fall of this type of life-extending operation, it has its critics, with some advocating staying in the yard for life-extension modifications, or "where the competence is", in case something goes wrong. Beenen disagrees: "This is offshore construction work. The execution is different (than in operations). It could involve six months of prepping and front-loading. After that, it's a project and not part of the fleet."

For the Sendje Berge, one of BW Offshore's five life-extended vessels, a renewal survey in 2009 paved the way for a four-year extension. In the extra time, it produced 100 million barrels, so it was expensive to stop for access to tanks and for new four-person cabins, HVAC, new lifeboats, sewage, galley, a refurbished main boiler, a new emergency generator and central production controls. The Sendje Berge offshore project schedule continued offloading for eight days, while BW's client tied in new wells (RW).

Data Collection

While work done at the yard can be "$100 million to $200 million" (much of it project management and parts), three to four years of repairs can bring "six to 10 years more production".

Although, the benefits for the operator might be felt five-years on, "Too often one-year options are awarded in succession (instead)," he says. This limits life-extension potential and business value, when assets appreciate due to work done.

With most FPSOs at 90 percent of their design or field life, candidates for life-extension are growing, as new oilfield value is pinned to modifications for new well stream, new production phases, new tie-ins, tail-end production or increased oil recovery (IRO, Norne).

If project specs can be made to mate with the average FPSO, if asset-integrity regimes can be made to start with a database of vessel history (including incident reports and breakdowns) then safe life-extension can be made safe late-life and commissioning of the type Mr. Hox overseas in the North Sea.

"It's all data-gathering. It's the basis of life-extension," says Anaturk, and Beenan agrees. While the consensus among these men is that FPSOs in 2015, 2016 will mostly be leased due to reduced CAPEX for operators, it is easy to see life-extension gaining in popularity. The price of very large crude carriers, or VLCCs, is "sky-rocketing" and topsides average 30,000 tons. Then there's the preponderance of deep-water-only new FPSOs whose numbers haven't grown. Openings exist for more deep-water work and for life-extension in the world's more marginal mid-water oilfields. For signs of strength, Anaturk points to the strong lease market for low-volume vessels.

"(The FPSO market) will survive," he says, adding, "Sorry. I'm not that pessimistic, really."

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Offshore Inland

Longer Docks; Deeper Water in Pensacola

With Offshore Inland Marine & Oilfield Services Inc (OIMO), a leader in topside and riding crew repair services, experiencing strong growth before the drilling market softened, the company knew its days in Mobile, Ala., were numbered, as it had outgrown its five acre facility and fabrication shop. But it didn't have to go far, earlier this year moving 60 miles east to Pensacola, FL, finding the backing of a strong maritime community with a wealth of technical talent, not to mention vastly improved facilities.

Offshore Inland made the strategic decision at the end of 2014 and into the beginning of 2015 to transition it corporate office to Pensacola, where the improved fabrication shops, deep water vessel access and the required property allowed it to take on larger projects than it could in Mobile.

Offshore Inland's shipyard in Pensacola is located within the Port of Pensacola affording it the opportunity to berth vessels alongside its five deep water berths. All bulkheads are concrete and the berths combined give the company more than 2500 linear feet of dock space coupled with more than 33 ft. of water depth, with adequate cranes to perform a multitude of lifts for quick mobilizations and demobilizations.

While the offshore market has taken a significant hit in tandem with the move, OIMO sees a bright future in its new facilities. "It goes without saying, it has been a challenging time for all of us, but we have worked very hard to ensure that we were as prepared as possible for the downturn and remain dynamic to the ever changing market," said Nick Fuller, Director of Business Development.

The market for the last 12 months has been turbulent for many companies, competitors and clients alike. The beginning of the year remained steady for Offshore Inland with a backlog of projects.

The remainder of the year has been much more challenging with client budgets and drilling activities slowing in the GoM. However, OIMO reports that it has remained fiscally strong and a preferred supplier to its clients. "We were very proactive to be the business partner our clients expect us to be and offered them unsolicited commercial solutions to ease their challenges as well," said Fuller. "We have been successful in providing a quality service that has made us a preferred supplier to our clients which has afforded us an opportunity to continue to providing our services during this prolonged downturn."

The Coming Year

Offshore Inland positioned itself within the markets that it serves to be the go-to repair company for marine vessels and offshore contractors, making investments in management and personnel, facilities and equipment to make strides in efficiencies, deliverables, client communication, safety and quality. That said, in a down market it has its new facility and a lot of property that needs to be active with vessels undergoing repairs, conversions, upgrades, mobilizations and fabrication.

With the downturn in the drilling market, Offshore Inland has focused on its existing clients and taken the necessary steps to reach into markets that we have been limited in by our capacities in our previous locations. For example, it has registered success with its subsea clients for subsea fabrication, staging and mobilizations.

While the direction and speed of recovery of the drilling market is anyone's guess, OIMO continues to see its clients engaged for operational work that needs to be completed as well as upgrades and maintenance. Often with challenge comes opportunity, and OIMO is banking on its improved position to pay off handsomely when the market inevitably rebounds.

"Offshore Inland will continue to grow its subsea fabrication, rig/ship repair & maintenance, general fabrication, and mobilization businesses by providing our clients with high quality, timely, and competitive solutions.

Although we all face a challenging market situation in both the offshore and marine sectors, we plan to capitalize on

our recent successes with key customers while exploring new markets and opportunities," said Jack Berglund, Senior Vice President, Commercial.

Recent Jobs

Offshore Inland has completed an array of projects over the last 12 months, including this one which effectively illustrate the company's capabilities. Offshore Inland was awarded and completed an extensive topside maintenance period for one clients at its Pensacola facility, and time was off the essence.

At the kick-off meeting key milestones and schedules were set, and among the tasks:

- **Modification and fabrication** of Flag sheave, which included reinforcement requirements, grating removed for piping installation and re-install of grating;
- **Mooring Interference modifications;** all sheaves were relocated by removing the sheave from the mounting assemblies, demolishing of the existing bases, fabrication of new re-enforced bases, and re-install of the sheaves;
- **Fuel meter installations;**
- **Chain Locker modifications,** which required enlarging both the Port and Starboard chain lockers, abrasively blasted and primed with zinc rich primer, and finally installation; Additional requirements for completion were: removed and refit anchors and chains, relocated electrical cables, fluorescent lights and J-Boxes, relocation of bitter end connections and manholes for the chain lockers. OIMO demucked chain and mud box prior to installation. Stinger Vacuum hose and electrical replacement;
- **Stinger roller box removal** and replacement of Stinger roll boxes to include replacement of the electronic load pins. NDE was performed on all load pin keepers once load cells were removed. OIMO also performed Eddy Current testing on all critically fatigued areas;
- **Roller design change and machining;**
- **Gas Detection equipment electrical assistance** for the installation of their gas detection system;
- **Boom Stop repairs,** OIMO replaced damaged steel by use of scaffolding during a very small window of crane availability.

(Photo: ASTICAN)

THE SPANISH MARITIME HERITAGE

By Joseph R. Fonseca

With a coastline of 4,964 km and a vast majority of the country's population living along the coast, Spain's economy has a direct bearing on its ocean related activities. The importance of sun and sand tourism, of the energy sector – for which oil and gas are supplied by sea – and the ever-increasing role of sea trade are the key economic factors.

Being largely surrounded by water, Spain is heavily dependent on maritime transport and international trade as was evidenced in the middle ages when the closure of Constantinople by the Ottoman Turks led to voyages of discovery for new sea routes for trade.

Today, more than four-fifths of the imports and not less than two-thirds of exports pass through its ports. Spain is regarded as a large merchant marine, as well as one of the world's most important fishing fleets.

General traffic is very heavily concentrated in relatively few of Spain's many ports, most notably in Algeciras (province of Cádiz), Barcelona, Bilbao, Las Palmas, Santa Cruz de Tenerife, Tarragona, and Valencia. Most of the fishing fleet is concentrated mainly in Galicia and the Basque Country.

Currently, the network of primary ports in Spain is state-run, managed by a public body which coordinates and regulates the system having considerable operational autonomy.

No one port stands out above the others as Spain's 'great' port. Only in terms of Free Zone storage can any 'one' be considered to have a major share of business.

Ports are, more than ever before, seen as operational centers capable of generating technological exchange and fostering new industrial localization and extensive development potential.

Shipping & Fishing

Shipping in Spain is hassle free as the country is well-connected by road, rail and air besides the vast waterways. Spain has the advantage of its geographically strategic location that links it very convenient to other countries of the world especially those in Africa and Europe. A highly vibrant ferry service is functional connecting the various ports of the country as well as ports of other countries. Because of its very dynamic coastline with a number of highly proactive ports, shipping in Spain has now made relocation easy.

Photo: Zamakona Yards Group

The shipyard in Las Palmas de Gran Canaria, Repnaval. SA, belonging to the group Zamakona Yards in the Canary Islands, is operating a new slipway. The slipway will double the existing capacity is it can accommodate vessels up to 120 x 20 m beam and 5,500 tons.

More than 145 Spanish shipping companies operate from Spain mostly from Canary Island, Madrid, Barcelona, Vigo, Bilbao, Cadiz, Valencia, Corunna Gijon and Algeciras. (The Compañía Transatlántica Española is known as one of the first giant shipping companies that was established 1849.)

The Spanish fishing fleet is made up of almost 14,400 vessels. It is one of the biggest in the European Union in terms of tonnage. Half the fleet, both in terms of numbers of vessels and tonnage is registered in Galician ports. Around 1,100 vessels are registered in the Canary Islands.

Spain's long, narrow continental shelf is rich in fisheries resources. Spain's jurisdictional waters viz. the country's Economic Exclusion Zone, are its National Fishing Grounds. The bulk of the Spanish fleet fishes in four fishing zones: the Cantabrian Sea-Northwest, Gulf of Cadiz, the Canary Islands and the Mediterranean.

Despite the rich fishing waters - according to the FAO, Spain is Europe's second biggest consumer of fish products (40.5 kilos per person / year, behind Portugal's 59.8 kilos) and the world's third biggest importer behind Japan and the United States. It has become clear

Spain Facts

Population: 48,146,134
(July 2015 est./29th in the World)
Coastline: 4,964 km
Waterways: 1,000 km

Maritime Claims
Territorial sea: 12 nm
Contiguous zone: 24 nm
Exclusive economic zone: 200 nm
(applies only to the Atlantic Ocean)

Area:
Total: 505,370 sq km
Land: 498,980 sq km
Water: 6,390 sq km
Note: there are two autonomous cities - Ceuta and Melilla - and 17 autonomous communities including Balearic Islands and Canary Islands, and three small Spanish possessions off the coast of Morocco - Islas Chafarinas, Penon de Alhucemas, and Penon de Velez de la Gomera

Merchant Marine
Total: 132
By type: bulk carrier 7, cargo 19, chemical tanker 8, container 5, liquefied gas 12, passenger/cargo 43, petroleum tanker 18, refrigerated cargo 4, roll on/roll off 9, vehicle carrier 7

Foreign-owned: 27 (Canada 4, Germany 4, Italy 1, Mexico 1, Norway 10, Russia 6, Switzerland 1)

Registered in other countries: 103 (Angola 1, Argentina 3, Bahamas 6, Brazil 12, Cabo Verde 1, Cyprus 6, Ireland 1, Malta 8, Morocco 9, Panama 30, Peru 1, Portugal 18, Uruguay 5, Venezuela 1, unknown 1) (2010)

Ports & Terminals
Major seaport(s): Algeciras, Barcelona, Bilbao, Cartagena, Huelva, Tarragona, Valencia (all in Spain); Las Palmas, Santa Cruz de Tenerife (in the Canary Islands)

Container port(s) (TEUs): Algeciras (3,608,301), Barcelona (2,033,747), Valencia (4,327,371); Las Palmas (1,287,389)

LNG terminal(s) (import): Barcelona, Bilbao, Cartagena, Huelva, Mugardos, Sagunto

Source: The World Factbook 2013-14. Washington, DC: Central Intelligence Agency, 2013

Did you know?

The red and yellow colors are related to those of the oldest Spanish kingdoms: Aragon, Castile, Leon, and Navarre.

over the years that production in national fishing grounds was insufficient and fisheries have therefore been developed beyond Spain's territorial waters and in more distant parts.

Ship Building

Even as commercial shipbuilding is now firmly dominated by Asia, the Spanish shipbuilding sector is a leader in design and construction (see the August 2015 cover story of *Maritime Reporter & Engineering News* on Astican & Astander shipyards). The industry has invested €260 million in R&D activities, which represents 10% of its total annual revenue. There are 24 new construction facilities and 11 repair and transformation facilities in Spain, which directly employ nearly 8,000 people. Indirect jobs generated by the sector employ in excess of 38,000 persons, meaning, there are five people working for every one person employed by a shipyard. The repair shipyards have attracted new cruise, passenger, ferry and gas shipping clients, while maintaining their traditional specialization in large fishing, oceanographic, research and military vessels. In 2010, sales in this subsector stood at €250 million.

Earlier in 2003, Spanish shipbuilding held the fourth position in the EU in terms of new builds completed. Spanish shipyards specialize in large fishing and factory vessels and research vessels, delivering advanced and specialized ships with a high value added components, as well as some of the most accomplished ship repair and conversion facilities in the world.

Potential for Development

The mild climate during the whole year and the extensive sandy beaches of the Mediterranean and Atlantic Ocean, as well as of its two archipelagoes (the Balearic Islands and the Canary Islands respectively), have been attracting tourists from Northern Europe for decades. Plans are underway to invest heavily in this sector in order to take advantage of the tourist boom which saw 60.6 million tourists from overseas in 2013.

As a result of its large coast line another sector that is fast catching up is wind energy production. Spain is the world's second largest producer of wind power (11,600 MW), 5.5 % of the Spanish electricity consumption in 2004 came from wind energy. For example, in Tarifa (Andalusia) over 5,000 wind turbines have been installed within 10 km of the coastline. The Spanish government has recently adopted measures to speed up and promote the installation of offshore wind farms, to harness the potential Spanish coast offers.

Yachting marinas too have proliferated along the Spanish coast. The growing demand for berths and moorings has led to a major increase in the number of marinas along several parts of the coastline. Spain's marinas boast a high occupancy rate (more than 80%) and they make a significant contribution to the economies of coastal communities, providing 3,124 direct jobs and 23,409 indirect ones.

(Photo: iStock)

Portugal

Searching for Lost Maritime Glory

By Joseph R. Fonseca

Although a small nation on the Atlantic shores, Portugal in the 16th century was credited with discovering most of the "New World" previously unknown to Europe. In the process it became the richest nation in the West. The names of Bartolomeu Dias (Africa), Vasco da Gama (India) and Fernão de Magalhães – Magellan, who led the first circumnavigation of the globe but was killed in the attempt – echo down the centuries.

Over the years the country underwent a transformation and saw the hard won glory fade. In fact until 1974, strong public protection dominated the national shipping sector, especially regarding merchant shipping to Portugal's overseas territories. In that period, shipping policy was regarded as an instrument of integration for the colonies and therefore the Portuguese fleet received large subsidies. In the second phase, when Portugal lost most of its overseas territories, as a consequence it also lost most of the merchant shipping trade with those territories. This had a direct negative impact on merchant shipping.

Today, the country is caught up in the turmoil of an apparently interminable Eurozone crisis. The government is taking initiatives to revive the country's marine industries – or create new ones in a bid to recover its lost glory. Already, in the port sector things are looking up. The reform and modernization schemes of the recent past have had a positive impact on Portugal's ports. The combined cargo handled at the country's ports has shot up to 83 million tons in 2014, from just 61 million tons that was handled in 2009. More is expected. Both Leixões (Porto), Lisbon and Sines are in the process of expanding their existing container terminals and overall port capacity. In these ports new greenfield terminals are also being developed.

New cruise terminals have also been developed for Leixões (Porto), Lisbon (Santo Apolônia), the Algarve (Portimão), the Azores (Ponta Delgada) and Madeira (Funchal). The country is also investing in a string of new marinas.

Shipping Registry

Portugal has two Ship registers for vessels entitled to fly the Portuguese flag and under the same Maritime Administration viz. the Conventional register and the International register. The Conventional one is the "traditional" Portuguese register of ships. It is carried out by maritime authorities' offices (Capitanias or Delegações Marítimas) existing in each port in Portugal. Ships and owners in this register comply with all the Portuguese applicable legislations. The other known as the International Shipping Registry of Madeira (MAR) was created to reduce the country's "flagging out" process as well as to attract new ship owners and vessels. The advantage being that this register offers a favorable tax regime, applicable to both vessels and shipping companies licensed within the legal framework of the International Business Centre of Madeira. Ships are registered by the MAR Technical Commission (CT-MAR), with an office at Funchal, Madeira Island, and their home port is "Madeira". However, from the technical point of view ships registered at MAR are subject to the same maritime legislation as the ships of the conventional register. Last year by the end of September MAR became the fourth largest international shipping register of

Portugal Facts

Following its heyday as a global maritime power during the 15th and 16th centuries, Portugal lost much of its wealth and status with the destruction of Lisbon in a 1755 earthquake, occupation during the Napoleonic Wars, and the independence of Brazil, its wealthiest colony, in 1822. A 1910 revolution deposed the monarchy; for most of the next six decades, repressive governments ran the country. In 1974, a left-wing military coup installed broad democratic reforms. The following year, Portugal granted independence to all of its African colonies. Portugal is a founding member of NATO and entered the EC (now the EU) in 1986.

Population: 10,825,309
(July 2015 est./80th in the World)

Area:
Total: 92,090 sq km
Land: 91,470 sq km
Water: 620 sq km
Note: includes Azores and Madeira Islands

Coastline: 1,793 km
Waterways: 210 km (on Douro River from Porto)

Maritime Claims
territorial sea: 12 nm
contiguous zone: 24 nm
exclusive economic zone: 200 nm
continental shelf: 200-m depth or to the depth of exploitation

Merchant Marine
Total: 109
By type: bulk carrier 8, cargo 35, carrier 1, chemical tanker 21, container 7, liquefied gas 6, passenger 13, passenger/cargo 5, petroleum tanker 3, roll on/roll off 1, vehicle carrier 9
Foreign-owned: 81 (Belgium 8, Colombia 1, Denmark 4, Germany 14, Greece 2, Italy 12, Japan 9, Mexico 1, Norway 2, Spain 18, Sweden 3, Switzerland 3, US 4)
Registered in other countries: 15 (Cyprus 2, Malta 3, Panama 10)

Ports & Terminals
Major seaport(s): Leixoes, Lisbon, Setubal, Sines
LNG terminal (import): Sines

Source: The World Factbook 2013-14. Washington, DC: Central Intelligence Agency, 2013

the European Union, reaching the largest number of vessels since its creation, with a total of 316 vessels registered in MAR, 53 more than the total number registered at the end of 2013. A significant achievement was the decrease of the average age of the commercial vessels registered in MAR from 15.5 years at the end of 2013 to 12.5 years in late September.

Ship Building

Despite the growth in shipping tonnage, the shipbuilding industry is limited in size. The world share of the Portuguese shipbuilding industry was only 0.002% in 2012 in terms of completion (measured in GT). Portugal has around five major shipyards and around 200 ship repair companies, some of which are very small facilities, with minimal activity. The biggest shipbuilder engaged in newbuilding is Estaleiros Navais de Viana do Castelo, S.A. (ENVC), which is currently owned by Empresa Portuguesa de Defesa SGPS S.A. (EMPORDEF), a public holding, held 100% by the Portuguese government. The other companies also construct small ships (below 100 GT) such as passenger ships and fishing vessels, and some also work in the sector of manufacturing offshore equipment. Lisnave is dedicated exclusively to ship maintenance. The situation has been weakened by an inadequate research and development (R&D) base. Employment in the shipbuilding and maintenance / repair industry as a whole has been decreasing. Where the number of workers involved was around 10,000 in the late 1990s, this number has fallen to about 6,000 in 2006 which number further dropped to about 3,800 in 2013. Since 2010, only one or two vessels have been constructed per year and published statistics suggest that no new orders for vessels over 100 GT have been received since at least 2009 (although the Portuguese government highlighted that orders were received in 2009, 2010 and 2011 by two shipyards, for asphalt carriers, ferries and hotel river ships). The Portuguese government offers no specific direct or indirect support measures to the shipbuilding and maintenance / repair industry, although firms have access to general programs of export credit guarantees and insurance, plus loans and loan guarantees to small and medium-sized enterprises.

Classification Society

Portugal has a classification society, Registro Internacional Naval, SA (RINAVE), established in 1973. RINAVE is authorized to conduct surveys and issue certificates in order to verify a vessel's compliance with relevant international conventions, codes, etc. Portugal is also home to the European Maritime Safety Agency (EMSA), which provides technical assistance and support to the European Commission and member states in developing and implementing European Union legislation on maritime safety, ship pollution and maritime security.

Portugal consumes about 600,000 tons of fish a year, twice as much as it produces, and is the world's third highest fish consumer per capita after Iceland and Japan. Yet the fisheries industry is hardly growing with only 74 vessels of up to 80 meters in length.

Oil & gas

Though relatively modest offshore exploration is taking place, Portugal has good potential to become an oil & gas storage, shipping and services platform. The country is well situated between several markets in Europe, Africa and the Americas.

There are also excellent bunkering facilities. One major strength Portugal banks on is the coastal tourism sector which has a good infrastructure base, including a large number of hotels and restaurants. Portugal is also widely known as a 'sun and beach' destination. The highest concentration of tourism comes in the period from May to October and in specific regions such as the Algarve, Setúbal, Lisbon, Peniche (Berlenga), the Azores and Madeira. The reason behind the gradual development of the tourism sector in Portugal is mainly: the increasing number of European citizens travelling abroad for their holidays; the length of the country's coastline; and the good weather conditions of the country.

John F. Kennedy (CVN 79)

1

(Photo by Chris Oxley/HII)

49,999 DWT IMO 3 product and chemical tanker

2

Image: Ardmore Shipping

LCS 6

Austal delivered USS Jackson (LCS 6), the first built by the yard as the prime contractor

Dredger for Congo Hydro-Dam

3

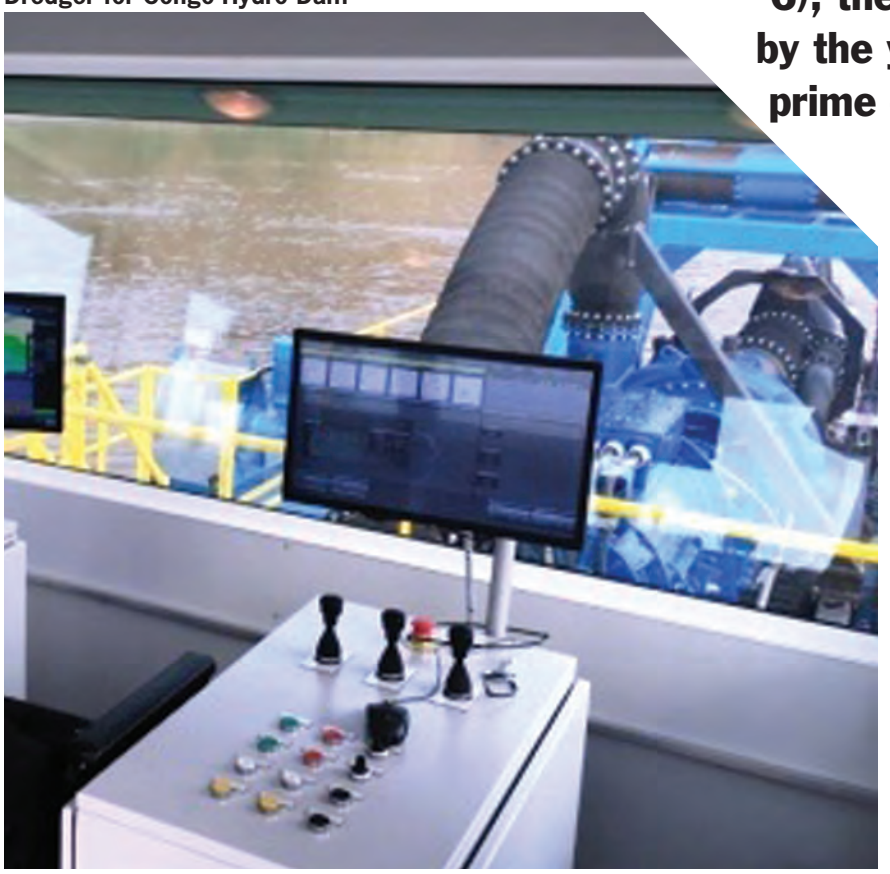


Photo: IDRECO

4

Photo: Austal

1 Keel Laid for US' Next Aircraft Carrier
Leon Walston, a Newport News Shipbuilding welder from Massachusetts, displays the welded initials of Caroline Kennedy, the sponsor of the aircraft carrier John F. Kennedy (CVN 79). Also pictured (left to right) are Rear Adm. Earl Yates, the first commanding officer of the aircraft carrier USS John F. Kennedy (CV 67); Newport News Shipbuilding President Matt Mulherin; Virginia Gov. Terry McAuliffe; and Rep. Joseph Kennedy.

2 Another Newbuild Tanker Joins Ardmore Fleet
Ardmore Shipping Corporation's latest newbuild vessel, Ardmore Seawolf, was delivered by SPP Shipbuilding from the Sacheon shipyard in Korea on August 13, 2015. The addition of the 49,999 DWT IMO 3 product and chemical tanker increases the number of Ardmore vessels on the water to 22, joining sister ships, Ardmore Sealion and Ardmore Seafox. Technical management of the Ardmore Seawolf will be provided by Univan.

3 Idreco Delivers Dredger for Congo Hydro-Dam
Idreco (International Dredger Constructions) of the Netherlands has designed, built and installed its second dredger, an ISD-600 with a digging depth of 30m, at the Inga Dam in The Democratic Republic of Congo. The dredge has a mixture production and solids production of approximately of 5,000 cu. m. /hr. and 1,500 cu. m. /hr. using an Idreco designed IDP 600 pump.

4 Austal-built LCS Delivered
Austal delivered the third littoral combat ship (LCS) [USS Jackson (LCS 6)] built at its Mobile, Ala. shipyard to the U.S. Navy on August 11. This milestone marks the first LCS ship built by Austal as the prime contractor as part of a 10-ship, $3.5 billion block-buy contract. After the delivery of Jackson, six Independence-variant LCS remain under construction at Austal's Alabama shipyard. Montgomery (LCS 8) is being prepared for trials later this year.

New OSV Concept

Image: Ardmore Shipping

Dedicated ship design office HEAVYLIFT@SEA has partnered with service provider to the offshore industry SeaRenergy a new 72-m vessel targets both efficiency and comfort, developed with a focus on minimizing losses during operation but still with a cost efficient propulsion arrangement with low fuel consumption and maintenance cost.

The vessel is designed to reduce motion and increase comfort for technicians in order to mitigate risk of sea sickness and weather downtime, especially in the harsh conditions of the North Sea. It accommodates up to 60 persons in single cabins, embedded in a true passenger ship class vessel including two day rooms, auditorium and a fitness room.

The configuration enables an efficient flow of people and spare parts around the vessel. The motion compensated gangway, which is accessible directly from the elevator grants direct access to wind turbines and offshore platforms in significant wave heights of up to 2.5 meters, arranged for workability at water levels of +/- 4.0 m around MSL. With the cargo transfer system, a barrier-free handling of spare parts and components of is possible up to 300 kg without using a crane.

The vessel is equipped with a daughter craft in its own hangar at the stern to be used as a second means for access to the boat landing of offshore structures. The hangar increases the safety of operation, especially in rough weather conditions.

Wind Farm Vessels

Photo: Atlantic Wind Transfers

Atlantic Wind Transfers, the commercial wind support services arm of Rhode Island Fast Ferry, joined Blount Boats and offshore wind developer Deepwater Wind for an official Ribbon Cutting ceremony to mark the start of construction on the first offshore wind farm crew transfer vessel in the U.S. With the first two jacket foundations for the Block Island project already in the water and on site, preparations for the construction phase of the first U.S. offshore wind farm are well underway.

According to a Navigant report, the U.S. offshore wind industry could be worth up to $2.2 billion by 2020.

LNG Containership Perla del Caribe Launched

Late last month TOTE and NASSCO launched Perla del Caribe, the second of two Marlin Class ships, the first containerships in the world to be powered by natural gas. These ships have received no lack of coverage in trade and consumer press globally, and for good reason. The 764-ft. Perla del Caribe and sister ship Isla Bella, are Jones Act vessels built for the Puerto Rican trade for TOTE Shipholdings, to be operated by TOTE subsidiary Sea Star Line out of Jacksonville, Fla.

According to NASSCO, the vessels' green ship technology, designed by NASSCO and its partners, will decrease emissions while increasing fuel efficiency when compared to conventionally-powered ships. By moving to natural gas, the ships will reduce NOx emissions by 98 percent, SOx by 97 percent, carbon dioxide by 72 and particulate matter by 60 percent over the Ponce Class ships, the company's vessels currently serving the trade, TOTE said.

"The ability to innovate and lead in the maritime sector is something that comes along once in a lifetime," said Tim Nolan, President of Sea Star Line. "These ships and the technology they employ will redefine what is possible in the shipping industry both here in the United States and abroad."

Ordered in December 2012 as part of a two-ship contract between TOTE and NASSCO, Perla del Caribe will enter service in the first quarter of 2016 between Jacksonville, Fla. and San Juan, Puerto Rico. The Isla Bella, the first Marlin Class vessel, was launched in April of 2015 and will enter service later this year.

"The Marlin Class ships are the most fuel efficient, eco-friendly containerships in the world. As the first of their kind, these ships represent the next generation of US-built ships and we at General Dynamics NASSCO are proud to be leading in that effort," said Fred Harris, president of General Dynamics NASSCO. Emma Engle, the daughter of Tim Engle and third generation of Saltchuk ownership, is the ship's sponsor and had the honor of christening and launching the vessel. Alcinda Buirds, a 32-year NASSCO employee, pulled the trigger to release the ship into the San Diego Bay.

A video of the launch can be viewed at: https://www.youtube.com/watch?v=DEje7KWlg2c

The ship's sponsor Emma Engle christens the Perla del Caribe, the second of two LNG-fueled Marlin Class ships built by General Dynamics NASSCO for Tote. The LNG-fueled Marlin Clss ships will reduce NOx emissions by 98 percent, SOx by 97 percent, carbon dioxide by 72 and particulate matter by 60 percent compared to TOTE's Ponce Class ships.

(Photo: General Dynamics NASSCO)

Ulstein Verft Launches its Largest Ship to Date

Ulstein Verft launched from its dock hall a special offshore construction vessel, Yno 302, for Island Offshore and Edison Chouest Offshore. The newbuild measures close to 160 m in length with at beam of 30 m, making it the largest offshore vessel built at Ulstein Verft to date. A video of the launch is available here: https://www.youtube.com/watch?v=tXHDzPQsuYM&feature=youtu.be. According to Ulstein, the vessel's total steel volume is about 8,800 metric tons – approximately the same as five platform supply vessels. Of this volume, Ulstein Verft's department in Vanylven has produced approximately 1,520 metric tons, the largest steel volume delivered to one project from this department.

Scheduled for delivery Q4 2015, the vessel remains at the shipyard as its heli deck is currently being mounted.

The vessel, jointly owned by Norway-based Island Offshore and U.S.-based Edison Chouest Offshore, will be managed by the latter, and thus carries the Edison Chouest colors and logo. Edison Chouest Offshore and Island Offshore ordered Yno 302 in 2013 through the company Island Ventures II LLC as part of a two vessel deal which saw one vessel built at Ulstein Verft, and the other in the U.S. at Edison Chouest's LaShip yard in Houma, La. Both ships are of Ulstein SX165 design. The ABS-classed vessels include accommodation for 200 people and are equipped with two cranes capable of lifting 400 tons and 140 tons, respectively. The vessels each feature three separate engine rooms, enabling two-thirds operational capacity to be maintained should an error force an engine rooms to go out of service. In addition, the ships are equipped with SCR catalyst system for NOx emission reduction.

By Eric Haun

(Photo: Ulstein)

Tactical Response Vessel Delivered to NYPD

Gladding-Hearn shipbuilding, Duclos Corporation delivered a second 70-ft. tactical response vessel to New York City's Harbor Patrol Unit. The two sister-boats were part of a five-boat order from the New York City Police Department (NYPD). Measuring 68.8 ft. on deck, with a 19-ft. beam and 3.8-ft. draft, the new high-speed, Tactical Response Vessel features C. Raymond Hunt's deep-V hull and a "squared-off" bow, with fendering and knees installed above the main deck to facilitate bow landings.

The superstructure, including the fly-bridge, has ballistic-resistant windows and panels installed on the sides, front, back and roof. An American Safe Room Nuclear, Biological and Chemical (NBC) filtration system pressurizes the vessel's accommodation spaces. Two decontamination showers, along with a containment system, are located on the aft deck. A 1,500 gpm remote control water cannon is mounted on the wheelhouse roof.

A guard over the water-jets forms a fixed rescue platform accessible by a hinged grating in the main deck. The forward, side, rescue-recess and aft decks are heated to prevent icing in the winter. On the aft deck is a hydraulic, knuckle-boom crane for launching and recovering a tender.

The vessel is powered by twin 12-cylinder MTU-12V2000M94 diesel engines, each producing 1,920 Bhp at 2,450 rpm, giving the boat a top speed of over 41 knots, and at 30 knots a range of about 225 miles. The engines turn a pair of Hamilton HM571 water-jets through ZF3050 gearboxes. A 30 kW Northern Lights/Alaska Diesel generator provides service power. Twin Humphree interceptor units, each fitted with an automatic trim and list control system, adjust the vessel's running trim and list at various speeds and load conditions. The heating and air-conditioning, a chilled water/heated loop system, includes a 48,000 Btu chiller and an Espar 16kW diesel heater.

Photo: Gladding-Hearn

FPSO and other mammoth offshore Floating Production Systems, courtesy of Dockwise, are

Hitchin' a Ride

When the Dockwise Vanguard was conceived, Dockwise, part of the Boskalis Group, had a vision for a new market - transporting the world's largest cargoes, including FPSOs (floating production storage and offloading vessels).

It hasn't taken the vessel, the largest heavy transport vessel in the world, long to prove its worth, as well as the feasibility of such a feat. The vessel has currently transported its first ship-shaped FPSO cargo, Bumi Armada's Armada Intrepid, to South East Asia which also happens to be one of the three largest cargoes ever transported. It is a ground-breaking job for a vessel which had only just completed the transportation of ENI Norge's 107m-diameter, 64,000-tonne, Goliat Sevan-design cylindrical floating production and storage unit from Hyundai Heavy Industry's yard in South Korea to Hammerfest in Norway.

What's more, the 110,000-ton capacity Dockwise Vanguard's next major job will be yet again bigger in size and weight - Total's 85,000-ton, 250m-long, 60m-wide Moho Nord floating production unit (FPU), which will be transported from Hyundai Heavy Industry's yard in Ulsan, South Korea, to West Africa early 2016.

All three projects are noteworthy achievements, but transporting the FPSO is the biggest, proving the ship-shaped FPSO transport concept. Being able to transport FPSOs using a heavy transport vessel offers FPSO operators and owners a faster and safer alternative to the current industry norm - slower wet tows using tugs.

"This is opening a new market," says Hans Leerdam, category manager – strategic vessels, Offshore Energy Division of Boskalis. "We have just complete transporting the heaviest cargo (Goliat), and now the Armada Intrepid, the first ship-shaped cargo. Next, we will be getting ready for Moho Nord FPU. To have these three contracts in a row shows why we brought the Dockwise Vanguard to the market."

Safe Loading

The Armada Intrepid, previously known as the Schiehallion FPSO while it was working for BP, west of the Shetland Islands, was safely and successfully loaded on to the Dockwise Vanguard in Rotterdam's Caland Canal on May 8, just eight days after the heavy transport vessel's arrival in port. The job, loading and transporting the Armada Intrepid, posed the Dockwise project team some interesting and unique challenges, due to the dimensions of the cargo. Terpstra says: "The configuration of the loading marks this out from other projects. At first sight, it looks like a normal transport, but what's quite novel is that it was the first ship-shaped FPSO we are transporting on the Dockwise Vanguard. Weighing 60,000-tonne (42,000-tonne plus ballast), it is among the top three heaviest cargoes ever transported. That, in combination with its ship-shape, with a 245m-long, 45m-beam hull, makes the this project quite interesting."

Unlike normal loads, which are positioned on the Dockwise Vanguard's 275m x 70m deck by ballasting the vessel beneath the water line and floating the load across its beam, the Armada Intrepid, which is too long to float across the beam, had to be floated over the deck via the Dockwise Vanguard's stern, carefully slotting between the two aft casings, with just 2.5-3m leeway either side.

Removing one of the aft casings could have been an option, like we will do to load the Moho Nord FPU, but, due to the time and cost to do this, and the ability to take the Armada Intrepid through the stern in this case, the team went for the latter option, saysTaco Terpstra, senior project manager for the Armada Intrepid, Boskalis. This loading configuration meant more handling (tugger and tow lines) was required compared to normal jobs, due to the careful maneuvering required. Getting the water depth and tidal window right it key, making loading location and timing crucial.

"We had to wait for the right high-tide and the right environmental conditions," says Terpstra. "The wind needed to be less than 15 knots, or Beaufort scale 4. Crucially, the water depth needs to be sufficient for long enough."

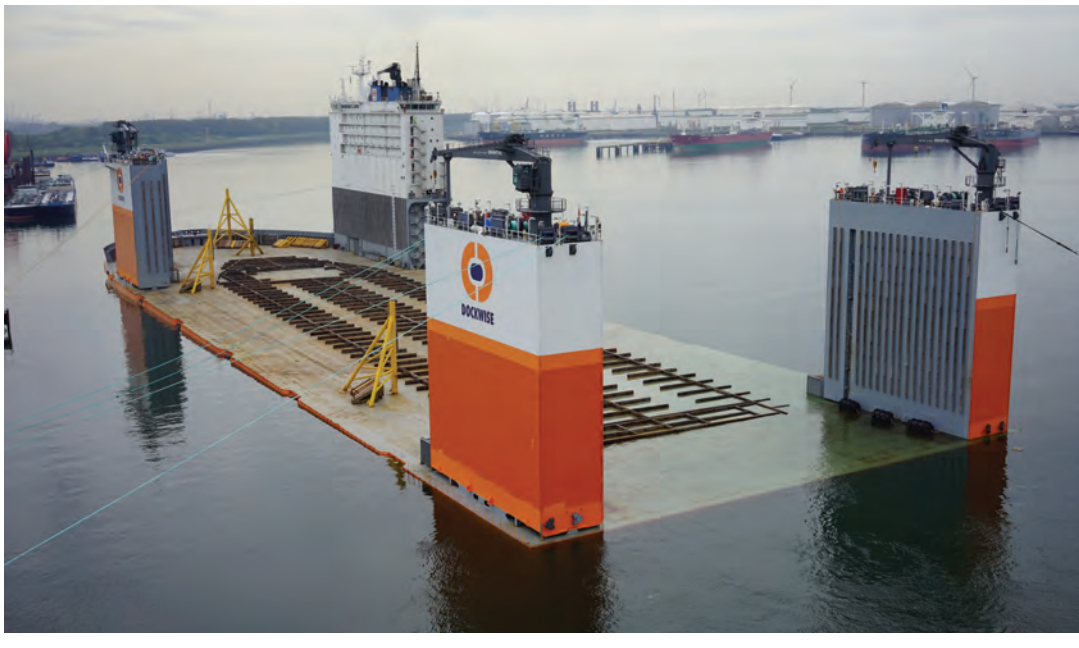
In Rotterdam, the tide ebbs and flows every 12 hours, with high-tide, at this time of year, providing water deep enough – at 24m - for 5-5.5 hours to carry out the operation.

On May 8, the right weather window was identified and the action started early in the morning. The Armada Intrepid was taken from its dry dock by four tugs to the Caland Canal and, by 11am, it was in position, ready for the high tide.

The pressure was on. The team had a big job on their hands and some 1000 spectators as well as local and national media watching. But, they also had ideal conditions – sunny weather and little wind.

Stop ...

Drop ...



Load ...

... & Float away.

"A few hours before we had the right water depth, we ballasted the vessel (Dockwise Vanguard) so it had a free board of 1m," says Terpstra. "We then waited for the final go-ahead." With the go-ahead given, the team continued to ballast the Dockwise Vanguard while the four harbor tugs brought the FPSO to its stern. At 4:30 pm, the float-on operation started, with the first tugger lines (from the Dockwise Vanguard to the Armada Intrepid) slowly pulling the vessel in between the two aft casings. It's a slow and careful process, with the Dockwise Vanguard crew taking over the handling for the final positioning on to guide posts on the heavy transport vessel's deck.

By 7:30 pm, she was in place. However, even once in place, the position had to be monitored, to make sure it was correct, before the Dockwise Vanguard was slowly de-ballasted, finally lifting the Armada Intrepid out of the water. Once the Armada Intrepid was fully out of the water, further inspections were carried out and, finally, deballasting was completed and the load successfully executed. The final task, before sailing, saw some 54 sea fastenings (each comprising approximately 2.5 x 3m brackets) welded into place, to make sure the FPSO would remain secure during the transit, about 54 sea fastenings. "The operation was executed under ideal circumstances," says Terpstra. "The weather was perfect, no wind and clear skies, resulting in good sight, which is essential for the operation. Altogether, the operation went well, as per schedule, and no unforeseen circumstances were experienced."

Preparation

However, loading an FPSO, or any major load, onto the Dockwise Vanguard's deck requires more than just careful loading and sea fastening – a lot of preparation work is required, making the fast turnaround all the more remarkable. First, the Dockwise Vanguard had to be cleaned following its transport of the Goliat FPSO. Then, the vessel had to be fitted with cribbing material - a 600mm-high wooden layer fixed with angle bars bolted to the deck, on which the Armada Intrepid or any other load would rest. In addition, the guide posts, against which the FPSO is positioned, had to be installed. All of this was done before May 8.

Further, the work will not stop until the FPSO is safely delivered, even though it has been safely loaded and secured. During the voyage, the FPSO, sea fastenings and cribbing are being regularly inspected.

For this transport, Dockwise is also trying something new - having permanent, real-time pressure monitoring on the cribbing. "This is something that has not been doing before and we are trying it," says Terpstra. "So far we have not been able to this. We will be able to get real time data on this voyage." All in all, it's a big job. The Dockwise Vanguard's crew was increased for the loading operation, from the usual 25/26 to 33, because of the amount of line handling involved, says Terpstra. With Dockwise as the main contractor, the project also used other Boskalis Group companies, including using SMIT Harbour Towage Northwest Europe tugs.

For Hans Leerdam, the biggest achievement is proving the FPSO transport concept. "For me, this is an innovation, a first," he says. "We are able to show to the market this is a better, faster, more efficient solution to transport ship-shaped FPSOs from one side of the world to another, be it for refitting or new builds. The alternative is a wet tow - at half the speed. We expect the Dockwise Vanguard to cruise up to 12,5 knots. Wet tow speed is about 6-8 knots. You can also be more flexible, going around bad weather. You are safer and more in control."

In fact, insurance premiums for wet tows are 10 times more expensive than the dry tow alternative, showing that insurance companies recognize that dry transport is a safer solution, says Leerdam. The Dockwise Vanguard, with the Armada Intrepid on board arrived in South East Asia, early July, sailed via the Cape of Good Hope, without the need for tugs and in less time than a wet tow would have taken.

Interlake Steamship to Install More Scrubbers

As vessel owners struggle over the best and most efficient means to meet stringent new emission regulations, the Interlake Steamship Company has proven phase one of emissions-reduction technology on Great Lakes; and two additional ships are to be outfitted with exhaust gas scrubbers in 2016. Following the implementation of exhaust gas scrubbers on its self-unloading bulk carrier M/V Hon. James L. Oberstar, the Interlake Steamship Company said it plans to expand its emission-reduction efforts to one-third of its fleet by installing similar scrubber systems on the M/V Lee A. Tregurtha and M/V James R. Barker early in 2016. In April 2015, Interlake became a pioneer, installing freshwater scrubbers on the Great Lakes when the system became operational on the 806-ft. Oberstar. The 826-ft. Tregurtha and 1,003-ft. Barker will be equipped with the same single-inlet, closed-loop DuPont Marine Scrubbers from Belco Technologies Corp. (BELCO), a division of DuPont Sustainable Solutions. Interlake President Mark Barker, who has driven innovative solutions in a very traditional market, said "this technology allows us to achieve our goal of continually shrinking our fleet's environmental footprint while dependably, safely and efficiently delivering raw materials to our steel, construction and power generation customers throughout the Great Lakes. We have proven the technology on our 800-ft. traditional Laker and now we're ready to scale up to our 1,000-ft. class ships with our first installation on the James R. Barker." A total of five Interlake vessels will be outfitted with these types of scrubbers by 2017.

(Photo: Interlake Steamship Company)

"We have proven the technology on our 800-ft. traditional Laker and now we're ready to scale up to our 1,000-ft. class ships with our first installation on the James R. Barker."

Mark Barker, President, Interlake

How it Works

The scrubber units, which are attached to the exhaust system of each of the ship's two engines, effectively strip the majority of sulfur from its stack emissions. Exhaust gas from the engine is sent through a series of absorption sprays that "wash" and remove impurities, specifically sulfur and particulate matter. That washed gas then travels through a droplet separator before a clean plume of white steam is discharged into the atmosphere. "The sulfur reductions have exceeded our expectations," Barker said. At the end of the 2015 navigation season, the Tregurtha and Barker will sail to Bay Shipbuilding in Sturgeon Bay, Wis., to have the scrubbers and associated equipment installed during winter layup, in early 2016.

Bay Shipbuilding is where the first installation on the Oberstar was completed earlier this year. The scrubber system relies on an injection of sodium hydroxide – to neutralize and remove sulfur from the exhaust gas – and that chemical has to be delivered to the vessel about twice a month. Working with partners, Hawkins Inc., PVS Chemicals Inc., Garrow Oil & Propane and OSI Environmental, the company has established waterfront supply capability at Sturgeon Bay, Wis., and Detroit, Mich., and expects to develop a similar capability in Duluth, Minn., hopefully within the next month. From there, the supply-and-delivery infrastructure will be built out at ports located near East Chicago, Ill., and Burns Harbor, Ind.

Hybrid Propulsion for New Fairplay Tugs

The Fairplay fleet in Rotterdam welcomed two new members: The hybrid tractor tugs Fairplay IX and Fairplay XI, each equipped with a Schottel hybrid propulsion system including two Schottel Rudderpropellers SRP 4000 with hybrid gearboxes, two electric motors and an integrated steering control system, specialized for hybrid propulsion. The installed hybrid propulsion concept enables the Fairplay tugs to operate with an optimal power output, according to the propulsion manufacturer. At part load, the electric motors (600 kW each) suffice while the two MTU diesel engines (2,240 kW each) are employed for operation at full load. Here, the electric motor can be switched on to provide additional power. The 29m long tractor tugs have a bollard pull of 90t and travel at a maximum speed of 13.5 knots.

The Schottel hybrid propulsion concept is suitable for Rudderpropellers with power input ratings of up to 4,200 kW. It offers a flexible combination of diesel engine and electric motor power due to the hybrid gearbox. The power output of the electric motor is variable according to the applied diesel engine performance and rotation speed. Another feature of the Schottel one-stop-shop hybrid propulsion solution is the included steering control which is optimized for the flexible operation with two different motor types and integrated in the vessel's control panel from the outset.

(Photo: Schottel)

EMP

Renewable Energy Battery Solution for Ships

A range of marine battery solutions received approval for use on-board ships or marine related applications such as offshore platforms and renewable energy projects. Available from Eco Marine Power (EMP), a developer of renewable energy solutions for ships, in cooperation with storage batteries and electrical machinery manufacturer Furukawa Battery Company of Japan, the battery range has been accepted for use on classed vessels by ClassNK (Nippon Kaiji Kyokai) in addition to having been evaluated by EMP. Three main battery types from Furukawa Battery will now be used by EMP as part of its Aquarius Marine Solar Power and Aquarius MAS + Solar solution packages.

- **FC38-12: FC38-12 VRLA** (Valve Regulated Lead Acid) batteries are suited for small marine solar power applications (i.e. up to around 5kWp) and can be supplied either as a battery pack set or as individual 12V units. Advantages: size and weight, suited for installation in small (but ventilated) spaces onboard vessels.

- **FCP Series:** Furukawa Cycle Power (FCP) series battery units are available in various configurations and are supplied complete with a modular design mounting rack for vibration resistance. The space saving design of the unit also reduces installation and maintenance time. FCP series batteries are ideally suited for renewable energy applications. Advantages: Long life (to 15 years) and low maintenance.

- **UB Series:** The Ultra Battery (UB) series are a solution for smart grid, wind power and solar power applications both on land and on ships. UB-50-12 batteries can be supplied as individual units or as a pack for use with an EMP marine solar power solution. Advantages: Long cycle life (approximately 4500 cycles for the UB-1000) and suppression of cathode sulfation.

www.ecomarinepower.com

EMP

ECO Retrofit Service

Making Bulbous Bow Optimizations Future-proof

Ship owners and operators are turning to bulbous bow retrofits to increase their vessels' energy efficiency. DNV GL has developed a tool as part of the ECO Retrofit service to support the industry in tailoring retrofit projects to the future needs of their fleet. While the service identifies new bow shapes based on computational fluid dynamics (CFD) calculations, the new tool explores the effect of alternative operational options. Overall, this approach can help customers help save 5-10% on their annual fuel bill. The biggest issue in many retrofit projects is the definition of the individual operational profile. In the past two years the ECO Retrofit service has already helped to upgrade some 200 vessels. Aside from analyzing their fleet's past performance, ship owners and operators frequently have questions concerning the future, such as: What if I operate at other conditions some day? Can we change the operational profile again? "Even though our new ECO Retrofit tool cannot change the volatility of the market, it quantifies performance for a bandwidth of scenarios from worst-case to best-case scenarios, supporting more informed business decisions," said Carsten Hahn, Senior Project Engineer ECO Lines at DNV GL – Maritime. DNV GL's new ECO Retrofit service creates 5,000 to 10,000 vessel-specific bow designs and assesses them for a broad range of operational conditions using CFD. An interactive excel-based tool allows easy and immediate exploration of "what-if" scenarios for changing operational conditions. The input is drawn from the target operational profile and is typically displayed in a matrix of four speeds and three drafts. Optional constraints, such as reaching design speed at 85 percent engine power, are also considered before the best bow shape for the operational profile is chosen. The tool can then assess the performance of this bow for alternative operational profiles. It displays estimated savings (in $ per year and amount of power in %) and payback time of the best bulbous bow option for all specified operational profiles. The payback time calculation takes aspects like fleet size, conversion costs and fuel price into account. Should customers want to change any elements of the analysis the tool simply recalibrates the new input to create more what-if-scenarios.

LNG Bunker Barge Concepts

Jensen Maritime Consultants debuted a pair of LNG bunker barge concepts. The first concept involves outfitting an existing barge with an above-deck LNG tank. The concept can be further modified to accommodate more than one type of product, if a customer has a need for multiple liquid transfers. Design advantages include a fast turnaround and a reduced need to invest in specialized assets if a customer has short-term LNG requirements. The second concept is for a purpose-built, new bunker barge. Offering greater carrying capacity and improved visibility, the design features a larger LNG tank that is nestled inside of the barge. This new barge will also feature the latest safety features and efficiencies. As the maritime industry continues to evaluate the pros and cons of switching to LNG or dual fuel options, bunker barges offer a solution for the maritime industry, which is currently struggling with the decision over which to develop first – LNG infrastructure or vessels. These barges are a resource for those who have LNG needs at ports not located near an LNG terminal or as an alternative to over-the-road transportation.

www.jensenmaritime.com

Jensen

ShippingInsight Fleet Optimization Conference & Exhibition

Optimize ... or Else ...

By Jim Rhodes & Frank Soccoli

The worldwide decline in fuel price will no doubt ease some of the immediate pressure on shipping companies to squeeze greater fuel efficiency out of ship operations. But it's only a temporary reprieve. It does nothing to assuage the perfect storm of a persistent economic slump in world trade, overcapacity in many segments, a bubble of newbuilds at bargain-basement pricing from order-strapped shipyards, disastrous freight rates and rising costs of compliance with deadlines looming for ECDIS, ballast water treatment and ECA restrictions on high sulfur fuel.

For now, low bunker prices are providing a calm spell for ship managers to catch a breath and consider ways to harness new technologies for bringing greater efficiency to ship and fleet operations. For many shipping companies, their very survival will depend on it.

This is the atmosphere in which the 2015 edition of the SHIPPINGInsight Fleet Optimization Conference & Exhibition will convene next month. The fourth annual gathering of technologists and shipowners will take place in Stamford, Conn., Oct. 13-14.

We recognize that the maritime industry is besieged by an ever growing number of conferences, exhibitions and symposia. There is something on the events calendar nearly every week of the year – with the possible exception of Christmas and mid-summer holidays. They range from massive trade fairs like SMM and Nor-Shipping to small tightly focused single-issue conferences. SHIPPINGInsight, we believe, is different, in that it brings together technology companies, classification societies, flag state authorities and – most importantly – shipowners in an intimate format that facilitates sharing of ideas and technological solutions for running ships profitably. This happens in the formal conference sessions, in the exhibit hall and less formally in the many networking opportunities. Technology is moving very fast, and this year there will be an even broader spectrum of available solutions for shipowners to consider for fleet optimization.

SHIPPINGInsight 2015 will focus on three key areas: Fuel & Propulsion, Efficient Ships and Ship Telematics. Panel sessions will feature more than 25 speakers presenting case studies and results in reducing operating costs and boosting efficiency. The panels will be moderated by senior executives from ship operating companies. In addition, there will be four themed open-discussion Q&A-driven roundtables of experts addressing ECA Compliance, the Role of Class and Flag, Human Resources and Connected Ships & Cyber Security. ShipNet will host an educational seminar on shipping management software solutions on the afternoon of Day Two. All registered delegates to SHIPPINGInsight 2015 are cordially invited to attend at no extra charge.

A consistent themeline running through the whole SHIPPINGInsight conference is the need for more and better data exchange between ship and shore in order to make timely decisions using modern analytical tools founded on solid facts. That's why we're devoting the entire program on Day Two to the subject of Ship Telematics and Big Data.

The conference chairman is Capt. Michael Wilson, President and COO of Laurin Maritime Americas. Keynote speakers are Gary Vogel, CEO of Eagle Bulk Shipping; Paal Johansen, Vice President and Director of Operations, Maritime, DNV GL; Angus Campbell, Managing Director, Bernhard Schulte Ship Management (UK); Scott Bergeron, CEO of the Liberian Register; and Shane Rossbacher, Senior Vice President of Business Development for Inmarsat.

The second annual SHIPPINGInsight Award will be presented during a luncheon on Day One of the conference to a shipping company and its technology partners, recognizing achievements in advancing the state-of-the-art in ship and fleet optimization.

We are grateful to Maritime Reporter for being a faithful media sponsor of the SHIPPINGInsight conferences since the first event in 2012. Special thanks to Greg Trauthwein and his great team of professionals for all the support they've given to this important event.

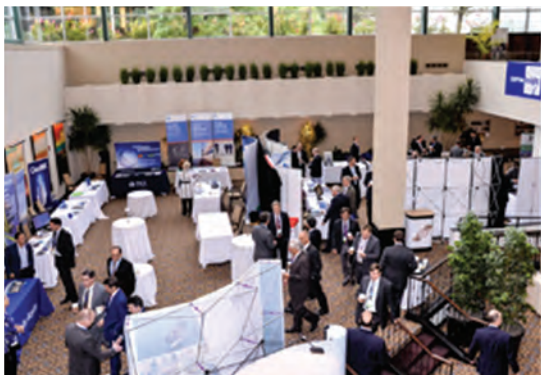
For more information, visit **www.shippinginsight.com**

The Authors

Jim Rhodes and Frank Soccoli are co-directors of the annual SHIPPINGInsight Fleet Optimization Conference and Exibition.

Plan to attend

ShippingInsight
October 13-14, 2015
Stamford, Connecticut
www.shippinginsight.com



MARITIME REPORTER AND ENGINEERING NEWS

EDITORIAL CALENDAR

		BONUS DISTRIBUTION
JANUARY Ad Close: Dec. 21	**Ship Repair & Conversion Edition** Market: Passenger Vessel Operation Optimization Technical: Marine Salvage & Recovery Product: Maritime Propulsion: Gears, Thrusters, Waterjets & Propellers Country Reports: Spain & Portugal	**PVA Maritrends** Jan. 22-26 Washington DC
FEBRUARY Ad Close: Jan. 21	**Cruise Ship Technology Edition** Market: U.S. Navy Technology Technical: BIG DATA: Satellite, Data, Tracking & Communications Product: Marine Coatings & Corrosion Control Country Report: Italy	**Cruise Shipping Miami** March 14-17, Miami, FL **Asia Pacific Maritime** March 16-18, Singapore **ASNE DAY** March 2-3, Arlington, VA **NACE Corrosion** March 6-10. Vancouver **PSOCE 2016 Florida** March 17-19, Tampa, FL
MARCH Ad Close: Feb. 22	**Green Marine Technology** Market: Training & Education: Maritime Simulation Centers & Technology Technical: Workboat Fleet Maintenance & Repair Product: Green Marine Fuels & Lubricants and Emission Technologies Country Report: Japan	**CMA Shipping** Mar 21 -23 Stamford, CT **Workboat Maintenance** April 12-14, New Orleans, LA **Sea Japan** April 13-15, Tokyo
APRIL Ad Close: Mar. 21	**The Offshore Annual** Market: Port & Ship: Loading and Unloading Technology & Equipment Technical: Satellite Communication Product: Deck Machinery, Winches and Ropes Region Reports: Scandinavia: Denmark, Finland, Norway & Sweden	**OTC** May 2-5, Houston, TX **Inland Marine Expo** May 10-12, St. Louis **Portsecure 2016** May 18-20, Toronto
MAY Ad Close: Apr. 21	**The Marine Propulsion Edition** Market: RIB & Patrol Boat Report Technical: Workboat Design & Construction Product: Marine Electronics: Navigation Radar & ECDIS Country Reports: Greece & Turkey Special Report: U.S. Coast Guard Annual	**Posidonia** June 6-10, Athens **Sea-Air-Space** May 16-18, National Harbor, MD **SeaWork** June14-16 Southampton, UK **CIMAC CONGRESS** June 6-10. Helsinki
JUNE Ad Close: May. 20	**Annual World Yearbook** Market: Maritime Simulation & Training Centers Technical: Dredging Vessel Technology Product: Pumps, Valves, Pipes & Insulation Country Reports: U.K. & Ireland	**Marine Money Week** June 21-23, New York, NY
JULY Ad Close: Jun. 21	**Marine Communications Edition** Market: Tugboat, Towboat & Barge Technical: Oil Spill Response & Recovery Product: Marine Electronics Equipment & Supplier Guide Country Report: Singapore	JULY SPECIAL CONTENT ELECTRONIC EDITION www.whitepapers.marinelink.com
AUGUST Ad Close: Jul. 21	**The Shipyard Edition** Market: Offshore Deepwater: Structures and Systems Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan Product: Ballast Water Technologies Country Report: The German Maritime Cluster	**SMM HAMBURG** September 6-9, Hamburg, Germany
SEPTEMBER Ad Close: Aug. 22	**Maritime & Ship Security** Market: Caring for the Mariner: Onboard Amenities Technical: Maritime Propulsion: The Hybrid Drive Solution Product: Clean Water Technologies Region Report: U.S. West Coast Maritime	**Shipping Insight** October, Stamford, CT
OCTOBER Ad Close: Sep. 21	**Marine Design Annual** Market: Ship Classification Societies Technical: Marine Firefighting, Safety & Salvage Product: CAD/CAM Country Report: The Netherlands	**SNAME** November 2-4, Bellevue, WA **Arctic Technology Conference** October 24-26, St. John's
NOVEMBER Ad Close: Oct. 21	**Workboat Edition** Market: The 'LNG-as-Fuel' Revolution Technical: Deck Machinery, Winches & Ropes Product: Marine Coatings Special Report: Gulf of Mexico Builder and Supplier Guidebook	NOV. SPECIAL CONTENT ELECTRONIC EDITION www.whitepapers.marinelink.com **Workboat Show** Nov. 30-Dec. 2, New Orleans, LA
DECEMBER Ad Close: Nov. 23	**Great Ships of 2016** Market Report: The Autonomous Ship: Command & Control Technical: Shipyard Automation: Welding & Cutting Equipment Product: Marine Engine Guide Country Reports: China & Korea	**Surface Navy Association 2017** Crystal City, VA

Tenneco: Large Engine SCR System

Tenneco was awarded three product design assessment (PDA) certificates from the American Bureau of Shipping for its new selective catalytic reduction (SCR) system for large engines. The PDA certificates cover key components of the system, including the complete dosing and control system, injectors, load sensors and the human machine interface (HMI) remote monitor, as well as catalyst and reactor hardware configurations for both EPA and IMO applications.

Tenneco's SCR after treatment system features a complete dosing control solution specifically designed for marine engine applications up to 7,500 kW or 10,000 hp. The system is designed to enable propulsion and auxiliary engines to meet EPA Tier IV and IMO Tier III regulatory requirements and provide precise and reliable delivery of liquid urea via a proprietary, high-performance injector design, a precision mechatronic fluid delivery pump and customizable remote monitoring and controls.

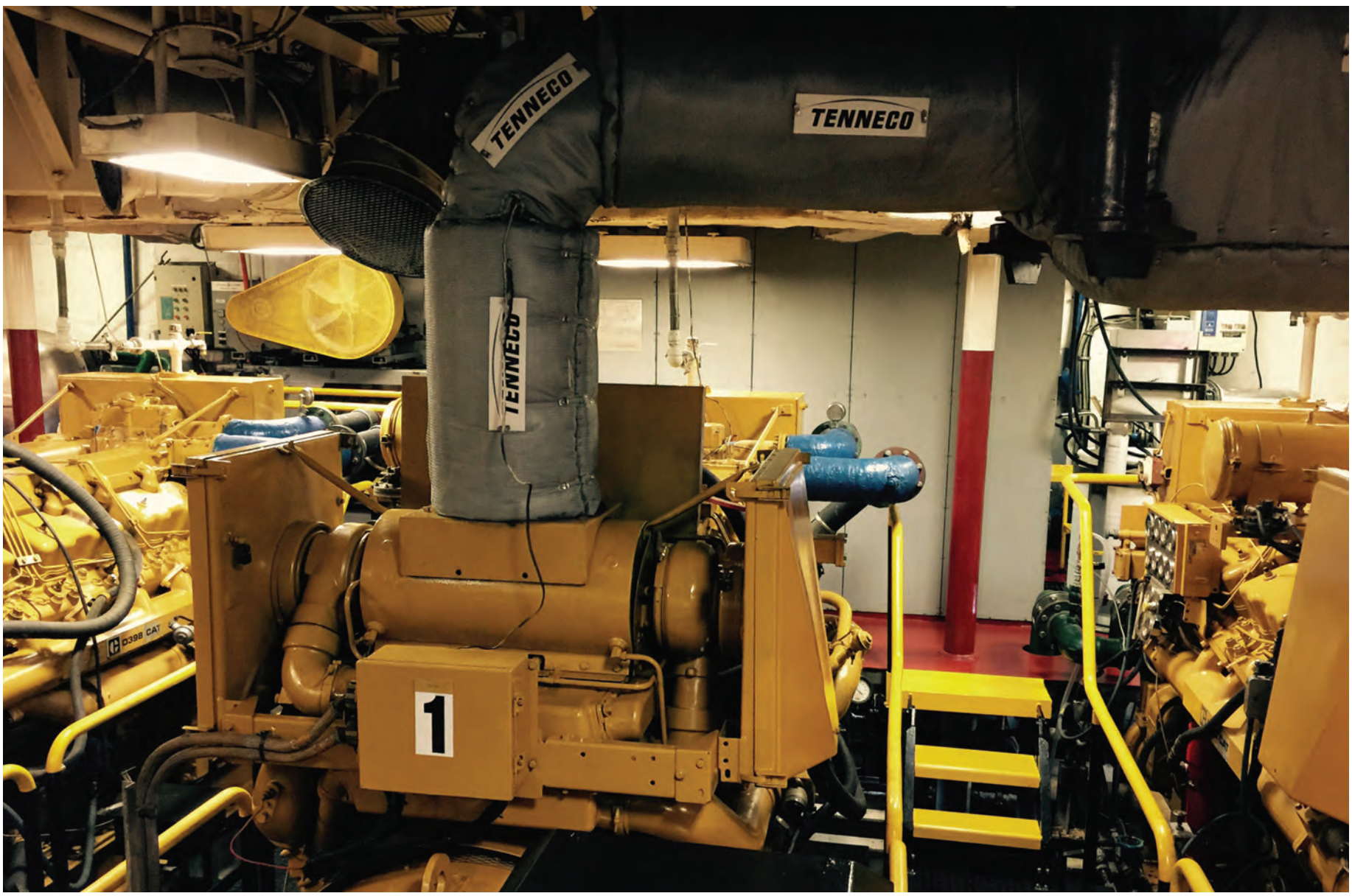
In the past year, the company has conducted a series of field tests to demonstrate how the system's form, fit, function and performance capabilities can be integrated into a vessel's engine and control architecture. Field tests were conducted in 2014 on a 224 ft. Great Lakes training vessel powered by four 800 hp, circa 1984 Tier 0 engines. In a series of validation tests, including the ISO 8178 E2 cycle, when one of the engines was outfitted with the after treatment system, the engine met all criteria for IMO Tier III including NOx and SOx. In 2015, additional field tests are currently underway on a similar training vessel in the Gulf of Mexico powered by the same type of engines.

SCR System Features

The SCR system's modular design enables seamless integration for a broad range of engine sizes and works with electrically or mechanically controlled engines. It has been validated for durability and all components are easy to maintain and service without the need for special tools.

The fluid delivery system with dosing control software is capable of managing multiple injection points and sensors. The system can support urea flows up to 120 meters, which enables a wide array of installation options. Airless urea injection provides high dosing accuracy and consistency without the need for designated compressed air.

The system's Human Machine Interface (HMI) can be accessed on the front of the fluid delivery box or remotely via a touch screen tablet. It features an easy-to-use interface to access onboard diagnostic functions and to monitor all system parameters including but not limited to NOx reduction performance and urea concentration levels in real time.



TS General Rudder is powered by four, 1982 Caterpillar 800 hp, tier 0 diesel engines.

SCR System

Tenneco's new large engine selective catalytic reduction (SCR) system for marine and large engine applications. The system's high performance dosing control and unique remote human machine interface (HMI) control pad maximize system design and installation flexibility for engine manufacturers and shipbuilders

Tenneco, Texas A&M Partner

Tenneco is helping engineering midshipmen at the Texas A&M Maritime Academy learn firsthand how advanced after treatment technology can help diesel engines meet new emissions regulations while efficiently and effectively powering the ships of the future.

Midshipmen received hands-on experience this summer with Tenneco's latest large engine SCR diesel after treatment technology on the TS General Rudder, which is operated by the Maritime Academy. Midshipmen helped conduct field tests during their training cruises in the Gulf of Mexico to demonstrate how the system's form, fit, function and performance capabilities can be easily integrated into a vessel's engine and control architecture. "Over the next few years, new vessels similar in size to the General Rudder will be required to meet more stringent EPA emissions regulations," said Timothy Jackson, chief technology officer, Tenneco. "The testing conducted on this ship provides us with important data on the system's performance in real-world ocean conditions and gives midshipmen the opportunity to work with some of the industry's most advanced emissions technologies."

Beginning in May of 2015, the midshipmen collected and documented over one thousand hours of real-time operating data, including exhaust backpressure and temperature monitoring, NOx conversion efficiency and urea quality and consumption. Tenneco's SCR system was installed on a 33-year old 800 horsepower, Tier 0 engine that was operational for the duration of the Academy's summer cruise training period. While running the engine through multiple duty cycles during real time operation of the vessel, emission results collected using telematics demonstrated NOx reduction levels that kept the General Rudder compliant with today's stringent EPA Tier IV marine emission requirements under all operational conditions.

"Transforming a 33-year old mechanical engine into one that meets current EPA Tier IV marine emissions standards clearly demonstrates the effectiveness of Tenneco's SCR system, and how its modular design can be quickly and easily integrated into any engine architecture," Jackson said.

Tenneco conducted similar tests on a 224 ft. training vessel in the Great Lakes in 2014. In a series of validation tests, including the ISO 8178 E2 cycle, when a similar engine was outfitted with Tenneco's SCR system, the engine met all criteria for IMO Tier III, including NOx.

HMI System

The SCR system's remote human machine interface (HMI) control features an interface to monitor and control key system parameters including NOx reduction performance and urea concentration levels in real time.

Texas A&M University at Galveston Midshipmen received hands-on experience this summer with Tenneco's latest large engine selective catalytic reduction (SCR) diesel aftertreatment technology on the TS General Rudder, which is operated by the Maritime Academy.

Efficiency, Safety & the case for on-board chlorine generation

Chlorine/mixed-oxidant generation is a strategy that has been proven to be more effective and efficient for combating waterborne pathogens, including Legionella, than sodium hypochlorite for years — first in municipal and hotel pools, and more recently aboard scores of US Navy carriers and amphibious ships. Now the cruise ship industry is beginning to leverage that experience to delight its passengers with cleaner water that virtually eliminates harsh chlorine odors and irritation, while at the same time improving efficiency in numerous ways for better bottom lines.

Howell Laboratories, a longtime supplier of on-board equipment based on patented MIOX on-demand mixed-oxidant generator technology to the US Navy, recently landed the contracts for two new ships being built for the cruise industry.

Adam Jones, Howell's Director of Business Development-Commercial Products, said in and of itself, the system's ability to prevent the formation of biofilm, which renders traditional chlorine strategies ineffective against the dangerous Legionella pathogen, has high value for an industry that has suffered costly and well-documented trip interruptions due to outbreaks of Legionnaire's Disease. But Jones says the efficiency benefits and the contribution of the strategy to passenger enjoyment are what drove the client's decision in this case.

For passengers, the MIOX chlorine/mixed-oxidant strategy virtually eliminates the harsh odors and stinging eyes tied to the traditional use of sodium hypochlorite. A college pool used for both competitive and recreational swimming found that operators, coaches and students reported no chlorine smell after switching to the MIOX system, despite the fact that chlorine levels in the pool remained at the same level of 1.0 ppm (water temperature was maintained at 82 to 84 degrees F.).

In addition, the operators of the same pool, as well as those of literally thousands of installations in municipal, hotel and college pools around the world, report crystal clear water quality with the MIOX system.

A municipality in Japan that operated a pool that entertains 92,000 guests per year even reported that water clarity improved 3.5 times with the switch to MIOX (from 8 meters to 28 meters). And similar results have been repeated successfully in installation after installation, over many years.

Plus, municipalities that use the system for potable water, not to mention the Navy, report a decrease in the chlorine taste in drinking water. This is especially notable since the two upcoming cruise ship installations will also use the system for potable and hotel water on board.

Efficiency and Safety Enhancements

In disinfecting water and controlling Legionella, the MIOX chlorine/mixed-oxidant solution virtually eliminates the need for additional costly — and caustic — bio-control chemicals like Sterilex, which is only approved for pools and spas, not hotel water. By contrast, the MIOX system is EPA-approved for both recreational and hotel water. Another benefit of the strategy is elimination of the need to transport and store bottled chlorine, an expensive process with inherent safety dangers. The storage space needs for the raw material — food grade salt — is 4x less than that for bottled chlorine. Plus, the generated solution of the mixed-oxidant system is nominally 0.45 percent chlorine, a concentration that requires no protective equipment like masks or gloves. So it is inherently safer for both the crew and guests. The generated chlorine/mixed-oxidant solution can also be used very safely to disinfect galleys, decks and other surfaces on board, just as you would with any other chlorine-based disinfectant.

Lower Chemical Costs

There are benefits to Howell's MIOX chlorine/mixed-oxidant strategy for disinfecting recreational, potable and hotel water on board cruise ships versus the bottled chlorine strategy.

But in the end it all comes down to cost. And according to the manufacturer, the price efficiencies of the system are most favorable.

For more information,

e: ajones@howelllabs.com

Using patented MIOX technology, Howell Laboratory's on-board chlorine/mixed-oxidant generation system not only prevents Legionella and disinfects all shipboard water, it eliminates the odor and stinging eyes associated with traditional sodium hypochlorite disinfection, making for a better guest experience.

WEEGO Portable Jump Starter put to the Test

Anyone who has read these pages knows that 'product testing' is generally not our area of editorial cover. However on occasion we will receive offers to test drive a product, as we recently were when the company with the unusual name and interesting product line came knocking.

Weego is an innovator in portable battery solutions, and it recently launched its Weego Jump Starter Battery+ to the marine market. The product line is comprised of a family of compact and portable jump starters ranging in price from $99 to $199.

Seeing as though I recently purchased a 27ft. cabin cruiser, I thought 'why not.'

To be honest I was skeptical that such a small package could pack the power to jump start anything more than an iPhone, and during much of the 'test' that's exactly what it performed, keeping power to a variety of phones and tablets. I was just about to return the unit when, lo and behold, I left one of my batteries on in an overnight stay at a local marina, forgetting to engage my battery charger while hooked to shore power.

I was literally able to put the Weego to the test on the water, and it performed exactly as advertised, providing the needed spark to jump start my 5.7L Volvo Penta marine gas engine. So impressed was I with the compact unit and ease of use, I threw out the return package and called Weego the next day to purchase the test unit.

Weego is pocket sized and capable of starting 12V batteries in boats, cars, trucks, motorcycles, ATVs and more, as well as charging phones, tablets, speakers and other USB devices. Incredibly easy to use, each Weego model includes jumper cables that can be attached to the terminals of a dead battery. Easy to follow instructions are printed on the back of each Weego for quick reference. To start, boaters simply connect the clamps to the battery terminals, attach the cable to the Jump Starter Battery+, turn the power on and start the engine. A built-in LED flashlight assists in low-light situations and a strobe with SOS function (on the two larger capacity models) draws on-the-water or roadside attention if needed. A 3-in-1 USB charging cord, 8 popular-brand laptop connectors, wall and car chargers, and a carrying case are included.

Weego Jump Starters are offered in three sizes. The JS6 Standard is capable of starting gas engines up to 4.6L and diesel engines up to 2.4L; the JS12 Heavy Duty (as tested) can start gas engines up to 6.4L, diesel engines up to 3.2L and the JS18 Professional can start gas engines greater than 6.4L and up to 4.8L diesels. Constructed with durable, high-quality components and long-lasting batteries, Weego features built-in circuitry protection, an auto-off feature, and jumper cables with both a fuse and diode to ensure user safety, as well as protection for the unit. Weego jump starters offer up to 1,000 charging cycles (a full charge plus full discharge), have an operating temperature from -4 to 140-degrees Fahrenheit (-20 to 60-degrees Celsius).

Pricing and Availability

The Weego Jump Starter Battery+ has a suggested retail price of $99.99, $129.99 and $189.99 for the JS6, JS12 and JS18, respectively.

http://www.myweego.com/videos/

G. Trauthwein

	Standard JS6	Heavy Duty JS12	Professional JS18
12V Lithium-ion Battery	6000 mAh	12000 mAh	18000 mAh
Engine Capacity	Gas: up to 4.6L Diesel: up to 2.4L	Gas: up to 6.4L Diesel: up to 3.2L	Gas: 6.4L+ Diesel: up to 4.8L
Starting/Peak Current	150A/300A	200A/400A	300A/600A
Chargine Time (using 14V input)	1.5 hours	3 hours	5 hours
Flashlight, Strobe & SOS	Flashlight only	Yes	Yes
MSRP	$109.99	$149.99	$199.99

CleanSewage Bio

CleanSewage Bio joins the portfolio of RWO, dubbed by its creator as an attack on the wastewater treatment market, offering one-side-access to the system to give significant space, as well as an easy and understandable handling concept. The one-side-access saves and allows planning without maintenance space at both sides and the back of the system. Together with a very compact system design, the space demand is up to 25% smaller than its competitors, depending on the capacity. To ease operation and bring failure rates to the lowest possible, RWO has developed an intuitive status control which enables checking the plant's status at a glance.

www.rwo.de

Headhunter

Headhunter's team of engineers, fabricators, and wastewater specialists work together to provide innovative and efficient sewage treatment solutions. Offering systems in three categories; STP, Physical Chemical MSD, Biological MSDs, all can be customized to fit customers' needs. This includes space-saving modular unit designed for the bilge of a megayacht or a skid-mounted turnkey package complete with lift stations for a jack up rigs, and more.

www.headhunterinc.com

BallastMaster

GEA Westfalia Separator Group has Class Approval from DNV GL for its ballast water management system, BallastMaster ultraV 250. The chemical-free system solution for ballast water treatment fulfills all D-2 standards of the IMO. Performing at up to 250 cu. m./hr., its modular design is suitable for retrofitting existing ships. The DNV-GL certified system can be mounted as a complete "plug-and-play" unit as well.

www.gea.com

SeaHow's Skimmer System

New SeaHow skimmer systems can be implemented to almost any work boat over 6m in length. Skimmers are designed to collect both light and heavy oils efficiently. These features provide totally new operational efficiencies especially for near shore and coastal oil spill response. The system fosters efficient utilization of existing work boats and vessels in oil spill response.

www.seahow.net

ELASTEC 1.5m BoomVane

ELASTEC'S 1.5 meter ELASTEC BoomVane is designed to quickly deploy heavier oil booms in coastal and open waters in advancing sweeping and skimming applications – with only one towing vessel. No longer limited by the length of a sweep arm, wider boom swaths can be configured with the unharnessed power of the BoomVane to tow the boom into position. BoomVane also solidly holds the swath configuration in place, maneuvered by the boat's captain.

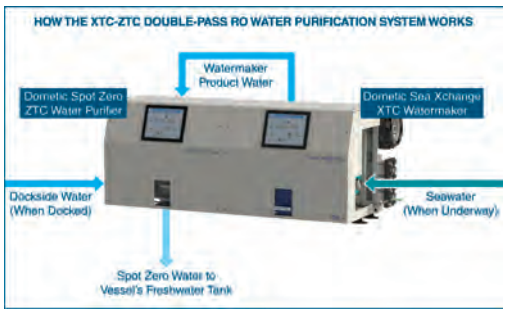
www.elastec.com

The Rapid Repair Clamp

The Rapid Repair Clamp is designed to be a fast, easy way to temporarily repair pipe leaks and bursts. The self-contained design allows for installation by one person in less than 60 seconds, without the use of any tools. Made from marine-grade stainless steel, the Rapid Repair Clamp provides an extra tight seal for water, steam, gas and most chemical/petroleum liquids. Its unique design makes it ideal for commercial applications such as marine, oil and gas, plumbing, food processing and emergency services. The Rapid Repair Clamp is available in four widths and a variety of diameters, fitting pipes ranging from 38mm – 930mm (1.5" – 36") and can be applied to pressurized pipes up to 20 bar.

www.worldwidemetric.com

Dometic's SeaXchange Reverse Osmosis System



Dometic is now focused on the workboat sector with a range of products, including the Dometic's SeaXchange Reverse Osmosis System. Featuring a compact design that yields a surprisingly small physical footprint, as well as high quality components that are designed for continuous high performance, the SeaXchange RO System boasts high rejection levels with a user friendly interface. There is more than one way to purify water, but Dometic chose to use reverse osmosis because of its cost effectiveness and ease of maintenance. The system is designed to produce the same high-quality, purified water anywhere – in open ocean waters, in harbors or in brackish water, regardless of temperature or level of dissolved solids in the water. Dometic's Sea Xchange XTC and Spot Zero ZTC Series double-pass combination systems provide operators with the flexibility in purifying feed water from not only a dockside potable water source, but also from seawater or brackish water source. From a dockside source, with one touch, the Dometic Spot Zero ZTC Series fresh water RO system will automatically process and purify feed water and will remove 95%-99% of the total dissolved solids before sending the purified water to the vessel's onboard tank. From a seawater source, Dometic's Sea Xchange XTC Series fully-automatic seawater RO system will first process raw seawater or brackish water, and then will send the product water from the XTC system to the Spot Zero ZTC automatic fresh water RO system for further processing to create a true double-pass process before the ultra-purified water is sent to the vessel's tank.

www.dometic.com

Cleaner Eliminates Need for Multiple Solutions

The eco-friendly Oil Eater Original cleaner/degreaser is ideal for marine maintenance while eliminating the need for multiple solutions. The cleaner quickly disperses grease, oil and grime from bilges, engines and decks. Proprietary anti-corrosion chemistry guards against damaging surfaces. The cleaner is water-based, non-flammable, biodegradable and contains no acids, abrasives or petroleum solvents. It penetrates rapidly, rinses off easily, leaves no residue and will not harm fiberglass.

www.oileater.com

Maersk Orders Advisory Software

ABB and MeteoGroup won an order to outfit 140 Maersk container vessels with software to optimize routes. The deal will see ABB combine its Octopus motion-monitoring, forecasting and decision-support software, with MeteoGroup's SPOS Seekeeping plug-in. Once fitted on the ships, it will enable captains to define onboard loading conditions and accurately determine areas of the ocean where their ship's motion is likely to exceed threshold values. Routes can then be optimized automatically to skirt adverse conditions, ensuring cargo arrives safely and on-time at its destination port.

www.abb.com

Adhesive-Bonded Fasteners

Click Bond's ABS Type-approved fasteners are attached using structural adhesives that are resistant to saltwater and hydraulic fluids. The chemical barrier inhibits galvanic corrosion. Each fastener includes an installation fixture that holds the part in place under positive pressure, optimizing bond strength while the adhesive cures. The fasteners offer reduced holes, stronger structures, greater work sequence flexibility and require no hot work.

www.clickbond.com

Scienco/FAST

Scienco/FAST is an original equipment manufacturer specializing in marine sewage devices, environmentally-friendly cleaners and other industrial water management technologies. These MSDs treat sewage and ensure compliance with ever-changing regulations. Scienco/FAST has several different models to offer, depending on physical footprint, weight of operating unit, access for retrofit installations, and price. Every system is functionally tested before shipping to ensure performance and eliminate service issues. In its 30th anniversary, Scienco/FAST's commitment to environmental stewardship is providing superior sewage and water management systems that lessen the impacts of wastewater in waterways. The MarineFAST is the result of decades of experience to provide the best environmental sanitation technology and continually requested by vessel owners and chief engineers. Since the first installation in 1969 on board the M/V Missouri Tugboat, MarineFAST Sewage Treatment Systems have been installed on myriad workboats and offshore facilities to provide total sewage treatment, pretreatment, and (in some cases) water reuse opportunities. Scienco/FAST takes pride in the fact that these certified, Type II Marine Sanitation Devices (MSD) and Systems are installed on some of the 'greenest' ships in the world.

www.sciencofast.com

MacGregor's Lashings Storage System

MacGregor, part of Cargotec, has developed a new 40-foot flat rack loose lashings storage system designed to make better use of available deck space. MacGregor said its new flat rack system meets ISO standards and can accommodate a total of 16 storage bins that are color-coded for twistlocks, midlocks, stackers and damaged products. Two flat racks stacked on top of each other and connected with twistlocks are the equivalent dimensions of a high cube container (9.5-ft.). Flat rack is operated as a standard container and other containers can be loaded on top of it. As usual for flat racks, it should only be lifted from the top corner fittings with a spreader lifting frame or from the bottom corner fittings with suitable lifting gear.

www.macgregor.com

TPS/i Robotics: Automated Welding Redefined

Fronius is launching the new TPS/i Robotics power source, which is designed to meet the demands of robot-assisted welding. Thanks to its interconnected and fully synchronized system components, it is designed to enable robotic welding to be performed faster and with a higher degree of reproducibility. A crucial role is played by the modified dip transfer arc (LSC - Low Spatter Control) and the modified pulsed arc (PMC - Pulse Multi Control), which give the welder a significantly higher level of control over the arc.

www.fronius.com

Bollinger

Fanguy

Photo: Evan Sisley, Office of George Bush

Harry Horgan, President George HW Bush and Captain William Rey.

Metalcraft

Ellis

Harding

Webb

Bekkens

Martin

EMS

Monnell

Fanguy Snags SNAME Award

Bollinger Shipyards, LLC announced its vice president for quality management system, Dennis Fanguy, will receive the 2015 William M. Kennedy from the Society of Naval Architects & Marine Engineers (SNAME). The award is given in recognition of outstanding service and contribution in the development of systems and planning applying to shipbuilding and ship repair. Fanguy, a 1984 graduate from the University of New Orleans (UNO) with a Bachelor of Science degree in Electrical Engineering, has been employed at Bollinger since his graduation 31 years ago.

President Bush Sails with Disabled aboard the Impossible Dream

Former President George HW Bush and First Lady Barbara Bush set sail with the crew of the Impossible Dream, a unique catamaran designed for disabled sailors, a chance for the watermen and activists to thank the 41st President of the United States for signing the Americans with Disabilities Act (ADA) into law in the summer of 1990. Impossible Dream is a 60-ft. wheelchair accessible catamaran yacht that this summer set sail from Miami up the eastern seaboard in celebration of the 25th anniversary of the ADA.

ALMACO Wins Drillships Work

ALMACO Group was awarded the design, material supply and supervision contract from Kawasaki Heavy Industries, Ltd. (KHI) in Japan for the first (DRU#1 - Ondina) and second (DRU#2 - Pituba) drillships for the Enseada Industria Naval project In March 2014, KHI contracted ALMACO Group to deliver the design, material supply and supervision for the catering areas, inclusive galley, provision stores, refrigeration machinery and mess rooms, located on the hull of the first drillship, Ondina. The expected delivery date for this work is end of 2015.

Metalcraft Celebrates 50th

Metalcraft, a designer and manufacturer of fire detection and suppression equipment, is celebrating its 50th anniversary. Beginning as a machine shop in the mid-60s with two owners and a secretary, the company served a localized Baltimore customer base. Within 10 years, it began supplying fire extinguishers to the U.S. government and defense agencies. By 1997, Metalcraft had become an international company. It currently has a staff of over 50 employees, with an extensive global sales and distribution network.

Obituary:
Elmer Morley: 1930 – 2015

Maritime Professional Training Founder Elmer Morley, MPT's founder, long time chief engineering instructor, father, grandfather, great grandfather, and husband lost his battle with pancreatic cancer last month. He founded Maritime Professional Training in 1983.

Retlif Expands Into North Carolina

Retlif Testing Laboratories has expanded with a new location in Concord, North Carolina. The new laboratory is in answer to the growing regional need for testing services and is the result of two years of searching for an ideal location. The new laboratory is initially offering pre-compliance evaluation Electromagnetic Interference/Electromagnetic Compatibility services, including EMI, EMC, Lightning testing and Electrostatic Discharge (ESD). The EMI test standard for the Department of Defense is MIL-STD-461, while the EMI test standard for the Commercial Aviation Industry is RTCA DO-160. Other available services include ESS regulatory consulting and documentation, as well as extensive engineering services. The address of the new Retlif laboratory is 7140 Weddington Road, Suite 140, Concord, NC, 28027 USA. Phone: 704 787 8474.

Master Mariner Quain Joins Hill Dickinson's Shipping Team

Hill Dickinson said that Captain Joe Quain, formerly of Bentley's Stokes and Lowless, will be joining the firm as a partner in the Singapore office with effect from September 1, 2015, bringing the firm's strength of Master Mariner lawyers to six in total. Tony Goldsmith, partner and master mariner who heads the Singapore office, said: "As a solicitor and Master Mariner of 20 years' experience, Joe's expertise in all aspects of Admiralty work can only strengthen our existing commitment to provide our clients with the highest standard of legal advice."

BMT Nigel Gee Reaches 1000th Project Milestone

BMT Nigel Gee (BMT), a subsidiary of BMT Group Ltd, and a leading independent naval architecture and marine engineering design consultancy, is celebrating its latest achievement in securing its 1000th project which will involve the delivery of detailed production engineering for a ferry machinery conversion. John Bonafoux, Managing Director of BMT Nigel Gee comments:

"Reaching our 1000th project is a massive achievement and I'm extremely proud of how far we've come. Our first ever project seems such a long time ago now, but I still remember it well. It was a new ferry design and both Nigel Gee and I were burning the candles at both ends, ensuring the delivery of the project and ever since then the company has gone from strength to strength."

Operating across four principal market sectors, the naval architectural practice delivers design and engineering services for specialized vessels in the commercial, yacht, defense and offshore energy markets. With 62 live projects, BMT made an exciting start to the year with current contracts equating to a total vessel length of nearly 2600m, spreading across 13 countries, over three continents. The company also recently announced the completion of new offices in Southampton to meet this large increase in design work.

(L to R): Members of the Nigel Gee and Associates team in 1986; Members of the current BMT Nigel Gee team; and 21m windfarm support vessel Trearddur Bay.


SBI
Goley


Port of Seattle
Pulsifer


Braemar
Eddings


Alphatron
van Boom


Matson
Wagner


BMT Designers & Planners
Skvarla

Bekkens: Big Win for Harding

Statoil awarded Harding a contract for delivery of the nine free-fall lifeboats needed for phase 1 of the Johan Sverdrup North Sea development. “This order is a solid validation of the quality of our products, the competency and commitment demonstrated by all our employees, and the effects of the significant restructuring which we have implemented in order to strengthen our competitive edge in a tough market,” said Styrk Bekkenes, CEO, Harding. The contract comprises nine FF1200-lifeboats, with nine corresponding LA 1200 SU davits.

Webb Welcomes Martin

Webb Institute announced Michael T. Martin, PE as the Assistant Professor of Electrical Engineering. Prof. Martin has more than 23 years of experience as a marine electrical engineer with a broad background in electrical systems including, electrical propulsion, power generation, power distribution, lighting systems, communications, navigation, and internal communication systems. For the past five years, Prof. Martin has been the Vice President and principal engineer at Marine Design Dynamics, Inc.

EMS Appoints Monnell

Electronic Marine Systems Inc., EMS, has appointed Ron Monnell as National Sales Manager. Ron comes to EMS with over 35 years of Marine Sales experience in the commercial and military sectors of the U.S. Marine Industry. Ron will be responsible for developing new opportunities for the EMS automation line of products in the U.S. Ron will be based in Florida.

Goley Signs on as Director at SBI

SAFE Boats International (SBI) announced that Rob Goley has joined the company as its new Business Development Director – U.S. Federal Programs. Goley comes to SBI as a recently retired 20-year veteran of the U. S. Coast Guard (USCG).

Port of Seattle Names Interim Maritime Division MD

Lindsay Pulsifer, general manager of marine maintenance for the Port of Seattle, has been selected as the interim maritime division managing director.

Braemar Appoints Eddings

In announcing plans to restructure its offshore and dynamic positioning (DP) operations in the U.K. and U.S., maritime engineering consultancy Braemar Engineering appointed Kyle Eddings to a new role within the company. Eddings will now take overall responsibility for global DP and offshore projects, with functions coordinated between Braemar Engineering’s U.K. head oiffice in Maldon, Essex; Aberdeen, Scotland; and Houston, Texas.

Alphatron Hires Regional Manager

Alphatron Marine appointed Erik van Boom as country manager for the Euro border region Scheldemonden. In his new role, van Boom will leverage more than 25 years of experience in the maritime navigation and communication sector to help support the growth of Alphatron Marine.

Pon, Parcom Purchase Imtech

Pon Holdings and Parcom Capital announced they have agreed to buy Imtech Marine, the marine division of Dutch engineering services company Royal Imtech who has been declared bankrupt. No monetary figures have been shared. The final details of the takeover are yet to be worked out. Imtech Marine presently employs nearly 2,500 staff at almost 100 offices in 30 countries.

Matson Appoints Wagner

Matson, Inc. appointed Keoni Wagner as director of corporate communications, succeeding Jeff Hull, who is retiring from Matson after a 33-year career with the company. Wagner will report to Matt Cox, president and CEO, and is based at Matson’s corporate office in Oakland, Calif. Wagner most recently served as public information officer and spokesman for Oakland International Airport.

Skvarla Named President

BMT Designers & Planners, a subsidiary of the maritime design, engineering and risk management consultancy BMT Group, has announced the promotion of Kai Skvarla to President. Formerly Vice President of Strategic Planning with BMT for the past five years, Kai will now concentrate on developing new commercial markets for the firm to generate sustained growth.

Sheklin to Serve on MERPAC

Seaworthy Industries, LLC said that Managing Partner, Michael A. Sheklin has received a federal appointment from Secretary Jeh Charles Johnson to serve on the Merchant Marine Personnel Advisory Committee (MERPAC). Sheklin brings to this office more than 40 years of experience in the maritime industry. A professional mariner, holding a U.S. Coast Guard Master’s License, he is a graduate of the State University of New York Maritime College and has pursued a career in the marine business that includes marine operations, technical management, ship surveys and inspections, marine investigations, training and safety. He is currently a managing partner of Seaworthy Industries, LLC.

BCG Donates Simulation Software

Maritime training solutions provider Buffalo Computer Graphics Inc. (BCG) has donated its Enhanced Graphical User Interface (GUI2) simulation software to the U.S. Naval Academy Foundation in Annapolis, Md. for distribution to the academy’s seamanship and navigation department. BCG’s donation included four software licenses to support past donations from Northrup Grumman Corporation of the Navy’s Electronic Chart Display and Information System (ECDIS) to train midshipmen on the charting system they will encounter once they graduate and move out to the fleet.


Plebe Ellen Walker Acceptance Honor.

USMMA Welcomes Class of 2019

The U.S. Merchant Marine Academy (USMMA) at Kings Point welcomed 243 “plebe candidates” of the Class of 2019 into the Regiment of Midshipmen as they took USMMA’s Corps of Cadets Oath administrated by Rear Admiral James A. Helis, Ph.D., Superintendent of USMMA, during the Acceptance Day Ceremony and Parade. They were then sworn in as midshipmen in the U.S. Navy Reserve by Rear Admiral Mark R, Whitney, Deputy Commander, Logistics, Maintenance and Industrial Operations Naval Sea Systems Command. Acceptance Day marks the transition of the “plebe candidates” to “plebes.” The Class of 2019 officially arrived on June 30, 2015. The congressionally-nominated plebe candidates began a rigorous, 20-day regimen of academic, military, and physical training known as Indoctrination – their first step toward becoming future leaders and licensed merchant marine officers. After administering the oath to the newest Navy reservists, Rear Admiral Whitney discussed the leadership challenges they will face. “There are two key parts to trust that every leader must have: positional and earned.” He told the plebes that as graduates of the Merchant Marine Academy, they will have a definite advantage by the experiences they will have through their time here.

BUYER'S DIRECTORY

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

ALUMINUM BOATS

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

ANCHORS & CHAINS

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

ANTI-CONDENSATION COATINGS

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

ATTORNEYS

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

AUTOMATIC IDENTIFICATION SYSTEM

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

COATINGS/ CORROSION CONTROL/ PAINT

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

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

COMMUNICATIONS

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

CORDAGE

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

DRILLS

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

ENVIRONMENTAL SOLUTIONS

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

FILTERS/FILTER SYSTEMS

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

HOISTS

Kleeco, 10110 S. M43 Highway Delton, MI 49046

INSURANCE SERVICES

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

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

LIFESAVING EQUIPMENT

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

LIFT EQUIPMENT

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

MARINE AND PROTECTIVE COATINGS

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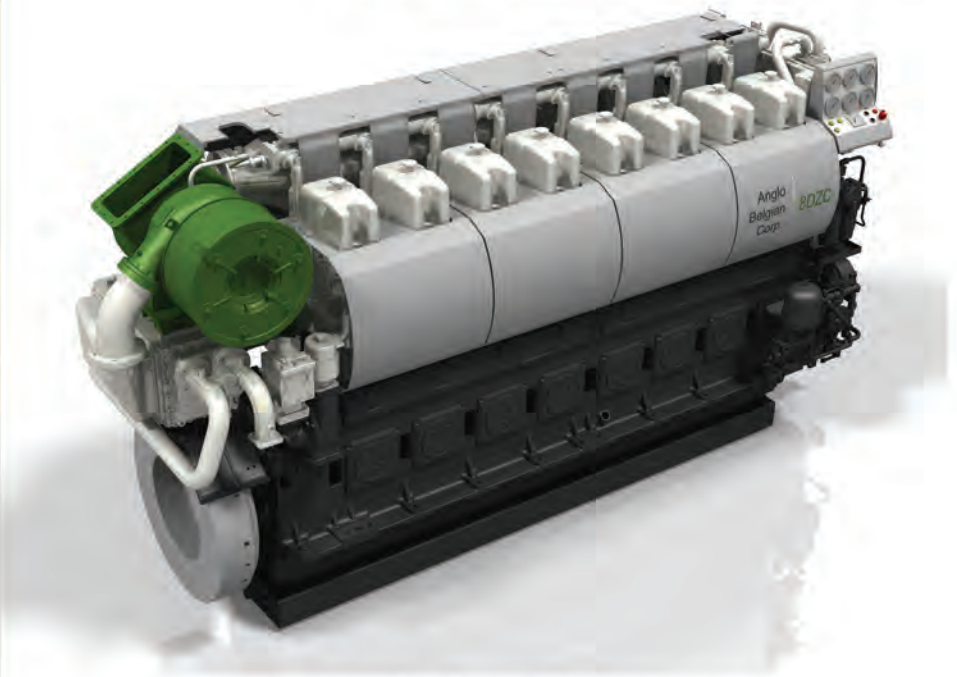

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