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MARITIME REPORTER AND ENGINEERING NEWS

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April 2017

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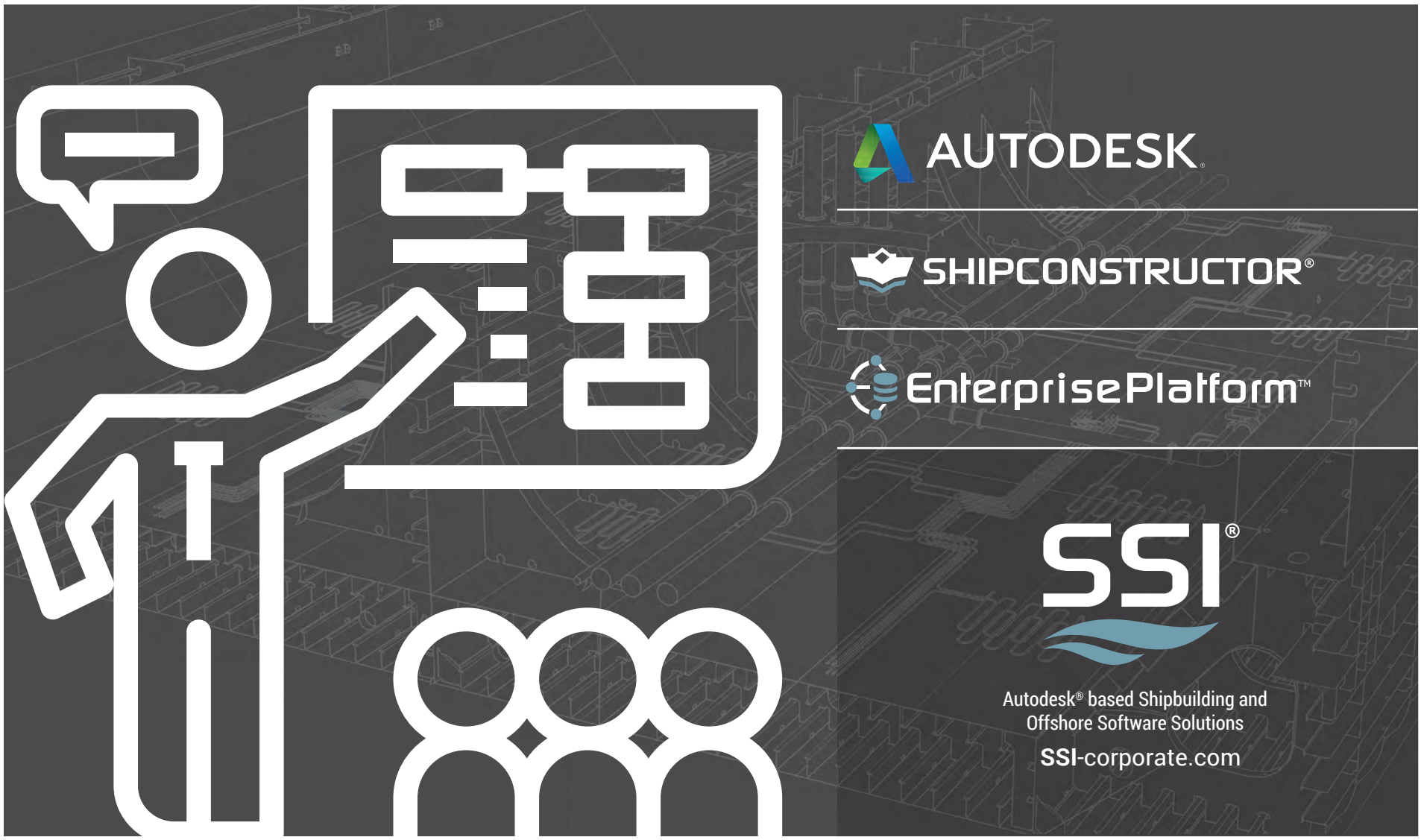

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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

Questions regarding the future price direction of energy come less frequently these days, seemingly as the collective industry has settled on the so-called 'new norm.' (Though personally, I think that is somewhat of a misnomer, as in the business of energy production there is no 'norm.') Regardless of your station in the offshore energy business chain, be assured of a few things:

- The low-price pain points will continue for the foreseeable future, particularly as more cost-efficient land-based methods continue to be found;
- The mantra at energy exploration companies is cost cutting and control. Technologies that are proven to innovate and reduce costs will win.
- Just when everyone has settled on the new reality, something will happen that will send the price soaring again.

The Floating Production sector of offshore energy has been particularly impacted, as quite frankly it represents one of the most costly means to extract and deliver energy. While the sector has predictably slowed, **Jim McCaul** of IMA/World Energy Reports – who has studied this global market segment in intimate detail for more than 20 years – finds that while it is a tad early to be bullish, there are signs of life in the sector. His report starts on page 42.

Related to energy production is, of course, energy use, and there is not a oceangoing vessel owner/operator reading these pages that is not keenly focused on the new IMO sulfur cap looming in 2020. When the new rule on clean fuel was announced late last year, we immediately tapped our **Tom Mulligan** to address the changing fuel regulation from every angle. In a continuation of that series, this month Mulligan, starting on page 22, looks at the new rule from the point of view of the fuel and lube producers, with insights on how several majors are ramping efforts to ensure that no matter the fuel chosen, it will be readily available and compliant with current machinery needs come 2020.

While the industry collectively laments the rapidity of the new fuel rule coming in 2020, it simultaneously watches with disdain as a rule demanding the most expensive ship refit program in the history of the industry – that of course being the Ballast Water Management issue – drags on well into its second decade.

While the IMO rule is set to enter force in September 2017 and the United States Coast Guard is easing the logjam of uncertainty with three approved systems to date, there remain some troubling questions surrounding the new technology and onboard process, namely the efficient means and manner to sample ballast water to ensure that the systems are performing 24/7/365 as promised.

Joe Keefe was in Long Beach last month for yet another Ballast Water Management 'summit', and raises some troubling questions, in quintessential 'Keefe' style, starting on page 10.

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Virgin Cut

A steel cutting ceremony has signaled the start of construction for the first of three new cruise ships for the Virgin Group's new cruise line, Virgin Voyages. The three new ships are being built by Fincantieri at its shipyard in Genoa, Italy for scheduled deliveries in 2020, 2021 and 2022 respectively. Each 110,000 gt ship will measure 278 x 38 m. The ships will feature more than 1,400 guest cabins for 2,700 passengers, with 1,150 crew. The steel cutting ceremony was attended, among others, by Tom McAlpin, President and CEO of Virgin Voyages, and for Fincantieri by Luigi Matarazzo, Senior Vice President New Building Merchant Ships, and Paolo Capobianco, Director of the Sestri shipyard.
http://www.marinelink.com/news/voyages-virgin-cruise423454

Remote Contolled Workboats

Tuco Marine Group has introduced remote controlled navigation systems for the ProZero Workboats, offering autonomous self-piloting vessels. Working together with Sea Machines, Tuco Marine Group can now provide the ProZero series, delivered with a system that makes the vessels autonomous and remote controlled.
The system can be embedded into a wide variety of boats in the ProZero series, making them self-piloting, increasing productivity and keeping personnel safe from potential harm. Sea Machines Robotics' new system, called RC NXT, can be incorporated into an existing or newly built ProZero model.
http://www.marinelink.com/news/controlled-workboats423239

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Ice-breaking LNG carrier Christophe de Margerie

An ice-breaking tanker docked for the first time at Russia's Arctic port of Sabetta to test a new route that could open the ice-bound Arctic Ocean to ships carrying oil and liquefied gas. The 80,000 ton-capacity Christophe de Margerie, an ice-class tanker fitted out to transport liquefied natural gas, docked in the icy port of Sabetta, with Russian President Vladimir Putin reportedly watching via live video-link.
http://www.marinelink.com/news/shipping-tanker-forges423729

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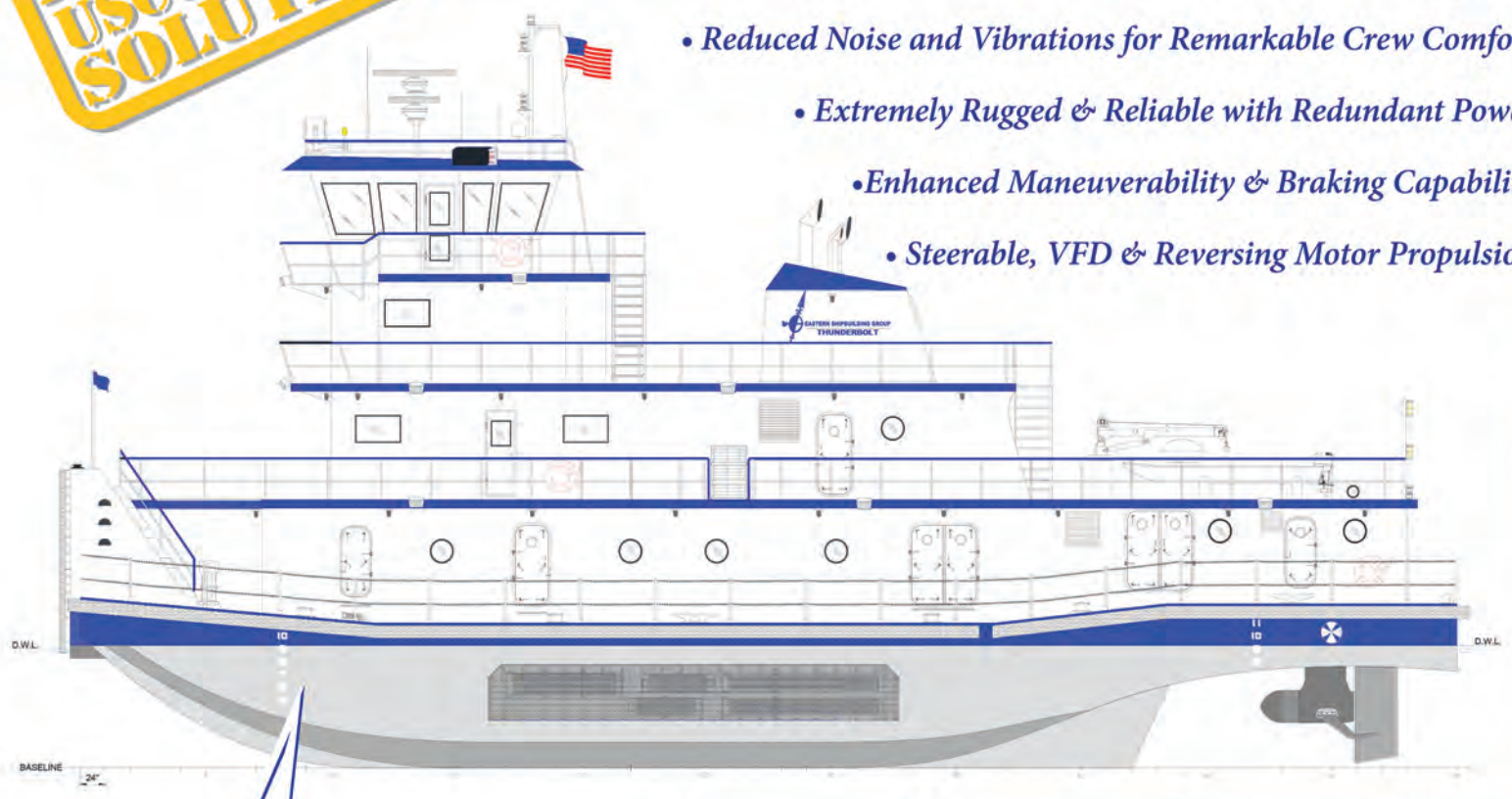

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BWT A 'Sample' of What's Next

Having just returned from the 4th Annual Ballast Water Management Summit held in Long Beach, CA, I'm completely up to speed on the complex topic of ballast water management systems, treatment and the regulatory quagmire represented by the IMO, U.S. Coast Guard, the EPA and 16 other U.S. states that have their own Balkanized idea of what this should entail. I can't believe I've been obsessing over this topic since 2003. **By Joseph Keefe**

Time does fly when you are having fun. In the first quarter of 2017, it is nice to see that we've moved along expeditiously towards a final solution. And that's just we're doing, apparently – moving briskly right along. The ratification of the IMO ballast water convention has been followed in short order by the U.S. Coast Guard's approval of not one, but three OEM BWT systems. A fourth is in the pipeline. A new bill inching its way through the federal legislative process – the so-called C VIDA bill – promises to unite all domestic regulatory oversight into a single entity. Separately, and according to ABS Regional VP Michael Michaud, it is possible if not very likely that as many as 12 BWT systems in total could be approved by the end of the year.

So, it's all good, right? Not so fast. The flurry of activity has spawned a whole new raft of issues, not the least of which will involve finding dry dock space and availability to get the BWT equipment retrofitted. Sure – and as it was opined at the BWT conference – the figure of 60,000 hulls is probably high, but you can bet that, as a minimum, tens of thousands of vessels will be queuing for the equipment that will put them into compliance. I'm told that the prices of approved systems are now predictably (and significantly) higher than the ones not yet boasting of a Coast Guard seal of approval. For U.S. yards, sadly, the INTEL from the conference was that virtually anyone with a blue water, Jones Act hull needing BWT retrofits was either fleeing (or getting ready) to an Asian drydock for a cheaper price. But, I'm veering off course again.

That's all assuming that the OEM's themselves can ramp up quickly to produce the necessary hardware in quantity. A good engineer and/or naval architect will tell you that ship operators ought to be planning now for the big event, something which can take up to six months to put all the pieces into place. And yet, talk at the conference often came back to the topic of how one might obtain or apply for an extension from the U.S. Coast Guard – something apparently, many owners have been doing as a regular event. Consensus at the show was that, looking at the three systems already approved and with as many as nine more looming large in the proverbial porthole, the nation's fifth uniformed service was about to get a lot more stingy with any approvals for delay. In other words, you better have a compelling reason for that delay.

Long Ago and Far Away: A Parallel Universe

It seems like just yesterday that, in my previous life after involuntarily coming ashore, I spent many years as a marine consultant. That involved a lot of things – vetting, condition surveys, draft surveys, ISPS surveys, and yes, cargo surveys. We did some bulk cargoes and offbeat stuff, but ours was mostly a petroleum, tanker based outfit. And, we performed *a lot* of cargo oversight, expediting and in general, making sure our principal's interests were attended to during marine custody transfers. Often, this involved loss control work, supervising cargo measurement and other unpleasant tasks, typically at 3 a.m. in the morning while swatting mosquitoes large enough to carry away small children and pets.

What you discover very quickly, as you gain experience, is that the quality of the cargo being delivered or received is every bit as important – if not far more important – than the quantity or volume that is measured. Sure, call your trader at 4 a.m. to let him know that you were 0.75% short on volume on a one million barrel crude cargo, and you'd get an earful. On the other hand, it was never ideal to have a fuel oil cargo whose sulphur content was too high or perhaps, sediment and water (S&W) content 'out of spec.' Suddenly, your principal might be faced with having to renegotiate the price of the parcel, or worse – face rejection of the delivery altogether. No one, apparently, wants to be 'long' on a large parcel of petroleum on a tanker that just missed its next laycan because the current charterer can't find a buyer for his suddenly unwanted cargo. These were good times had by all, I assure you. And, I do have a point. Bear with me.

A Sample … of What to Expect

What does any of the foregoing have to do with ballast water? As it turns out, plenty. Eventually, all these vessels will have these BWT systems installed and everyone will sail off into the horizon and trade happily ever after. That is, until they arrive back in San Francisco Bay and are then asked to deliver ballast water samples to the local authorities. Or, perhaps, it is time to check the sample box on your VGP declaration. It is at this point that all bets are off. That's because your device may be working just fine, but if the samples being delivered don't reflect that reality, then you could be in a world of trouble. For example, imagine being 'long' on 30,000 metric tons of ballast water that no port will let you discharge.

Traveling back in time (just once more, I promise) to my petroleum days, the one thing that I always kept a close eye on when quality was a key metric in the cargo transaction, was (a.) who was doing the sampling, and (b.) how that sampling was being accomplished. That's because the typical third party inspection firm in the late 1980's would, more often than not, send the most junior person in the company on deck to perform what was easily one of the nastiest (and ironically, the most critical) jobs on the planet. That

individual, often now up for more than 24 hours and owing to the scaled overtime rates then in force, might be making as little as $3.00 per hour. You can only imagine the highly motivated and competent fashion with which those samples were pulled, labeled, sealed and (finally) delivered to the gleaming lab across the channel.

That's not to say the traders weren't aware of their exposure. They were. Sometimes, in between squash matches at the Texas Club in downtown Houston, they'd even pause long enough to yell at me. Meanwhile, in the absence of an automatic in-line sampler, manual samples typically involved five different methods – an upper sample, lower, middle, running average (a skill unto itself if done properly and it rarely was) and what was called a "dead bottom" sample, taken with a special device. I remember one very particular blender who insisted on a seven step sampling process, something the sampling dudes referred to derisively (probably because it delayed their arrival at the bar on I-10 in East Houston by at least 30 minutes) as a "TB-7." TB, of course, were the initials of the blender. We'll leave it at that.

All of those samples, once received by the lab, would then be meticulously and volumetrically combined to form one 'representative' sample, which was then tested and deemed to represent the quality of the entire million barrel cargo. And for all the technology, gleaming equipment and highly trained lab technicians, in the end, the analysis was only as good as the samples (usually) taken by a sleepy guy working his way towards his GED in his spare time when he wasn't getting dirty on deck. Those analysis numbers also relied on the 'hope and prayer' that the inspector's sampling kit and bottles hadn't been rolling around in the back of a dirty and wet pickup truck for the past week. And that brings us right back to your treated ballast water samples.

Looking Ahead

It was a pretty good ballast water conference. I've been to it before, of course, and you always learn something new. A key take-away from this year's version was the murky subject of sampling, when that might be required, how it would be done, who would do it and all the rest of it. It turns out there isn't a clear consensus of what this will entail in the future, and as outlined above, it may be more important than the installation of the equipment itself. Based on my considerable experience – that and $4.50 will get you a hot beverage at a high end coffee chain – I believe that this aspect of the BWT equation is a can of worms that is about to give everyone a lot of trouble. If shipowners aren't worried about it, well, they should be.

Like the bunkers you lifted in good faith in the Far East that came complete with a beautiful analysis report (remember our 'crack' sampling crew?) that details full compliance with the new low sulphur requirements, that piece of paper may not be worth the paper it is printed on when the ECA flag state at your next disport comes on board and says that you are out of compliance. An apples-to-oranges comparison? I think not.

In the petroleum trades, it is called a "representative sample." I'm not sure what the ballast water equivalent to that term might be. It turns out that no one else knows, either. Eventually, we'll all find out together, I suppose. I also have this creepy feeling that it's going to be very expensive, when we do. Brace yourself.

– MarPro.

Lines in the Water

There are a variety of jurisdictional lines in the water. The first line to be considered is the national boundary between two adjacent or nearby countries. Adjacent countries tend to draw agreed boundaries extending their shoreside boundaries, with accommodations for headlands, capes, etc. Most national boundaries have been agreed upon long ago. A few, though, are not officially resolved. Somewhat surprisingly, of the four marine boundaries between Canada and the U.S., three are still in dispute.

The baseline is probably the most significant boundary encountered by a mariner, although few appreciate its existence. The baseline is generally drawn through the low water line along the coast. A nation may draw a straight baseline where the coast is deeply indented, as by a bay, or along the outer edges of a fringe of islands that lie just offshore from the mainland. The straight baseline rule can get more complicated in certain situations beyond the scope of this overview. Baselines are important, though, because once a ship passes inside the baseline it becomes subject to the full panoply of the laws and regulations of that nation. All waters inside the baseline are the internal waters of that nation. The baseline is also used as the starting point for measuring the width of almost all other jurisdictional boundaries seaward of that line.

Moving seaward from the baseline, one encounters the outer limit of the territorial sea. In accordance with the United Nations Convention on the High Seas (UNCLOS), a coastal nation has the right to establish the breadth of its territorial sea up to a limit not exceeding twelve nautical miles from a properly established baseline. Most coastal nations have claimed, and enforce, territorial seas out to the full extent authorized by UNCLOS. An outlier is the U.S., which has two different territorial seas.

In simpler times, the U.S. had only one territorial sea, which was all things to all people. The nation had, with reasonable consistency, claimed a territorial sea three nautical miles in breadth since its founding in 1789. Within the territorial sea, being under the full sovereignty (except for the right of innocent passage) of the U.S., all U.S. laws are enforced, as well as those of the adjacent coastal state of the U.S. The territorial sea and the internal waters comprise the navigable waters of the U.S.

This changed in 1988, when President Reagan, in response to the increasing threats posed by Soviet spy ships hovering off the U.S. coast, proclaimed a 12 nautical mile territorial sea. The proclamation specifically limited its application to international law. The Proclamation left undisturbed the three nautical mile territorial sea for all domestic purposes, including law enforcement. Thus, the Proclamation's only real effect was to require the spy ships to move further offshore. The Proclamation did, though, cause a reexamination of the domestic concept of the territorial sea, resulting in a willingness to deviate from the traditional three mile rule if need be shown.

Subsequent to the Proclamation, various federal statutes have been enacted that, for the purpose of that statute, have extended the territorial sea from three nautical miles out to twelve nautical miles. The first of these was the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, which established ballast water management requirements for ships arriving in US waters. This was followed by the complex and confusing Antiterrorism and Effective Death Penalty Act of 1996. This 1996 legislation made the extended territorial sea subject to U.S. sovereignty for purposes of most federal criminal law, as well as the criminal laws of adjacent states in matters where the federal criminal code is silent.

The Coast Guard Authorization Act of 1998 made various amendments to the U.S. Code with regard to the territorial sea and navigable waters. The Ports and Waterways Safety Act was amended to add the term navigable waters of the U.S., defined as including "all waters of the territorial sea as described in Presidential Proclamation 5928 of December 27, 1988." The effect of this provision was to expand U.S. Coast Guard jurisdiction for purposes of vessel operating requirements, vessel traffic service (VTS) systems, safety zones, many Captain of the Port (COTP) orders, and port access routes, among other things. The legislation also added the same new term and definition to Subtitle II (Vessels and Seamen) of Title 46 (Shipping) of the U.S. Code. Since this subtitle defines Coast Guard jurisdiction over U.S. flag vessels for most purposes and over foreign flag vessels for some purposes, its impact could be equally extensive. Measures specifically covered by this expanded authority include: negligent operation, carriage of dangerous cargoes by foreign flag vessels, lightering, uninspected vessels, recreational vessels, load lines, marine casualty reporting,

and federal pilotage authorization. The Vessel Bridge-to-Bridge Radiotelephone Act was amended similarly in 2002.

Over time, various needs arose which could only be efficiently dealt with by selectively asserting federal jurisdiction beyond the territorial sea. A contiguous zone out to 12 nautical miles allowed for the enforcement of customs, sanitation, fiscal, and immigration laws. In 1999, the U.S. contiguous zone, like that of many other nations, was extended to 24 nautical miles seaward of the baseline. In 1945, with offshore oil and gas drilling becoming more productive, President Truman asserted jurisdiction over the economic resources of the continental shelf off the U.S. coast. The continental shelf is now defined as comprising the sea-bed and subsoil of the submarine areas that extend beyond the territorial sea throughout the natural prolongation of the land territory to the outer edge of continental margin or to a distance of 200 nautical miles from the baseline, whichever is longer.

With the increasing efficiency of fishing techniques, depletion of the living resources of the sea became an issue. The U.S., not unlike other nations, tried a combination of limited unilateral control and multilateral cooperation, but to little effect. Eventually, the U.S. joined the increasing number of nations claiming an exclusive fisheries zone, now called an exclusive economic zone (or EEZ) extending 200 miles offshore. Various federal water pollution laws were also extended to cover the same area. None of these claims, though, attempted to assert general U.S. sovereignty beyond the traditional three nautical miles, even though an increasing number of nations were claiming territorial seas of four, six, 12, and 200 miles.

There are two outliers – jurisdictional lines in the water that are not directly related to any of the lines discussed above. The demarcation lines have been established by the U.S. Coast Guard dividing the high seas from harbors, rivers, and other inland waters of the U.S. for the purpose of determining the applicability of special navigation rules (i.e., the Inland Rules) in lieu of the International Regulations for Preventing Collisions at Sea (COLREGS). The demarcation lines are generally, but not always, consistent with the baselines of the U.S. The boundary lines are applicable to a grab-bag of federal statutes. These statutes include: 33 USC 152 relating to the length of towing hawsers; 46 USC 5102(b)(6) which exempts from load line requirements certain vessels on domestic voyages; 46 USC 3301(6) requiring the inspection of seagoing barges; 46 USC 3301(7) requiring the inspection of seagoing motor vessels; 46 USC 3302(d) which exempts from inspection requirements certain vessels under 150 gross tons that operate within the waters southeastern Alaska and the State of Washington; and 46 USC 8304 implementing the Officers' Competency Certification Convention, 1936. The boundary lines generally follow the general trend of the seaward, highwater coastlines, but with more variations than do the demarcation lines. Left untouched in this conglomeration of charge are various other jurisdictional concepts. The cabotage laws, primarily enforced by the US Customs and Border Patrol (CBP), remain fixed at three nautical miles, plus the points on the continental shelf used for exploration for or extraction of natural resources. Also, the Federal Water Pollution Control Act and the Oil Pollution Act (OPA) are limited to three nautical miles. Various federal civil laws, such as the Death on the High Seas Act and the obligation to mark and remove wrecks, are still controlled by the old territorial limit of three nautical miles. Some other statutes include the terms "territorial seas" or "navigable waters" without defining their limits. Mariners, and others, will continue to be confused by the boundaries of the United States, at least for so long as it claims different territorial seas for different purposes.

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Image: GE

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New Horizons Cruise Industry Challenges & Solutions for 2017

Approximately 130 million Chinese citizens travel internationally, making China the world's largest outbound travel market in the world. With one-sixth of the world's population, many recognize this country as a market with huge potential.

Until a few years ago, travel by ship was a common mode of transport, but China's rapid economic evolution has attracted more people to leisure travel opportunities and the luxury holiday experience cruise liners can offer. It is anticipated that the number of Chinese passengers will reach 4.5 million by 2020, which is more than 20 percent of today's global cruise passengers. The relaxed visa rules also mean that China is set to accommodate more foreign visitors from cruise vessels.

Cruise shipbuilding is developing in parallel, signalled by the move made by Carnival Corporation. The company recently signed a joint venture agreement to design and build two cruise ships with the China State Shipbuilding Corporation (CSSC) and Fincantieri. These will be the first ships ever to be built in China for the Chinese market and will be tailored to meet the needs of Chinese travelers.

In 2017, as the cruise market evolves, a number of industry changes and considerations are coming to bear.

Advanced Technology

The attraction of going off the beaten track has given rise to the expeditionary travel market. Many of these adventure holidays involve a cruise element, and this growing sector, with demand for smaller vessels, is impacting the industry. At the other end of the market, there is growth in very high-capacity, high-specification vessels for the luxury experience.

Whatever end of the cruise sector, space on board ships is always at a premium; more cabin and facilities space means higher revenue potential. Therefore, power-dense engines, propulsion motors and power electronics with a reduced footprint are the preferred choice for ship owners and operators. GE's compact, COmbined Gas turbine Electric and Steam (COGES) propulsion system can help save valuable space on board.

Derived from GE's powerful aircraft engines, GE gas turbines already operate on cruise ships, eight of which feature COGES arrangements. With little maintenance required, COGES makes possible the reduction of up to four engineering crew members versus diesel-powered ships. For normal scheduled maintenance, the entire turbine can be removed and replaced in a very short time (approximately24 hours). The combination of outstanding reliability and gas turbine swapping greatly reduces downtime and minimizes interruption to ship operations.

Enhanced manoeuvrability is also particularly important for cruise ships. GE's Marine Solutions is currently partnering with shipbuilders to design the next generation of marine propulsion "pods," targeting improved fuel efficiency and manoeuvrability.

Clean Sailing

Following the COP21 Paris Agreement, emissions reduction has been high on the agenda for every industry. In fact, the marine industry as a whole is responsible for about 2.5 percent of global greenhouse gas emissions.

In an effort to curb emissions, various governmental organizations around the world are introducing strict regulations, which are set to impact maritime operations. In the European Union (EU), for example, new regulations come into force in 2017 requiring any large vessel

docking at an EU port to monitor and report its CO2 emissions.

In China, the government is creating emission control areas at major shipping ports, introducing a sulphur cap at 0.5 percent, ahead of the global IMO 2020 regulations.

To adhere to these regulations, marine operators need to rethink the most fundamental aspects of their operating models—how they consider everything from vessel design to vessel management to fuel choice and maintenance—to be compliant with the environmental regulations. New technologies can incur costs from development and upgrades, but also can bring efficiencies that lead to a fast return on investment and strengthen a market position for operators.

One way to embrace the change is through adopting cleaner engines, such as GE's Tier 4 diesel engine, which meets IMO Tier III and US EPA Tier 4 requirements without the complications of urea after-treatment. Separately, GE's marine gas turbines can be equipped with GE's dry low emissions combustion system to reduce NOx.

The emission volume is well below what IMO Tier III and US EPA Tier 4 standards require and with no exhaust treatment and no methane slip.

Along the green wave, alternative clean fuel, such as LNG, will become a more predominant marine fuel. The move is typified by Carnival Corporation, which has three LNG-powered cruise ships on order. In addition, GE's fuel-flexible COGES system is capable of burning diverse fuels including LPG, natural gas, marine gas oil and other bio-synthetic paraffinic kerosene blends.

As the marine industry transitions increasingly to natural gas, GE's Marine Solutions brings experience of working across the whole LNG value chain for two decades—from production to processing, transport and propulsion—to help achieve the smooth transition.

The Digital Wave

Booming demand is also incentivizing the cruise industry to dip into digital waters to further raise efficiency and ensure a smooth and pleasant journey for passengers.

Unplanned downtime for any cruise line can cause interruptions to passengers' journeys, loss of revenues and potential brand damage. However, analytic tools can predict an equipment's potential failure before it becomes an operational disruption, reducing downtime and more crucially, avoiding disruptions during the voyage. This predictivity can also enable a shift from calendar- to condition-based maintenance, further reducing maintenance cost.

Digital technology can also help improve fuel efficiency by analyzing weather conditions and current to optimize propulsion rate and speed. Furthermore, it can help operators make smart decisions to change to use cleaner fuels on the course of the route, depending on the speed needed, further curbing emissions and cost of fuel.

As the demand for cruise holidays soars, fleets continue to grow. While stringent regulations and new destinations may provide new challenges, they bring with them a host of opportunities. New regulations will push operators towards more efficient operations with reduced carbon footprint, while new destinations open up new revenue streams. By using the right technology—green and digital—operators are sailing in the right direction to capitalize on the opportunities in 2017 as well as those further on the horizon.

Photos by Jason Segal, Mate with Moran Towing

Firefighting on Workboats

Marine Fires have been some of the toughest fires for anyone to fight. Whether it's a fire on your own boat, or a vessel you are escorting or working with you will need to know what you are doing if you wish to operate safely. Marine Firefighting Inc. has been training mariners as well as land-based firefighters to deal with all types of marine fires for more than 17-years. Much of our mariner training dealt with work boats built with powerful firefighting pumps and fire monitors used to deal with LNG ships and offshore facility fires. That equipment can be dangerous if the crew is not trained in its proper and safe use. Many work boat companies consider this powerful firefighting equipment ancillary to the work the boat is to perform and therefore devote little time and effort in training to use that equipment. This is a mistake, as those powerful fire monitor streams can throw tons of water per minute, with the ability to injure or kill personnel and/or damage property. Moran Towing has been a good client of Marine Firefighting Inc. The company has devoted much time and effort to see that uits crews are not only provided with current training and safety materials but that they are receiving and understanding them in on-going realistic training and drills.

I recently had the opportunity to train the Moran crews in Baltimore, crews set to man the tug James R. Moran. This vessel is a Fi Fi 1 category tug which has been used to escort LNG ships into and out of the LNG facility in Cove Point, Maryland.

In addition to its powerful towing capacity and maneuvering ability, this boat is equipped with a fire pump capable of pumping over 10,000 gallons per minute and two fire monitors each capable of throwing over 5,000 gallons per minute, with the fire stream from these monitors able to reach 400 feet. The weight of the water from each monitor is over 20 tons per minute. The power of the equipment demands proper training.

LNG is, of course, not the only product which might require the use of these firefighting work boats. I have recently been training boat crews in Canada that are engaged in the transport of crude oil from and FPSO via shuttle tankers to a land facility. If the oil is not to be processed at that facility, then "second leg-tankers" periodically load the oil from there to deliver it to a refinery elsewhere for final processing. The docks and escort work boats at these facilities are kept very busy with the constant flow of shuttle tankers and second leg-tankers. In addition to the work of docking and un-docking they are also tasked with fighting fires aboard these crude oil tankers. This operation involved firefighting foam in massive quantities.

Fire Onboard Your Boat

I have written many times about the dangers of the equipment provided on many of these vessels and the need for continual training on this equipment for external firefighting. But my training is also conducted for situations involving fires on your own vessel. Often companies rely on video and CD based training left aboard their vessels, considering this 'training' adequate. In truth, without actual "guided" training sessions, backed up with realistic and varied drill scenarios, management will have no idea if their crews can protect themselves and the vessel from fire.

In particular, the fixed extinguishing systems protecting the machinery spaces on the vessels allow an engine room fire to be attacked with a minimal risk to the vessels crew. Many newer vessels have replaced CO2 systems with newer firefighting media which is less harmful to the environment. However, many existing boats still use CO2. The CO2 system has been able to save equipment and personnel at fires aboard work boats for many years. But the systems must be operated correctly and in a timely manner. If the system is operated too quickly, or after too much of a delay, the CO2 may be ineffective.

In the past, I have been asked to review the firefighting procedures used aboard vessels in a post fire reviews. Many times, the initial crew report states that the CO2 system had been discharged but did not control the fire and subsequently caused extensive damage. In reviewing the procedures followed as well as the photos of the vessel after the fire I have determined that, in some cases, one or more openings to the fire area had not been secured prior to the CO2 discharge. The CO2 will leak out of any openings to the fire area and, during a fire, the thermal currents from the heat of the fire will cause the amount of CO2 leaked to be greatly increased. This has occurred not only on workboats but also on large ocean going vessels. While operating the CO2 system too quickly can cause problems, so to can taking too much time to deploy the systems. I have studied many reports of fires where the CO2 activation was delayed. We all know that one of the main reasons to delay the activation is to ensure that all crewmembers are out of the fire area and accounted for. That is not something I intend to change. Life will always be a first concern. However, at many fires the dumping of the CO2 is delayed for other reasons. On a few occasions, it was because the vessels master was concerned about any corporate ramifications regarding his use of an expensive extinguishing system. The master tried many times to make many unsuccessful hose line attacks on the fire and delaying the CO2 activation for an extended period. By the time the CO2 was released the fire was too far advanced for the CO2 to handle it.

Here is a quote from a "GARD" publication which discusses both the delayed discharge and discharging too early:

"Emergency response to engine room fires can be better organized and carried out more efficiently if the crew is properly trained in the safe use of the ship's fire-extinguishing systems. The time it takes to make a decision to release the fixed fire-extinguishing system is considered to be one of the most critical factors during emergency response and main concerns related to use of CO2 as the extinguishing agent in ships' engine rooms can be summarized as follows:

Delayed release: For the typical engine room fire involving flammable liquids, it is important to introduce the required quantities of CO2 quickly to limit the escalation of the fire. Investigations reveal that evacuation, muster and head counts during engine room fires often take longer than expected because "the crew was running around and was difficult to count".

Engine room not properly sealed prior to release: The extinguishing capabilities of gas can be compromised if the integrity and tightness of the boundaries of the protected space are not sound. On more than one occasion, the effectiveness of a CO2 system has been limited by excessive leakage of gas through open or improperly closed doors, vents or ventilation ducts. Limited availability of fire-extinguishing agent: The quantity of CO2 gas available on board ships is normally limited to that required for a single discharge into a protected space."

http://www.gard.no/Content/20733345/06-12%20Fixed%20CO2%20fire-extinguishing%20systems%20-%20consequences%20of%20delayed%20release.pdf

It has also been found that CO2 may be ineffective or at least less effective if the area protected becomes super-heated. So, timing at a CO2 operation can be crucial.

In my training, I go over all the procedures to be followed during a fire aboard your vessel. The first is for the crewmember finding a fire to sound the alarm. Quite often a crewmember discovers a fire and immediately attempts extinguishment without sounding an alarm. If he or she is successful there may be no problem. But if the attempt is unsuccessful, then the fire may have extended from its area of origin, making it impossible to manually attack. Worse yet, if the crewmember is overcome by the smoke and toxic gases, then no one aboard is aware of the fire or of the unconscious crew member's location, and the fire increases in intensity.

In a previous article of mine entitled "Is Your Crew Ready for a Fire" I create a scenario of a very well trained work boat crew who receives a replacement crewmember just as the vessel is getting underway. When an engine room fire is later discovered the master sounds the alarm and orders that everyone follow pre-arraigned, and well drilled tasks, to activate the CO2 system. After the CO2 activation, the Master discovers that one of the engine room vents had not been secured and the CO2 is leaking out. It turns out that this vent would have been assigned to the crewmember who was replaced, and the new crew member had no idea of his/her position during a CO2 operation. The moral was that ongoing training is required and that any new crewmember should be trained on emergency duties required by him or her before they are assigned to the crew.

Most mariners remember that "boundary cooling" should be conducted while the CO2 is controlling and extinguishing the fire. However, in my training I have found crews on some vessels may be unaware that once CO2 has flooded the engine room the fire pumps may no longer be able to operate. During a fire scenario, I informed the crewmembers who were stretching a hose from the vessels hose station that the fire pump was not operating and asked what they would now do. Many were unaware that they had another source of firefighting water. While most work boats have portable pumps, the crews are not aware that they can provide an effective boundary cooling fire stream. Details such as this are very often overlooked in the training tapes and general training. When was the last time your boat crews operated these portable pumps to supply a firefighting stream? (Don't forget to flush them with fresh water after use!)

Whether it's operating powerful firefighting monitors on a tug boat or OSV or handling a fire aboard your own vessel you and your crews must be prepared by proper training. And proper training cannot be assured by merely providing training materials. Vessel owners and Masters must insure that the training material is viewed and understood. This can only be assured by running realistic fire and emergency drill scenarios. Merely squirting water over the side is not a realistic fire drill. Set up drills with scenarios for fires which might actually occur on your vessel. Don't have a galley fire for each drill!

At these drills find out what is working and what needs further training. Making the drill realistic will also test the emergency equipment. If you don't stretch and charge a hose line you will not know if it or the fire pumps will operate as they should.

Marine Firefighting Inc. has been providing firefighting and LNG training for mariners in the USA, Canada, Mexico, and Australia for over 17-years.

Taking your training seriously will help protect you, your crewmates, and your vessel.

Stay safe,

About the Author

Tom Guldner is a retired Lieutenant of the New York City Fire Department's Marine Division. His company, Marine Firefighting Inc., is involved in consulting and training mariners and land-based firefighters in all aspects of marine firefighting and Liquefied Natural Gas (LNG).

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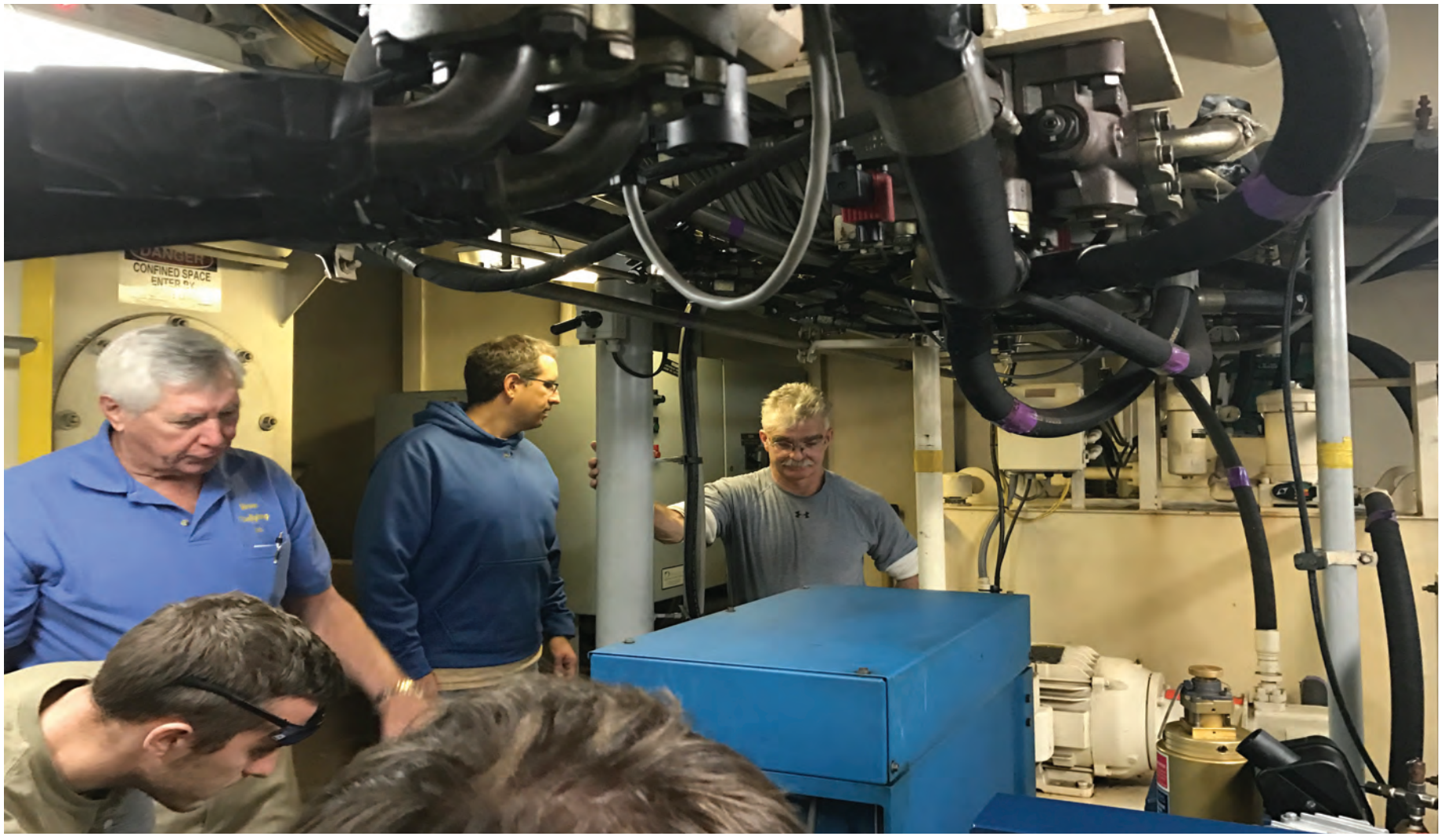

Photos by Jason Segal, Mate with Moran Towing

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CBP'S Lawful **Jones Act Revocation**

About the Author

Aaron Smith is the President and CEO of the Offshore Marine Service Association (OMSA). Previously, he was the Executive Director of the Offshore Service Vessel Dynamic Positioning Authority (OSVDPA) and spent 10 years working on Capitol Hill.

About OMSA

The Offshore Marine Services Association (OMSA) represents more than 200 member companies and 12,000 employees of member companies all engaged in servicing the offshore energy industry.

OMSA
Offshore Marine Service Association

In 2009, the U.S. offshore marine sector received a long over-due indication that the U.S. Customs and Border Patrol (CBP) was preparing to close loopholes and enforce U.S. law in accordance with the Jones Act. This happened when the agency unhesitatingly issued its first revocation of more than 20 letter rulings that were inconsistent with the U.S. law of the land – the Jones Act.

Almost immediately there was an outcry from foreign interests who claimed, untruthfully, that this decision would impede oil and gas exploration in the Gulf of Mexico and drive up costs that the industry could not sustain. Scarred by this outcry and pressure from foreign interests, the CBP withdrew its proposed action and announced that a "new notice…[would] be published in the Customs Bulletin in the near future."

Instead of resting on its laurels waiting for the notice, the U.S. offshore industry responded with gusto –retrofitting and building 31 Jones Act-qualified vessels to meet the subsea capacity should the CBP follow through with the revocation.

In the eight years since the original revocation notice, the U.S. offshore industry has invested a total of $2 billion in American workers and American shipyards to ensure there would be no disruption in offshore energy exploration and production.

The industry was vindicated when on January 18, 2017, CBP issued its second and long-awaited new notice calling for the revocation of unlawful letter rulings of the Jones Act in accordance with 19 USC § 1625.

This lawful revocation notice called for reinstatement of proper enforcement of the Jones Act in the offshore sector, a ruling that would reward American workers, vessel owners, and U.S. shipbuilders.

According to IHS Petrodata, an average of 19.8 vessels of this capacity were working in the Gulf Coast over the past five years; after the investment by U.S. companies, there are now more than enough Jones Act-qualified vessels to meet this capacity.

However, foreign interests are continuing to purposefully muddy the CBP's ruling by claiming that it will make those operating in this field less safe. Because they have no standing to attack on the capacity front, they are purposefully confusing this as a safety issue for heavy-lift capacity, which is not affected by the CBP's ruling.

Moreover, the foreign fleet currently operating in this space is using cheap foreign labor and circumventing U.S. labor and tax law. This creates an uneven playing field for U.S. companies to compete on our own Outer Continental Shelf. To round out this egregious argument, these foreign entities are now trying to ludicrously say that the revocation notice was issued incorrectly in a rushed capacity.

This is laughable. Eight years is more than enough time for CBP to fully consider the ramifications of their proposal. As previously noted, Section 1625 is a specific and unique Congressionally mandated process that allows CBP to post notices in the Customs Bulletin that revoke or modify previous letter rulings.

Typically followed by a thirty-day opportunity for public comment and a subsequent thirty-day consideration period, the CBP's second notice was given an extended comment period; allowing three times the statutorily defined period for public comment.

This is on top of the eight years the CBP has had to consider the impact of this ruling. Not only is this revocation process completely lawful but also has been anything but rushed.

Not to go unmentioned, this revocation, should it prevail, is correcting previous flawed rulings of U.S. law. The Jones Act, which requires U.S. built and owned ships, crewed by U.S. citizens, to be used for the transportation of merchandise from U.S. point to another is the law of the land.

Every modern president has supported it because it is grounded in a national defense policy of ensuring domestic shipbuilding and seafaring capacity while supporting a strong domestic maritime industry essential for U.S. economic security and job creation.

In fact, the CBP revocation would create more than 3,200 U.S. jobs in the Gulf Coast alone with an additional projected economic impact of more than $700 million for the region.

If the CBP were to delay revocation, not only would it be in contravention to U.S. law but would undermine the serious commitment made by U.S. companies in this sector.

It is time for CBP to rectify the past misinterpretations of the Jones Act and U.S. law and to enforce the sovereign laws of the United States.

Why Is Fuel Testing Important?

© plufflyman / Adobe Stock

Ship operators should make on board fuel testing an operational necessity, urges Wilhelmsen Ships Service (WSS).

There are a host of issues, which can arise with both traditional heavy fuels and modern low sulfur distillates that, if left unchecked, cause significant problems in the engine room.

Water content is a common problem for both fuels, but there specific issues associated with the two distinct fuel types.

"Heavy fuels are prone to problems with stability and the ominous catalytic fines that wear down engines, even in cases where they are within recommended levels," said Jonas Östlund, Product Marketing Manager, Oil, WSS. "Whereas distillate fuels see an increased risk of microbial contamination and biofouling, along with storage stability and lubricity issues." Unfortunately, as Östlund asserts, bunkering on-spec fuel is of no consequence: "Many of these inherent issues with fuel do go unnoticed and unattended, as they are not covered by standard fuel specifications.

For example, DNV's 2015 report showed that the presence of the biofuel component, which increases the risk of bacterial contamination in fuels, was increasing year-on-year and is now present in over 11 percent of all on-spec fuel."

Testing during bunkering is an obvious antidote to such fuel issues, but even this precaution has its flaws, Östlund says.

"MARPOL-approved testing during bunkering can highlight these problems, but recent estimates suggest just 20 percent of vessels are performing them. Those that do typically can wait up to six days to get the results back from the lab and by then they've been sailing on that fuel for almost a week."

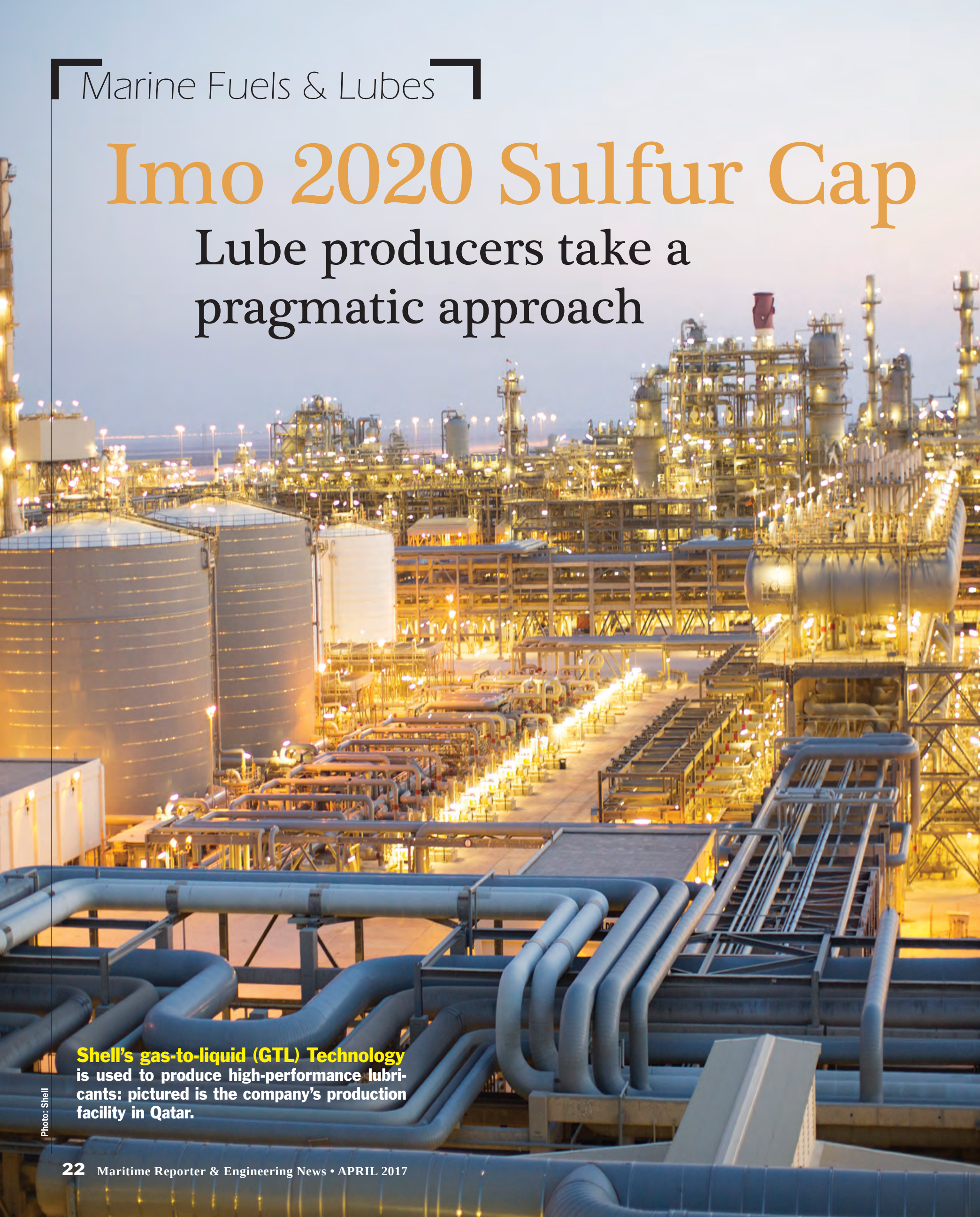
Based on the limited take up in bunker testing and the processing time for any tests performed, Östlund believes on board fuel testing is the, 'quickest, easiest and most cost-effective solution currently available.'

"For just a couple of hundred dollars a year you can drastically minimize the operational risks we've sadly all become too accustomed to," he says.

A video from WSS answers the question, why is fuel testing important? https://vimeo.com/202901797

Imo 2020 Sulfur Cap

Lube producers take a pragmatic approach



Shell's gas-to-liquid (GTL) Technology is used to produce high-performance lubricants: pictured is the company's production facility in Qatar.

Photo: Shell

BY TOM MULLIGAN

There has been little reaction by way of statements or position papers from marine fuel lubricant manufacturers to the IMO MEPC70 proposals for a global fuel sulfur content cap of 0.5% by 2020 but they are fully aware of the implications of the proposed regulations and are taking what could be termed a 'pragmatic approach' to fuel regulation compliance.

Marine lubricant suppliers have avoided getting involved in the debate as to whether the IMO MEPC70 proposals to reduce permissible marine fuel sulfur content to 0.5% or less is good, bad (or indifferent) but are concentrating on ensuring that their products will satisfy regulatory requirements. For example, when the IMO proposals were published in October of last year, ExxonMobil announced the first firing of a new marine test engine that replicates the demanding field environment through scientifically derived operating conditions and speeds up the development of next-generation cylinder and system marine oil lubricants while also shortening the timeline to bring new products to market whilst taking into account any emissions evolved and ensuring regulatory compliance.

ExxonMobil had, in fact, already collaborated in April of last year with Fathom Maritime Intelligence on the market research and consultancy company's report 'The Impact of Regulation on Cylinder Oil Lubricant Selection' which provided an overview of relevant legislation and regulations with respect to fuel sulfur content and SOx emissions. The report also reviewed the NOx emissions regulatory scene and described how the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP), both of which came into force in January 2013, had been introduced with the intention of improving the energy efficiency of new vessels greater than 400 gross tonnes (GT) (although there are exceptions such as cruise ships etc for which deadweight tonnage is not an adequate representation of transportation capacity).

ExxonMobil also introduced a specialist marine fuel that was created to meet the IMO's 0.1% per cent ECA sulfur cap formulated to help reduce operational complexity by providing fast and safe switchovers due to its higher viscosity and flashpoint than those of marine gas oil (MGO) and a minimized risk of thermal shock shutdowns due to handling and preheating practices similar to those employed for heavy fuel oil (HFO). In addition, the company developed a new cylinder oil designed to support marine operations in meeting the new lubrication challenges faced when using 0.1% sulfur fuel.

Opposite Approach: Lubes for High-Sulfur Fuel

In contrast, Chevron has taken a completely different approach by developing in collaboration with its customers and MAN Diesel & Turbo a new two-stroke cylinder lubricant designed for engines that run on high-sulfur fuel at low speeds. The company's rationale for this is that the product provides the flexibility required for blending on board (BOB) and is the first 140BN cylinder lubricant that is OEM-approved for use on its own for ultra-high corrosion environments, thereby meeting the demands of the most modern high efficiency engines on the market. These newer engines have an increased tendency to develop cold corrosion inside the cylinder than do

"Thanks to a wave of environmental regulations from the IMO and growing public pressure to clamp down on air pollution, ship operators, engine manufacturers and fuel suppliers alike have had to completely reassess their options. This has led to confusion for owners, operators and their crews."

Serge Dal Farra, Global Marketing Director, Total Lubmarine

the older, less efficient units. To mitigate the effects of this highly corrosive environment, the easiest method is simply to increase cylinder lubricant feed rates but this is not always an economic strategy: it would be more efficient to switch to a higher-BN lubricant once a certain rate is reached, providing the same level of corrosion protection with less product injected into the cylinder.

Chevron employs on-board drip oil monitoring in conjunction with on-shore testing to provide data to enable a vessel to optimize the feed rate on board to balance wear against consumption, thereby ensuring low running costs. The company said it would continue to offer a full range of lubricants from low- to high-BN products to meet a wide range of operating conditions and provide optimal engine protection and cost management.

Presumably the company expects that ships will still be running on high-sulfur fuels after 2020 but that they will employ SOx abatement technologies to meet the IMO regulations.

Lubes for a New Era

"We are now entering into a multi-fuel era and the lube industry has had to develop products that are compatible with a new range of fuels and engine types," succinctly summarized Serge Dal Farra, Global Marketing Director, Total Lubmarine. "Thanks to a wave of environmental regulations from the IMO and growing public pressure to clamp down on air pollution, ship operators, engine manufacturers and fuel suppliers alike have had to completely reassess their options. This has led to confusion for owners, operators and their crews."

According to Dal Farra, close consultation with customers is central to understanding future demands. To date, there is not a consensus regarding how ships of the future will be fueled: LNG powered engines, scrubber systems, biofuels, fuel cells or marine gas oil are all 'on the table' as potential solutions. While the course ahead is fuzzy, one thing is clear: whichever choice is made, it will impact the choice of lube.

"Total Lubmarine's response has been to develop a range of high and low BN lubes that meet our customers' needs, whatever fuel or engine type they choose," said Dal Farra. "From our Talusia Universal 100 product with its properties to fight cold corrosion down to our Talusia LS 25 a cylinder oil suitable for slow-speed 2-stroke engines running on ECA fuels below 0.1% sulfur, we have developed a range of strong performing lubes. In 2016 Total Lubmarine launched Optima, a cylinder lube oil compatible with high sulphur heavy fuel oils and ultra-low sulphur distillate fuels based on an innovative new chemistry."

In a complex environment, monitoring the lubes, engine and auxiliary equipment performance is more important than ever before. A ship can have up to 100 types of different marine equipment on-board, each of which needs attention. The challenge for ship operators is to safely and efficiently match the marine lubricant to the equipment, adhering to any OEM warranty and service guidelines. "Total Lubmarine offers on-board testing kits as well as a network of laboratories for more detailed analysis including kinematic viscosity, insolubles, flashpoint, water content, base number (BN), PQ index, metal content, acid number (AN)," said Dal Farra.

Total's role in the shipping industry continues to evolve. "Our affiliate Total Marine Fuels Global Solutions is committed to multi-fuel types for the shipping industry," said Dal Farra. "LNG will become an increasingly important part of the energy mix for ships and we are building an LNG bunkering structure to facilitate this. We are also committed to renewables including solar power.

Last year Total acquired battery maker Saft Groupe which will become our spearhead in electricity storage. We believe that there will be growing trend towards hybrid-electric propulsion systems for new ships. Developing the right lubricants for these systems will be inevitably take on greater importance over the coming years."

Marine Lubricant Innovation

Shell Marine Products has responded to the changing market conditions with what it describes as 'an intense program'

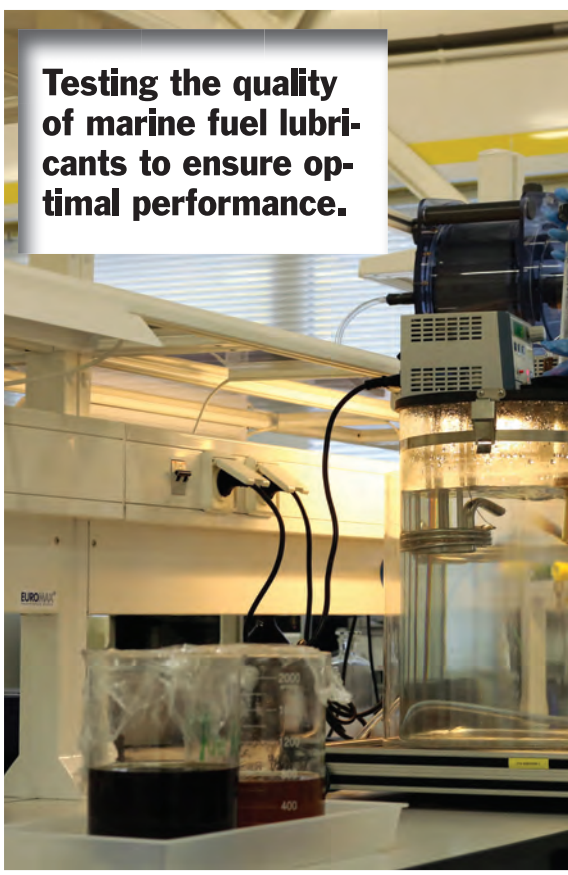
ExxonMobil

New test engine optimizes fuel and lube performance

Last October ExxonMobil completed the first firing of a new crosshead slow-speed test engine to drive forward the company's research and development of next-generation cylinder and system oils for the marine industry.

The company said the bespoke engine would provide it with a platform for meeting the needs of increasingly complex engine designs driven by changing regulations affecting the industry, including new challenges on engine lubrication stemming from operation under more varied and demanding conditions.

The test engine's advanced method for lubricant development is designed to help speed up the timeline for bringing to market next-generation cylinder oils that are aligned to customers' needs and that help them to address tomorrow's challenges in improving engine protection and performance. The test engine offers specialist capabilities due to its rapidly configurable bore-stroke ratio and its ability to simulate a wide range of new engine design parameters. ExxonMobil's research and engineering teams can also apply scientifically-derived operating conditions to replicate the demanding field environments to which marine lubricants are exposed, as well as operate the engine with a range of different fuels and specific high- and low-base-number (BN) cylinder oils.



Testing the quality of marine fuel lubricants to ensure optimal performance.

of marine lubricant innovation and observed that beyond 2020 shipowners face uncertainty, with an IMO review in 2018 determining global regulation and the European Union already committed to further limiting sulfur fuel content from 2020 regardless of what the IMO proposes.

In addition, the company recognizes the need to develop ship engines for lower-sulfur-content heavy fuel oil (HFO) and new fuel types as a result of years of oil inflation that caused owners to cut operating speeds for the bulk of their existing tonnage. It notes that despite recent falls in oil prices, engines fed by HFO continue to run predominantly at part loads which makes them vulnerable to cold corrosion.

Jan Toschka, General Manager of Shell Marine Products, said that the considered response to these variables from the cylinder oil development perspective has been a portfolio of lubricants for two-stroke engines broad enough to accommodate different imperatives:

"The cost and reliability of vessel operations can be affected by changes to a number of different factors," he said. "These include fuel sulfur content, but also climatic conditions such as high humidity, liner wall temperatures, and engine load influences such as hull fouling and propeller efficiency, changes to engine settings and operating conditions. In a changing regulatory landscape, SMP has invested in a broad range of cylinder oils for two-stroke engines and now offers cylinder oils with base numbers ranging from 25BN to 100BN to take account of different fuel sulfur contents, vessel operating profiles and engine loads.

"Shipowners and operators are as focused on fuel prices as they have always been, but new cylinder oils have been required at a time when wear rates and equipment protection are under unprecedented scrutiny. Today, customers want precise answers on wear rates and sulfur neutralization, on feed rates, thermal stresses and acid stresses. Of course, they have always needed to know that they were not spending too much on lubes, only now the conversation is not about the cost of the product alone, but about the total cost of ownership," he concluded.

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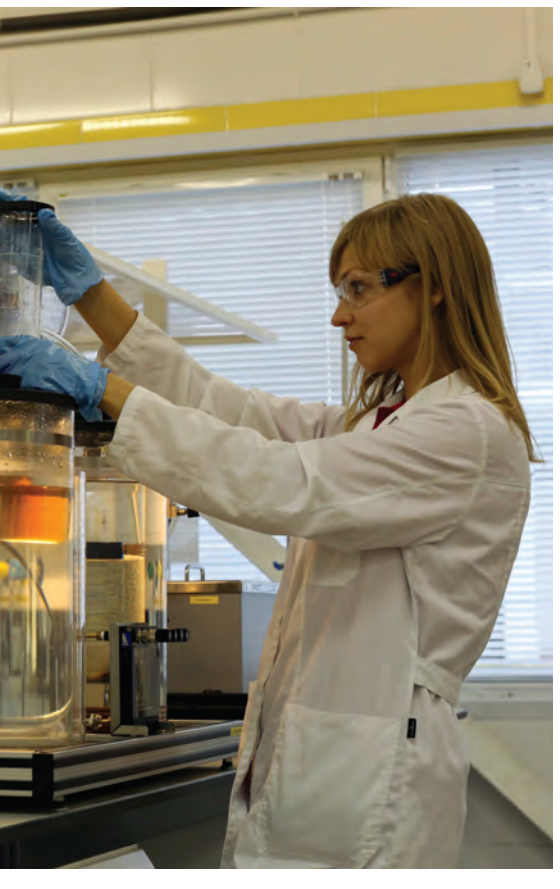


Photo: Shell

Brent Perry

[Founder & MD, PBES]

&

"The Wealth Factory"

Photo: PBES

BY WILLIAM STOICHEVSKI

This is historic, we tell ourselves, as PBES founder Brent Perry walks us around his still labor-intensive "battery factory" in the heart of Norway, from where ship owner capital controls half of the world's offshore tonnage. Perry, a shipbuilder himself, has chosen to house his first production center here in the haunt of another ship builder, Selfa Arctic, whose move north left for Perry a young cadre of college-educated workers.

They'll build PBES's stackable configurations of batteries that do not catch fire. Lithium cells' penchant for catching fire or going into meltdown — so-called thermal runaway — has been the bane of an industry, as it struggles to produce a set that withstands the rigors of actual marine use. European environmental authority tests of "leading" designs showed they were not. Only Perry's solution — steeped in decades of energy storage thinking from Western Canada's lithium battery brain trust — has shown bankable and insurable safety, power management and surplus horsepower.

Industry Firsts

"This is a front plate," Perry says, gripping the shell and circuit board that'll hold the brains of a cell module. Inside, 24 cells are kept as cool at 15 degrees Celsius by specially engineered coolant channels and a heat-exchanging material layer. "Lithium batteries — although they have extraordinary performance capacity — are very temperature-sensitive beasts. Most of the world today produces air-cooled batteries that live in reality an average 40 to 50 percent of their predicted lifespan because you have no control of the ambient temperature that you're working in. Every time you go over 30° C, you start to seriously erode it." The heat-removal quality of the PBES systems allow a 100-megawatt-hour storage system to provide 300 MW of power.

Many of the battery's components are sourced locally, like so much of this made-in-Norway plant. A new 'Made in Norway' brand based on Canuck lithium thinking is Oslo's own very recent idea, proclaimed aloud by Prime Minister Erna Solberg herself. Looking around, an assembly line of box-covered palettes, tables and busy young men is just discernable. There's space to grow. There are rows of metal shelves and crates ready to ship. There's a cluster of battery modules being tested.

Producing this way means Perry's spending "five-times as much" as he will be when his ordered automation arrives, but he's happy to employ local skills put out of work by the offshore downturn. "They're almost all college educated on some level. We like the guys. I like boatbuilders."

Lucrative Growth

Perry's "capacity of capacity" stands at 43 megawatt hours of energy storage systems (batteries plus intel). "With this set up alone we'll be able to deliver about 120 MWh," he says. Steady business is already ratcheting up, so he'll have to produce. His partner-clients — system operators like Siemens and ABB — are well established in Trondheim and along Norway's west coast. "They're just down the road" and they're also key movers in Oslo's plan to electrify several dozen ferry crossings with all-battery and hybrid vessels.

"We're full on business right now until end-of-June," Perry says, adding, "I expect that in the next few weeks we'll bring in enough contracts to keep us busy into 2018. We still have the ability to run this on two shifts and double our capacity." In square feet per dollar, Perry admits it's as effective a business "as a software company". He's producing 1 MWh every week, and with what he has he can produce 4,000 batteries a year.

"Everything coming out of Norway until the end of the year is going to be marine," Perry says, although word is he's just secured an energy storage contract for a major windfarm. Batteries destined for a two-ship order from 2016 are some of what we see. In a couple of

weeks, the order for a ferry company will be assembled and tested. There are 80 to 90 batteries aboard a typical ferry, but Perry's already ramped up from zero to 30 cell modules a day in just a few months. With his easygoing manner, it's easy to forget Perry founded the first megawatt-scale marine battery company in the world in Corvus, and that he helped grow it into a serious marine industry player in just four years. He remembers how early in his entrepreneurial life, as now, conservative boat owners were resistant to change. "The payback was all about saving fuel money," he recalls telling them. Payback in less than five years is a message Norwegian vessel owners, operators and propulsion engineers understand immediately from their contact with Perry. For his and his clients' clients, there's a powerful sales point — a way for them to earn.

Little Things

He used the same arguments in Australia, where he used to talk tugboats. "Tugs are fun because they're a great place to demonstrate just how powerful a battery is, where a 500-horsepower battery produces 5,000 horse … that is some interesting power." In Norway, he doesn't sell directly to the market, just to the end distributors who understand that his "smart" battery systems "talk to each other" and really are "the Internet of things". They see they can get the voltage they need by ordering the right number of cell modules and that they can get exponential power, safely, because the storage systems remove heat more efficiently that chemistry can build it up.

They get that the front plate assembly Perry's holding is equipped with a breaker rather than the industry standard fuse because it protects battery and DC buss from damaging each other. "We're the only company I know of that are actually using breakers on the battery." Apart from winning over engineers among his clients, his service mind drives a quality focus that's evident in detail like the touch screen "for managing and observing" cell states in the storage system; the battery module's simple disconnect rather than pricy power lock to open a module. "We have execution capabilities to match anybody else's, but we do think a little bit more like mechanics in terms of how to make things friendlier technically."

Customer Payback

A special orange insulator wrap protects the metal of the cell carrier from any current coming out of the cell itself. It's more of the detail system integrators inspect in their pre-audits of his factory processes. In fact, it's the details that make the PBES system work.

The company colors of one module we see are Siemens', but Rolls-Royce is understood to also have been by to audit his plant. From the system integrators' point-of-view, the battery systems represent most of the CAPEX in projects they're pitching their clients. "We're an intel-inside business. Intel inside, B2B," Perry explains. "They get a price and they turn around and package it out and sell it the way they want to."

His customers come to see the tests of their orders before they ship, and we see a 700 volt system being tested for high and low peak power. "It's way cheaper to

find a problem here than to find it out in the field," Perry says. Onboard a vessel, or under factory testing, an orange and yellow meter shows whether a system is being fired up or whether it's in shut-down sequence. "There's nowhere you can't acquire and monitor data," Perry says about the factory, installed systems, the production chain and his own supply chain. While his plant will soon have in place the monitors, bar code devices and other tools of cutting-edge, lean production, the storage solutions themselves are all traceable. Barcoding and data structures allow PBES to pinpoint the slightest failure to a plant,

Left & Below:
The Battery
The Sherman tank of batteries: A PBES energy storage system

Below & Right
First orders
Cell modules ready for testing

Photos: William Stoichevski

process, component and country.

"We monitor these systems 24/7. If we see a slight variation in voltage, we know it before the customer does. We are very proactive in maintenance and service and support, and so we can give a much better warranty because we always have eyes on the system. This energy storage system is a wireless hub. This is the Internet of Things. We can dial into these from anywhere in the world and fix something, change programming, update software. We don't have to be on the boat."

The batteries and their two to four millimeters of armor casing have survived vibration tests that would kill a man, making the PBES solution "The Sherman tank of batteries".

Replacing the battery room with the battery has also cut "by 90 percent" the space aboard ship that needs fire protection and extra ventilation. The battery has its own extraction system for gases like hydrogen and nitrogen.

"It's all approved and validated by type approval agencies and insurance companies. We're the only ones in the world who do that. These are all Class projects," Perry says. After all, he did help write Class's rules on energy storage.

Renewable Power on Ships

Eco Marine Power (EMP), in co-operation with shipping companies and tech partners, has begun a detailed study focused on the practical applications of its patented EnergySail and Aquarius MRE technologies. The study will cover the engineering aspects of installing an EnergySail or Aquarius MRE based solution on a variety of ships and the expected Fuel Oil Consumption (FOC) and CO_2 savings that can be achieved in an operational environment. Energy storage options, including fuel cells, will also be studied.

Technology partners include Teramoto Iron Works Co., Ltd. (Onomichi, Japan), KEI System Co., Ltd. (Osaka, Japan) and The Furukawa Battery Co., Ltd. (Yokohama, Japan). At this early stage the shipping companies remain confidntial. But in total more than a dozen ships will be included in the study, ranging in size from coastal chemical tankers to large RoRo ships, bulk cargo carriers and LNG tankers. For each ship involved in the study a preliminary engineering design will be prepared along with an analysis of the ships operational profile. The engineering phase will include ship surveys, on-board data collection, analysis using Computational Fluid Dynamics (CFD) software and virtual wind tunnel simulations. Computer modeling of ships fitted with EMP's EnergySail and Aquarius MRE technologies will be also be performed. EnergySail is a rigid sail based device that can be fitted with a range of renewable energy technologies such as solar panels or wind power devices. It is a unique renewable energy platform specifically designed for shipping. Aquarius MRE is an integrated renewable energy system for ships that incorporates EnergySail technology along with other elements such as marine solar power, energy storage and a computer system to monitor ship performance.


Eco Marine Power

Last year the first factory produced version of an EnergySail was manufactured by Teramoto Iron Works and an EnergySail Test Station has also now been established.

MOL Triumph First 20,150 TEU Containership

Samsung Heavy Industries

A new 20,150 TEU containership has captured the "world's largest" title: MOL Triumph, the first in a series of new mega containerships for Japan's Mitsui O.S.K. Lines, Ltd., (MOL) was named at Samsung Heavy Industries, Ltd.'s (SHI) Geoje, South Korea shipyard.

MOL Triumph is the first of four 20,000 TEU class ultra-large container carriers ordered by MOL in February 2015 to be built by SHI for 2017 delivery. Each surpasses the record setting 19,000+ TEU vessels built by Daewoo Shipbuilding & Marine Engineering (DSME) for Mediterranean Shipping Company (MSC), the first of which, MSC Oscar, was delivered in 2015.

MOL Triumph, with a breadth of 58.8m and draft of 32.8m, was named during a ceremony attended by SHI CEO Dae-Young Park and MOL CEO Junichiro Ikeda, among others. The vessel is expected to join the Alliance FE2 loop connecting Asia and northern Europe. In addition to the four vessels on order at SHI, MOL also has an memorandum of understanding with Shoei Kisen Kaisha, Ltd. for the long-term charter of two additional 20,000 TEU containerships to be built at Imabari Shipbuilding Co., Ltd and launched in 2017.

These vessels will also join the Asia-Europe trade. Imabari has orders for 11 20,000 TEU vessels.

JAPAN

Japenese Owned Fleet by Ship Type

VesselsValue

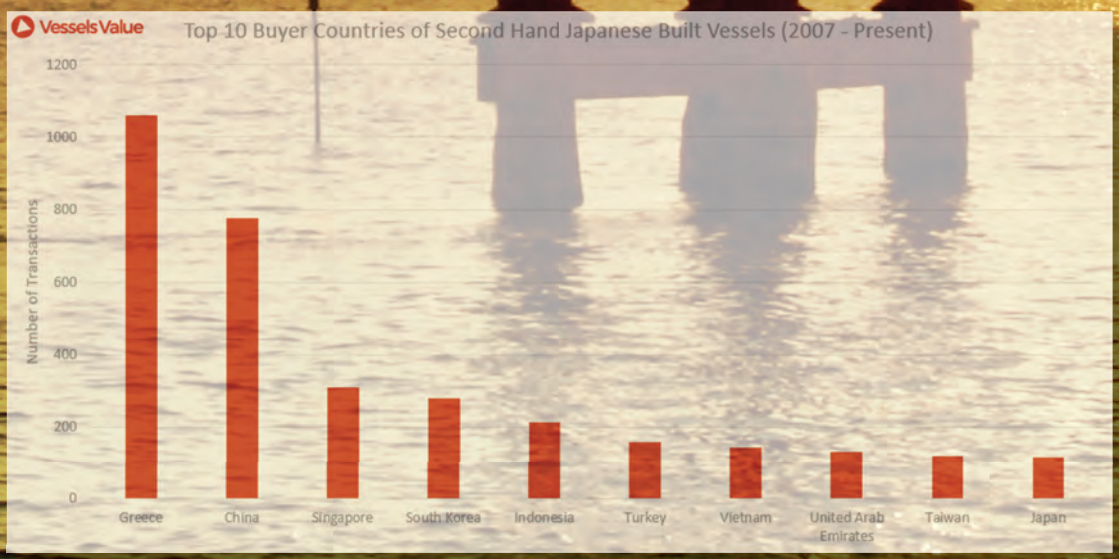
Ship Type	Number of Vessels	Total Size	Total Value USDm	Percentage Built in Japan*
		DWT		
BULKER	1,821	158263050	$31,898	86%
TANKER	1,060	48357500	$17,380	95%
SMALL DRY	721	4391200	$2,847	95%
COMBO	1	45700	$11	100%
OSV - PSV	1	500	$0.1	0%
		TEU		
CONTAINER	299	1982843	$10,006	72%
		CBM		
LNG	111	16098914	$15,038	70%
LPG	243	4899056	$3,846	93%
		BHP		
OSV - AHT(S)	12	80850	$33	100%
		FT		
MODU	7	12240	$325	71%
Grand Total	**4,276**		**$81,385**	**89%**

*Percentage of Number of Vessels

Japenese Owned Fleet

VesselsValue

Ship Status	Number of Vessels	Total Value USDm
Live	3,988	$61,837
On Order	288	$19,548
Grand Total	**4,276**	**$81,385**



A *Rising Sun* of Change

"No new fishing vessel has been (added) during the period," says the email we get form Japan's largest seafood company, Maruha Nichiro Corp. A year earlier, they had bought shares in New Zealand outfit, Sanford, which had just chartered a Nordic-looking vessel. Seafood rival, Nissui, had just done the same, buying New Zealand and Nordic. That all happened after the Naval Architect's Society of Japan said a vessel based on the Icelandic design of Reykjavik's Navis was its Ship of the Year. Expect more of the type, since Miho Shipyard now owns the Navis drawings and is expected to build for more fishing cooperative clients.

Wakayama Fishery Cooperative

BY WILLIAM STOICHEVSKI

One day, there could be more European-looking vessel profiles on that iconic Tokyo Bay scene of Mount Fuji behind tiny, high-prowed, reinforced fiberglass fishing boats (90 percent of the fleet) and the archetypical sloping silhouettes of commercial vessels in the 400 gross-ton, or GT class. Strike that — they're all commercial vessels, and that iconic photograph is shrinking: 60 percent of the fishery is made up of senior citizens, and that's a Fisheries Agency fact mirrored in the generally aged population. Pressed by plummeting recruitment in the fisheries sector, Japanese designers and shipyards have started stressing crew comfort — just as Norwegians did when crewing-up to meet their massive, oil-fueled offshore expansion and more recently, when offshore crews returned to the fishery to find crew comforts were "just like offshore".

Offshore is one of the categories the Japanese fleet and fishing cooperatives are grouped into: the other significant ones are coastal (mostly, those long-foredecked boats) and "overseas", into which the Navis design falls. "They go aboard several vessels," says Navis CEO and naval architect, Hjörtur Emilsson, about the Japanese fisheries delegations that have started visiting Iceland. "They're mostly just interested in the Icelandic way of operating boats and in the European line of fishing vessel." In the end, the shipyard **Miho Shipyard Co.** — (or Miho Zosensho) one of Japan's busiest — built the 600 GT Kaiyo Maru No. 51 using the **Navis** design. They own the design now and can be expected to build more. "(No. 51) was the first Japanese vessels to be built to Icelandic designs," Mr. Emilsson says, adding, "It seems to be the beginning." Icelandic equipment suppliers were also able to sell their wares aboard. A bridge system was sold. Winches and fishing gear were sold. Among the companies involved were Naust Marine, Hampiðjan, Marport and Marel. The Navis design that became The 51st Kaiyo-Maru will be owned by the Hachinohe Fisheries Cooperative Association, one of about a 200 with the clout to buy larger vessels.

FIRST TO CHANGE

The Maru was the first oceangoing trawler to have been built in Japan in "a quarter century," judging by United Nations stats.

One disincentive to build new ships has been a buoyant Yen for buying seafood in places like Boston. Another is Japan's excellent supply chain, especially its range of diesel motor and ships gear makers. Tokyo's oversight of fisheries and cultural imports, too, has only just slackened. "Many opportunities for Japanese fishing vessel owners can be found (now) that the government there has agreed to have the vessel built in accordance with Icelandic drawings," says Mr. Emilsson. Japanese delegations that included Fisheries Agency officials, labor groups and ordinary fishermen started arriving in Iceland in 2012, about a year after the devastating Great Eastern Japan Earthquake triggered a tsunami that killed thousands and destroyed countless fishing vessels and their supporting infrastructure. Government financial help prioritized fisheries piers and quays but quickly spread to fishing cooperatives with grants and loans to buy replacements for lost vessels. Others used insurance. Before and since the tsunami, a government program was al-

ready ratcheting up payments for energy efficient engines, power plants and fishing gear (10 percent of current subsidy of $1.2 billion, according to a report for the European Union).

YARD ACTIVITY

Just a handful of Japan's shipyards — many of which build non-fisheries behemoths — focus on medium-sized fishing boats. **Miho Shipyard Co.; Mitsubishi Heavy Industries,** or **MHI; Marine Hydrtotec Co.**, or **MHT; Mitsui Engineering & Shipbuilding Co**., or **MES and Niigata Shipbuilding & Repair** look to have been the busiest in recent months. They have built about a dozen vessels a year up to 500 GT since the 1990's.

Mitsubishi is fresh from delivering the 64-meter-long 1,000 GT fisheries training vessel, Shinyo Maru, for Tokyo University. A stern trawler in form, the Shinyo Maru will notably help study vessel operations that include trawling, squid jigging and long-line fishing. It's the fourth Shinyo Maro since the first in 1937, but unlike the others, this one is understood to have two 800 kW electric motors and Dutch acoustic survey equipment below the waterline.

NEW MODELS

After 50 years in fishing boats and ship hydraulic systems, **MHT** has upped its range in recent years and is understood to be working on an overseas branch for both vessel design and sales of its ship hydraulics. There's already a maintenance operation at Busan, Korea; parts distribution at Dalian, China and a sales presence in Taiwan. This designer-builder's most modern machining and welding is at its workshops in Shimonoseki, and **MHT** clients include the Japanese navy. **MHT** designs include range in size from 350 GT to 2,200 GT American purse-seiners to 90 GT Japanese-style seiners to *offshore* stern trawlers of from 65 GT to 160 GT. The American trawlers come with a tall, ABA FLEX crane to assist in hauling catch. For the 3,496 GT seiner, **MHT** makes two winch types: a choker winch and a three-drum purse winch.

There are more of the Japanese-style seiners in the Sea of Japan and the Northeast Pacific than the American, perhaps because the Japanese style of seining is a team operation of several vessels holding a line that's a good fit for the fishing cooperatives. All **MHT** Japanese-style seiners appear to come with double purse winches and a powerful crane, all made by **MHT** and all ISO9001-certified. Four other trawler types bear the distinctly pointed prows and sloping sides that emerged in Japan in the 1930's.

Photo: JSEA

Photo: Navis

Tokyo University's MHI-delivered Shinyo Maru

Niigata built the heavily photographed 88th Koyo Maru late in 2016, and the 760 GT vessel bears some of the new marks of Japanese fishing boats. Apart from doing nearly 18 knots, Tokai Fishery Co.'s 69 m, round-haul netter boasts a power management system and is reportedly safer and less labor-intensive to run than other, similarly sized vessels. These attributes garner grants and loans under the government's "better management" subsidy. The 2,942 kW units aboard the Navis-type Kaiyu Maru 51 also qualify for loans and grants for being energy efficient and meeting Tier II emissions strictures.

Engineering outfit **MES** holds the pulse of Japanese shipbuilding and is building about 180 **MAN B&W** low-speed diesel engines a year, all of them at the Tamano Works Machinery Factory. The company's record of installed horsepower and the Fisheries Agency both confirm the power quotient of Japanese vessels is on the rise (stat here). A pact since 1926 with **MAN Diesel & Turbo** has also served them well.

Ocean currents from the north and south meet both east and west of Japan, and the fronts create "a fish magnet … a huge feeding ground," wrote Masaki Sato in a UN report back in 1996. Since then, species counts have shrunken from one-twentieth to one half, and it's part of the reason there are fewer boats and the need for vessels that attract recruits.

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・***6/8EY26W*** : 1471~2560kW	・***6/8EY26LW*** : 1300~2300kWe
・***6/8EY33W*** : 2500~4500kW	・***6/8EY33LW*** : 2250~4600kWe

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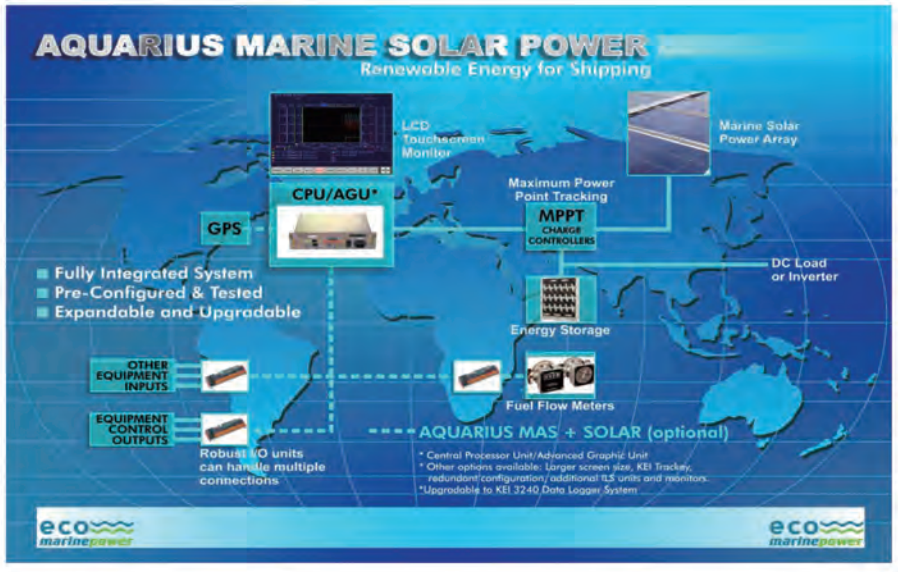

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Smart Ship Application Platform 2

SSAP2 Project Seminar

30th May

13:00 P.M. - 15:00 (Waves of change)

VENUE Thon Hotel Arena

NOR SHIPPING

Dr. Hideyuki Ando

Senior General Manager, Maritime Technology Division, MTI Co., Ltd.
(Chairman of SSAP2 Project)

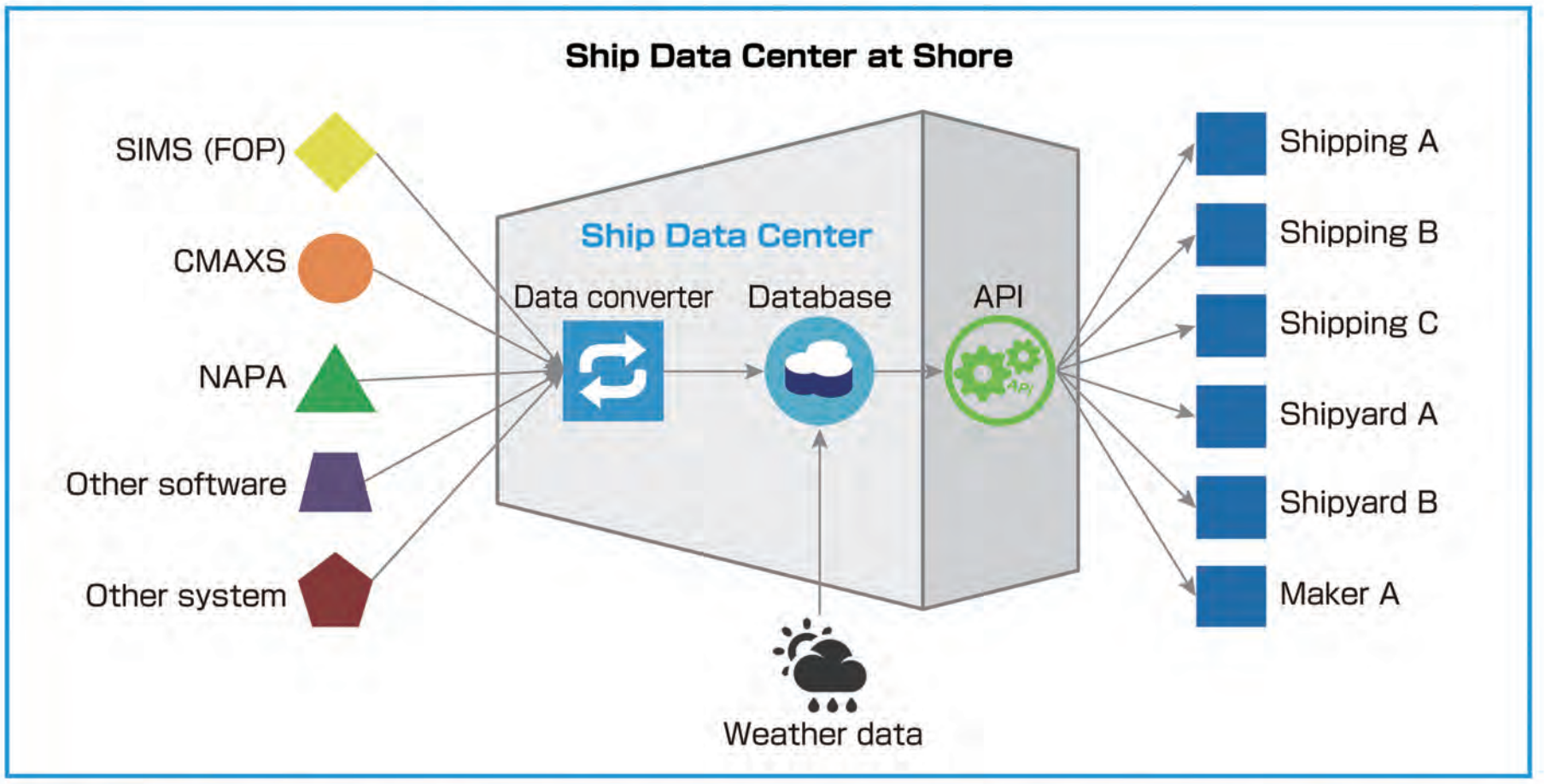
SSAP

SMART SHIP APPLICATION PLATFORM

JSMEA, Class NK, 34 member organizations and 10 observers are working together for SSAP (Smart Ship Application Platform) Project

Onboard and ashore IoT application services, which relies on ship onboard equipment data, have become prevalent.

The concept of Smart Ship is to utilize IoT application services to achieve optimum ship operation in terms of safety and energy efficiency.



Armed with the following two promoting new international standards, we aim at business development in marine information field utilizing ship IoT data.

- ***ISO/DIS 19847: Shipboard data servers to share field data on the sea***
- ***ISO/DIS 19848: Standard data for shipboard machinery and equipment***

Contact E-mail:info@jsmea.or.jp URL:http://www.jsmea.or.jp

JSMEA Japan Ship Machinery and Equipment Association

TUMSAT: More than a Rowing School

By Alan Haig Brown

Photo: Alan Haig-Brown

Philippine-born Ananya Surangpimol won a prestigious scholarship to Japan in 1971 and, after a year of intensive Japanese, entered Tokyo University of Fisheries, one of the first Asian women to do so in a former all-male imperial university. There she completed a master's degree in food science but one of her favorite memories of her attendance at this former naval academy was being required to swim a kilometer in the open sea and row a big 12-oar cutter in her freshman year.

In 2003, Tokyo University of Fisheries merged with the Tokyo University of Mercantile Marine to form the Tokyo University of Marine Science and Technology (TUMSAT), bringing their histories and reputations from way back in 1888 and 1875, respectively. Attendance by women has increased to about 40% from the 1970s when it started at 2%.

Recently, Surangpimol, now a Thai citizen, returned to her old Shinagawa campus, located a short distance up the Keihin Canal from Tokyo Bay, for the first time in 40 years. She was delighted to see a 12-oar cutter being rowed up the river by students, male as well as female.

On the shore, the same boat basin that she remembered from her student days contained a 19-meter research and training boat. It is the smallest of four vessels that the university operates. The 1,886-ton flag ship, Umitaka-maru, was away at the time. It travels to all oceans of the world and regularly visits the Antarctic. In addition to research responsibilities, the vessel is used to teach advanced courses of fisheries and ocean navigation. In February of this year, the 17-year-old, 93 by 15-m training ship was in the South Pacific. Also operated by TUMSAT are the 64.5-meter Shinyo-maru, the 35.5-meter Seiyo-maru and the 19-meter Hiyodori.

Near the boat basin, a large boathouse contained several big rowing boats. Two of the largest, 14 meters with 14 oars and sail, were in the boathouse while the third 14-meter boat was the one that students were rowing up the river. These are lovely slim vessels with the clinker style planking replicated in fiberglass. Next to them are three nine-meter carvel-style fiberglass boats. These boats have no sail but are manned by 12 oarsmen. A number of smaller vessels are to be found amidst a profusion of nautical fenders, oars, supplies and even racing trophies.

Busy with cleaning and tidying, while their crewmates were out rowing, a young couple, Yamada Masafumi and Tsukada Kaoru took time to explain the current role of rowing at the university. Yamada, who is a rowing-team member, explained that they have competitions with other marine universities in Japan. The two-kilometer races turn at the halfway mark and then return over the same one-kilometer course. The boats

Photo: Courtesy of TUMSAT

Unitaka-maru: *with a length of 93-meters sails the Pacific, Indian, and Antarctic Oceans teaching advanced courses in fisheries, marine technology and ocean navigation.*

One of TUMSAT's 12-oar cutters being rowed by students near the university campus.

Photo: Alan Haig-Brown

are crewed with one man per oar as well as a captain on the rudder and a chanter to call the stroke with a pace set by the captain. Tsukada, who does coordination work for the team, said that there were occasional one-kilometer races for women with smaller six-oar and six-meter boats but that these are not common.

Tsukada is in her first year at the School of Marine Resources & Environment while Yamada is in his third year in the School of Marine Technology. This will qualify him for a berth on the Umitaka-maru for a total of four months next year and then seven months the year after. The trips will take him down the coast of Australia and into Antarctic waters. After graduation, Yamada is looking forward to a career as a deck officer on deep-sea vessels. Tsukada, on the other hand, has not decided whether to get involved with environmental issues on land or on water. She is inclined, she says, to address human activity on land that impact marine resources as the ocean is too vast to reach.

A short distance from the boathouse is the school's original training ship, the Unyo-maru, the most visible feature of the Shinagawa campus from the Haneda Airport monorail. A barque-type sailing ship built in 1909, it was brought ashore in 1962 and set up on static display. For the first 20 years of her life, she contributed to whaling training, fishery investigation, student training, as well as development of fishery skills and tools. Later in life she pioneered the onboard processing of crabs. Today, the Unyo-maru and the university's training vessels, stand as symbols of the commitment of the Tokyo University of Marine Science and Technology to excellence in nautical training, ocean and fisheries research. At the entrance to the 3,000-student university, a sign proudly declares it to be one of the twenty best of the world's small universities.

Shinyo-maru: *with a length of 64.55 meters, she sails the Pacific and Indian Oceans for on board training in marine technology subjects, trolling, squid fishing and long line tuna fishing.*

Photo: Courtesy of TUMSAT

Updated Forecast on

Floating Production System Orders

BY JIM MCCAUL, IMA/WORLD ENERGY REPORTS

World Energy Reports has just released its midterm five year forecast of production floater orders. The forecast, detailed in the March 2017 WER report, reflects positive and negative developments in underlying business drivers since WER's five year forecast last October.

Positive developments

- Likelihood that the November U.S. election results will accelerate U.S. deepwater E&D – the new industry-friendly administration is cutting environmental barriers, opening new areas to E&D and plans tax cuts to encourage domestic energy development
- Faster pace of rebound in oil company capital spending – ExxonMobil, BP, Hess have increased their capex budget for E&D in 2017, reflecting a more bullish near-term outlook for capital spending than apparent last October

Negative developments

- Downturn in expected oil prices – while spot crude prices have increased due to the OPEC cuts, the futures market in March sees Brent crude for delivery five years out trading 10% lower than the projected prices last October
- Continued inability of Petrobras to regain traction following the corruption scandal – opposition to local content flexibility has delayed procurement of new FPSOs, legal challenges have prevented the sale of assets to improve cash position
- More rapid expected increase in cost of capital – US Fed targeting of three or four quarter point increases in the overnight lending rate within this year and likely similar tightening by other central banks will make deepwater projects more expensive

Overall, the net impact of these changes is slightly negative – but the outlook for a ramp up in production floater orders remains bullish. We now anticipate orders for 32 FPSOs and 8 FPUs over the 2017/21 time period – 2 fewer units than the October forecast. The reduction is the result of several FPSO orders being pushed beyond the five year forecast window. Similar to our October forecast, we continue to anticipate orders for 25 LNG regasification floaters and around 25 FSOs over the next five years.

In the March report is a list of 73 FPSO/FPU projects that have potential to move to the development stage through end-2021. They are all announced discoveries capable of moving to the EPC contracting stage over the next five years – i.e., a physical backlog of potential project starts. The projects are segmented into three time periods for possible investment decision – within the next 18 months, next 18 to 36 months and 36 to 60 months out. Of course, timing of the EPC contracting decision depends on the underlying business drivers – and at $50-$55 oil only a portion (~55%) are expected to proceed to a FID during the forecast period.

The data section in the report provides details for 199 floater projects in the planning stage, 48 production or storage floaters now on order, 294 floating production units currently in service and 28 production floaters available for redeployment contracts. Charts in the report update the location where floating production and storage systems are being planned, operating, being built and to be installed. Accompanying excel spreadsheets provide the report data in sortable format. Information is current as of March 20.

For more information, contact
Jim McCaul
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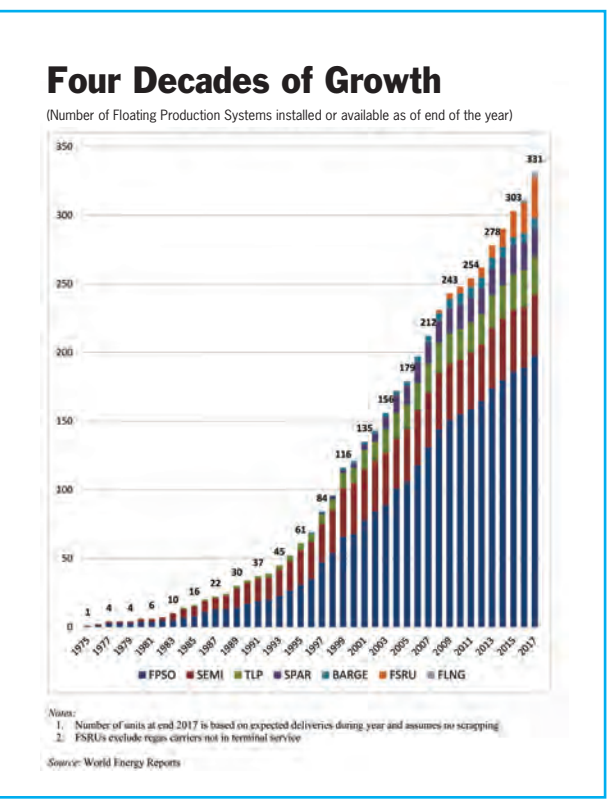
or
Jean Vertucci
vertucci@worldenergyreports.com

Photo: © ggw/ Adobe Stock



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CFD Simulation of a Fully Featured Offshore Platform Model

BY DANIEL BARCAROLO, HYDROCEAN

CFD simulations of offshore oil and gas platforms are used to predict the maximum wind loads acting on the structure of the platform topsides (the upper half of the platform, above sea level and outside the splash zone, including the oil production plant, the accommodation block and any drilling equipment). The wind loads are used as waves and current loads to design the mooring of the structure, and can be significant in specific ocean areas. Because platform topside geometries were traditionally considered too complex to mesh in high detail, CFD simulations relied on simplified, de-featured models. Their low fidelity meant that, when CFD was used, the results needed to be validated and refined through expensive, labor-intensive fabrication and testing of physical models in wind tunnels.

But in a recent R&D project funded primarily by French multinational Oil & Gas company Total S.A., with engineering management and additional funding from offshore engineering firm DORIS Engineering, numerical aero and hydrodynamics specialist HydrOcean, subsidiary of Bureau Veritas Marine & Offshore, succeeded in meshing a fully

detailed CAD model of a topsides module. Using this high-fidelity CFD model, HydrOcean investigated the effects of multiple wind angles on the platform, matching experimental data from wind tunnel and wave basin tests with wind generation capabilities to within 10 percent - and in most cases 3 to 5 percent - at a fraction of the cost.

The project was financed through Collaborative & Innovative Technology Program in Exploration and Production of Hydrocarbons (CITEPH), a French national program that facilitates access to private funding of innovative R&D projects in oil and gas and related energy industries (http://www.citeph.fr/en/). This was the second of two CITEPH projects in which HydrOcean received funding from Total to develop and validate the use of numerical CFD technology, specifically STAR-CCM+, to compute wind loads on offshore platforms.

CITEPH Wind Loads I

In the CITEPH Wind Loads I project, completed in 2013 and funded entirely by Total, HydrOcean used CFD to reproduce results of wind tunnel experiments that had been performed for a large FPSO unit in West Africa. The project successfully validated the use of CFD for such applications, and enabled to identify the bias of experiments such as confinement, scale effects and boundary layer effects.

CITEPH Wind Loads II

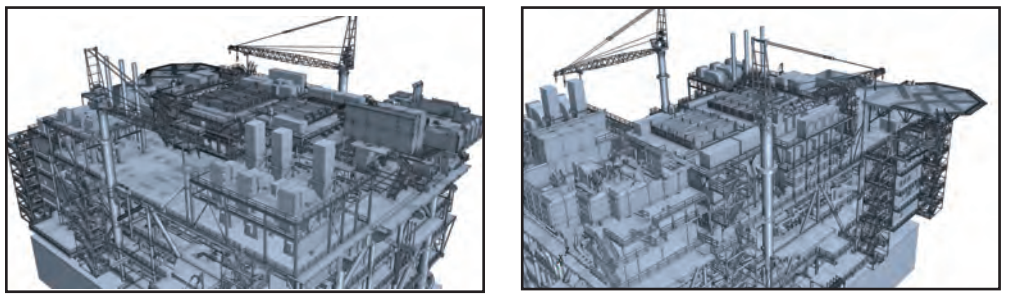
With the use of CFD validated, the CITEPH Wind Loads II project was designed to push CFD to its limits. This project, again managed by HydrOcean, required finding ways to increase the fidelity of both the physical models used in wind tunnel and wave basin testing and the numerical CFD model.

Traditionally, in physical experiments used to assess wind loads over offshore structures, the detailed CAD model of the platform is simplified substantially in the process of creating a physical model for testing. Small pipes are replaced by porosity grids, while complex objects are replaced by boxes, cylinders or other simplified geometry. But in this project, the participants realized that contemporary 3D printing technology would make it feasible to produce physical models that reproduce all the details contained in the CAD model. Meanwhile, for numerical simulation, in theory, any kind of geometry can be captured with today's CFD meshing tools.

Hence, in this project, there were two parallel workgroups. On the experimental side were CSTB, a provider of research, testing, certification and training for built-environment and construction industries which managed wind tunnel testing for the project, and OCEANIDE, an offshore and coastal engineering firm that took charge of wind load experiments in wave basin testing.

Meanwhile, on the numerical side of the project, HydrOcean's goal was to take a 3D CAD model of the platform topsides provided by DORIS Engineering designed for other purposes (layout, MTO) and mesh it directly without having to suppress or correct any geometry details. After months of trial and error, HydrOcean succeeded in meshing this extremely complex 3D Rhino model using the surface wrapper in STAR-CCM+, which shrink-wraps a high-quality triangulated surface onto the geometry, closing holes, joining disconnected and overlapping surfaces, as well as automatically discarding obsolete surfaces. The generated grids in this model had on average 140 million

FIGURE 1:
Views of the full-featured CFD model.



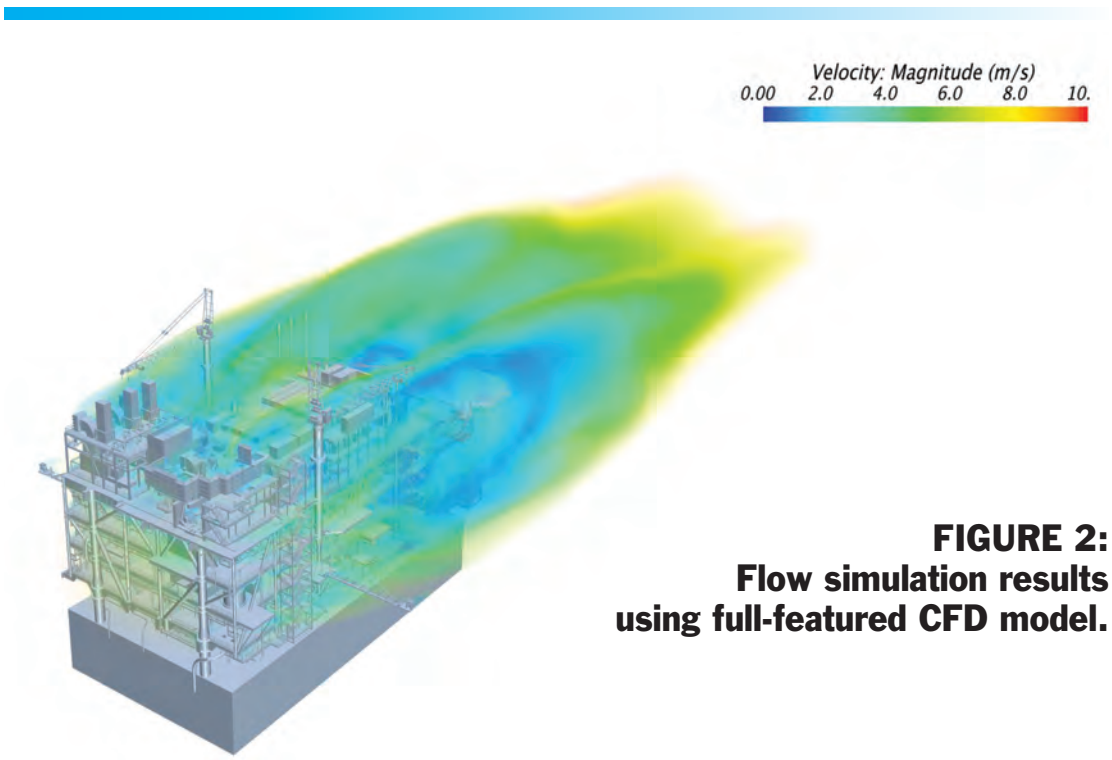


FIGURE 2:
Flow simulation results using full-featured CFD model.

trimmed hexahedral cells.

In an intensive joint effort with the Siemens PLM Software support team in France, HydrOcean found the correct parameters that provided good mesh quality (wrapper and volume mesh) and good numerical parameters for the simulation model.

The ultimate goal was to prove the feasibility of bypassing the CAD cleaning phase and use the surface wrapper instead and this was successfully demonstrated.

CFD Results Closely Match Experimental Data

Initially, HydrOcean simulated seven to eight wind heading angles, and the results for the forces were within 3 to 5 percent of experimental test data. Ultimately, the firm simulated 13 headings in all. In the largest divergence from test data, the simulation results differed by 10 percent. Next, two levels of simplification were performed on the CFD model and the corresponding 3D printed model to assess the impact of each simplification on the measured wind loads and moments.

In the first simplification exercise in the 3D printed model, small pipes were replaced with porosity grids and complex objects such as pumps and valves were replaced with boxes, cylinders or other simplified shapes - typical of industry-standard practice at present. In the second, more drastic simplification, the entire platform geometry was replaced by a simple box shape.

The resulting geometries were simulated numerically and also tested physically in the wind tunnel.

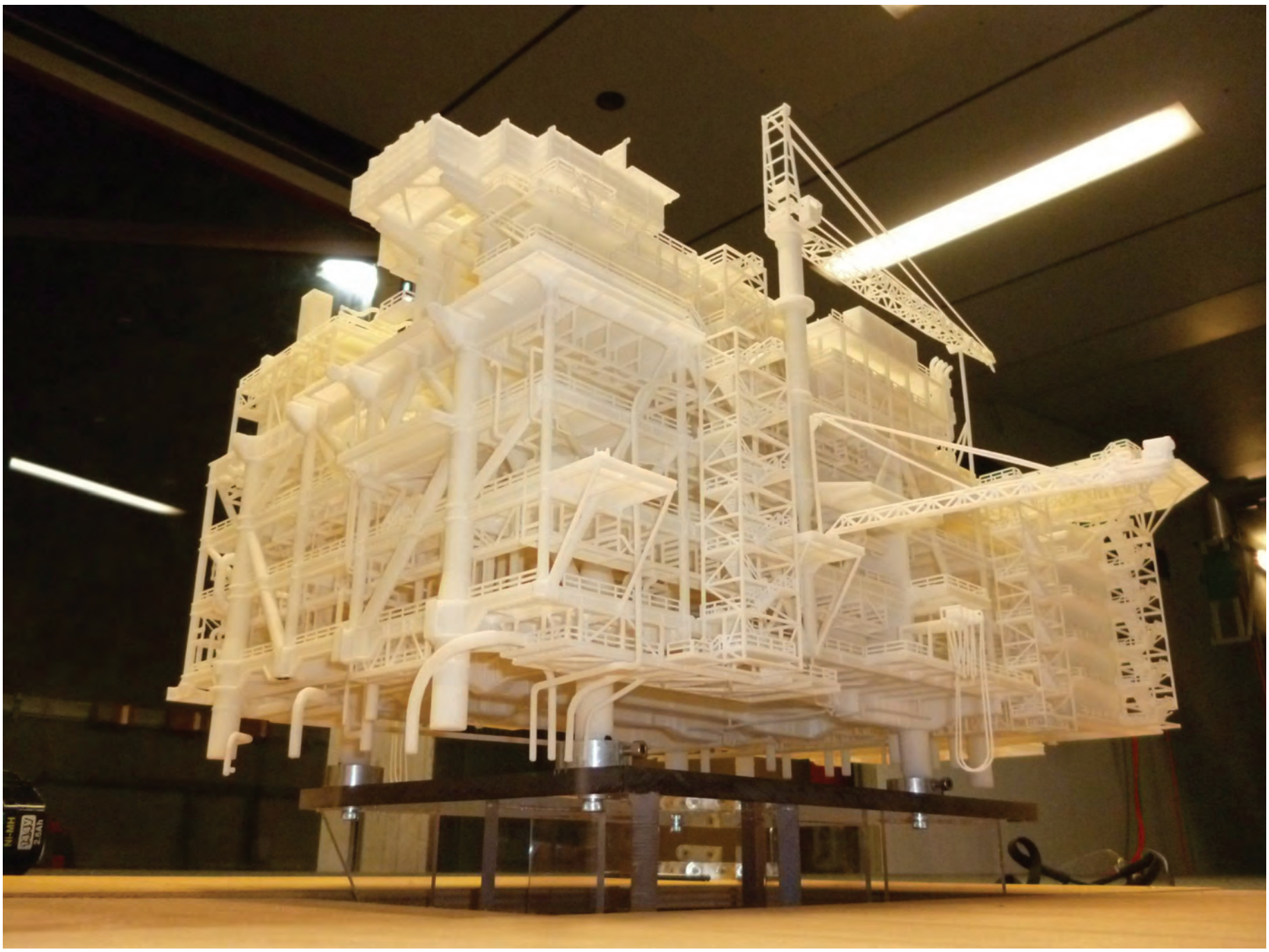
Both levels of simplifications compared well for the wind load forces - simulation results differed 5 to 10 percent from experimental results for the first level of simplification, and 8 to 15 percent for the second level. For the moment, however, it was harder to obtain a match, mainly for the most simplified geometry. For the most highly detailed geometry, simulation results were within 4 to 8 percent in average of test results.

No comparisons were made for the first level of simplification. For the second (most extreme) level of simplification, simulation results were within 4 to 6 percent in average of experimental results.

CFD Model Prep

One key interest of project funders Total and DORIS Engineering was to learn whether preparation of CFD models from 3D CAD files could be made as straightforward as the process of converting 3D CAD files into STL files for 3D printing. From extensive prior experience using CAD data to create physical models for wind tunnel testing, the companies knew that this process - although requiring some simplification of

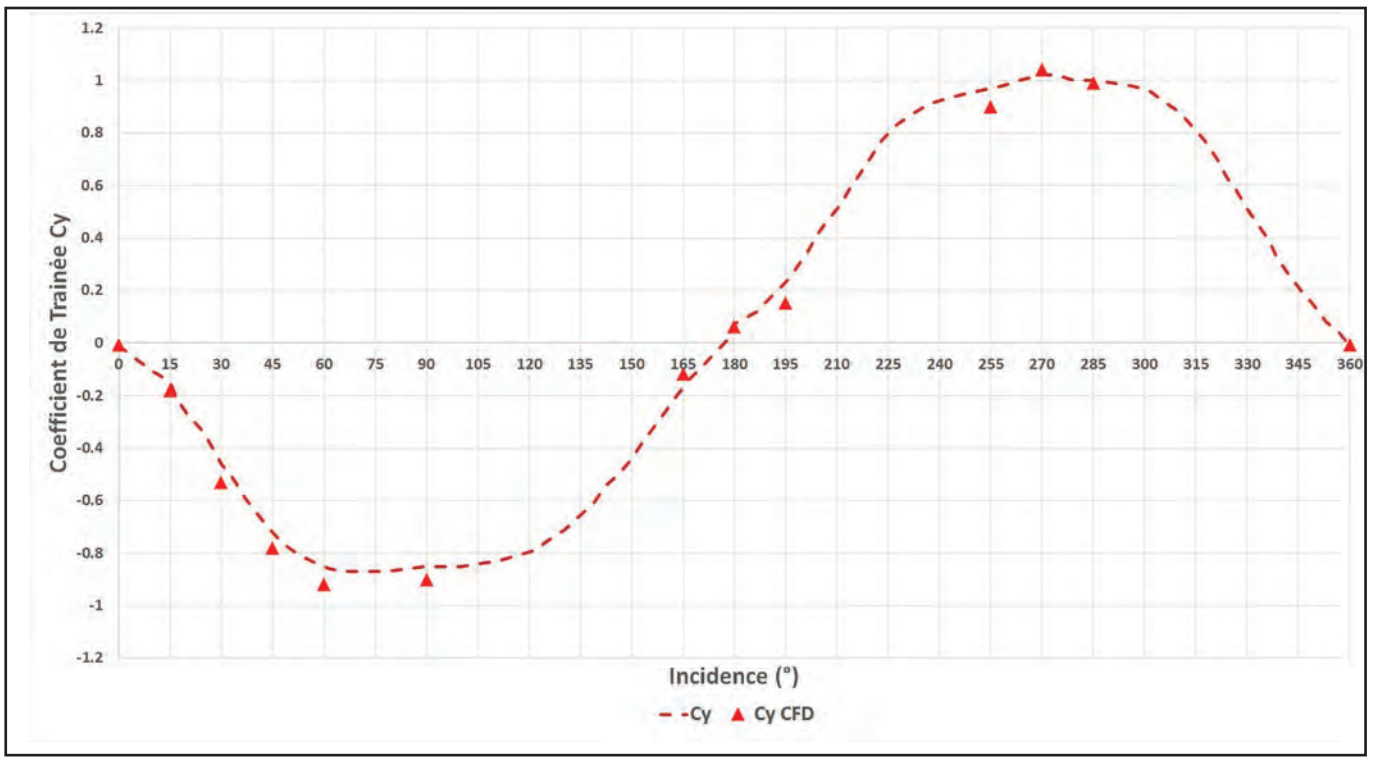
FIGURE 3: Full-featured 3D printed model used in wind tunnel and wave-basin testing.



Key Players

Key individuals leading the project for their respective organizations were Alain Ledoux, naval architect at Total S.A., Olivier Langeard, project engineer at DORIS Engineering, Daniel Barcarolo, PhD, Senior Aero & Hydrodynamic and Project engineer at HydrOcean, Graham Knapp R&D engineer at CSTB, Benjamin Rousse Chief Scientist at Océanide and Olivier Bachman, support and application engineer at Siemens PLM.

FIGURE 4: Correlation of CFD simulation versus physical test results (dots show simulation results, dashed line shows test results).



the CAD model - is nonetheless much more straightforward than the labor-intensive geometry simplification and defeaturing traditionally required for CFD model preparation. Their goal, says HydrOcean, was to develop a comparable approach for CFD.

The 3D CAD model that HydrOcean received from DORIS Engineering in Rhino format was a clean and for other purposes other than CFD modeling (layout, MTO, etc). However, it presented some features that such as multiple disconnected surfaces and elements, and very high levels of geometric detail which made it difficult to mesh for a CFD analysis.

Initially, the Siemens PLM support team suggested that HydrOcean split the model into multiple boxed regions, perform a local wrapping of each box, then perform a single wrapping operation to merge all the boxes. But HydrOcean decided that approach would require an unrealistic amount of time and labor and would not be the industrially feasible method sought by Total and DORIS.

Instead, HydrOcean decided to invest considerable time and research in finding how to apply the surface wrapper tool to accomplish meshing of the entire geometry in a single process, without splitting the geometry and significant loss of detail. The majority of time was spent on finding how to create a wrapped surface that could generate a very good volume mesh.

The quality of the simulation solution, as confirmed by comparison with experimental data, will be the confirmation that HydrOcean had found a very good wrapping setting and methodology. Initially, the solution did not converge. Upon closer examination, HydrOcean found the simulation model showed some areas of very high pressure, high velocity profiles and other results that revealed some regions of the volume mesh were not of high quality.

Those results, it says, were caused by the wrapper, so it explored how to adjust the wrapping process to create a volume mesh that would yield a simulation that converged. Over some 15 iterations, numerous surface parameters were varied, seeking to find the best connection among elements while avoiding such things as suboptimal triangulation areas in the mesh. In the end, it found surface parameter settings that yielded simulation results that in all instances were within 10 percent of experimental values. Thus, HydrOcean delivered an industrially feasible CFD simulation approach for full-scale, high fidelity, fully featured offshore platform modeling with STAR-CCM+, which will lower prototype and testing costs in the industry.

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The Future (of maritime) Care

For more than 15 years Christina Desimone has driven Future Care to be a transcendent maritime medical care enterprise. While the company fully embraces technology and the advent of telemedicine, it ventures far beyond traditional maritime medical solution providers, managing the logistics of effective and efficient mariner care from the beginning of the incident to its medical conclusion.

BY GREG TRAUTHWEIN

"If you have a sick crewman and have to deviate to a port to get him to a hospital because he wasn't treated early enough, you could miss 2 or 3 days off of your itinerary and miss your next cargo. **That could cost you millions of dollars. We understand that.** We need the owners to pass that message down to their technical and crewing managers. That's the education."

Gordon Cooper

Business Development, Future Care Inc.

As many global maritime sectors struggle to regain profitable footing, medical care for crews at sea is not exactly on top of the list discussion; in fact, crew medical care is often lucky to make the list at all. Christina Desimone, the ubiquitous CEO of Future Care, Inc., is determined to change attitudes.

"We are all very concerned with the shipping markets and their continued low chartering rates," said Desimone. "But from our perspective, a key issue is the lack of education of the people at the top of the ship owner chain in regards to the real value of a ship-to-shore continuous care telemedicine program for the overall health and well being of their crew."

Desimone is on a crusade to change attitudes on crew health care issues, but admits that the cornerstone to the effort will be the successful ratification of the Maritime Labor Convention (MLC) from the International Maritime Organization.

"As we are at the forefront of medical services provision to seafarers, and as we manage 25,000 healthy crewmembers every day globally," said Dr. Joseph T. Sera Jose, MD, Physician Medical Case Manager, Physician Advisor, Future Care, Inc. "Future Care brings a new dynamism and new ideas on how we can further assist, help and support our seafarers, from port side to onboard-vessel at sea."

Meet Future Care

"First and foremost, Future Care is a medical managed care and medical cost-containment company," DeSimone said. "We have chosen to work our medical care managed techniques within the unique environment of seafarers that work and live onboard vessels traveling the globe, individuals who are out to sea from a few weeks to a few months. We are doing medical monitoring, keeping in touch with the captain and the crew from the start of the incident until its conclusion. We conduct the diagnosis, we create the treatment plan and we follow up."

Future Care sets itself apart, as it not only provides a modern and continuously evolving medical care service with its Caring for the Crew program at its core, but Future Care lives, breaths and knows the conditions of the maritime market, courtesy of strategic hires such as Gordon Cooper, Desimone's Business Development lead who has more than 40 years experience sailing at sea and chartering ships.

"We are unique in the telemedicine community: we understand it from the commercial ship owner point of view," said Cooper. But he sees the evolution of shipping companies from family-owned to corporate-owned as one of the key hurdles ahead.

"When I went to sea in 1967, (ship owners) were mostly privately and family owned. By the time I left, it was changing, but the people still running the company were old line in their regard for the mariner. When I went to sea it was British crewed, British flagged: We were looked after well with competent crew care," said Cooper. But times change, and when Cooper was at sea the crews were much larger, specialized in certain jobs, with two to three days in port to receive medical treatment if needed. "The modern freighter with fewer, homogenized crews, it's a very different kettle of fish today."

"We are all very concerned with the shipping markets and their continued low chartering rates. But from our perspective, **a key issue is the lack of education of the people at the top of the ship owner chain** in regards to the real value of a ship-to-shore continuous care telemedicine program for the overall health and well being of their crew."

Christina DeSimone

CEO, Future Care Inc.

Cooper said that today many of the shipping companies are run "with other people's money. These investors changed the element. The owners are no longer generational shipping people, and they have no interest in the people at sea. The people at sea are only a cost element. So our services, which look after the people at sea, are harder to sell to organizations that look at the mariner as a cost element."

"In taking care of our seafarers, Future Care takes the lead by providing a totality of medical and logistical services to its Captains and crew members who are registered with Future Care Caring for the Crew program, whoever they are, wherever they may be," said Dr. Jose.

$4000 Per Year

Until the industry reaches the age of full autonomous operations, a healthy, well-cared for crew will continue to be a staple in efficient, profitable operations. As with other product and service providers in the sector which aim to prove that they 'pay for itself,' the argument surround crew care increasingly makes sound business sense.

Several of Future Care's services, particularly the consultation with physicians, are billed by the hour (in six minute increments), and controlling cost is always a concern from a vessel owner's point of view. But Desimone says that the billing procedure is the best workable solution, reasoning that it is impossible to give a price guarantee, as the amount of service required depends on the incident – is the problem dermatitis or a severed limb – as well as the overall age/health profile of the crew.

But Desimone claims that on average, leveraged across a fleet, Future Care's services average out to about $4,000 per ship per year to take care of everything.

Ship owners that choose to care for this in-house must realize that in addition to the obvious costs, there many subtle and hidden costs to a ship owner in managing a medical emergency, costs which can mount quickly if uninformed and/or mismanaged. "Future Care Logistical and medical oversight services also includes arrangements and coordination made for medical evacuation, debarkation and repatriation of an ill or injured crewmember, to a hospital, clinic or for a return flight home," said Dr. Jose. "This entails contact and communication with the different international sovereign coast guard and foreign navy offices, air, sea and land ambulance services for the transport of a crewmember from ship to shore to the hospital."

There is also an obvious cost effective aspect attained when using Future Care for shore side medical/dental consultations and evaluations because of the preferred medical facility partners of Future Care at every major port across the world, wherein these medical/dental port facilities do provide the best medical/dental care needed at an appropriate cost, with no undue advantage taken to either the crewmember or the client, and with only the best interest and welfare of the crewmember in mind.

Time is Money

"The efficient handling of a crew's medical profile can really save them commercial bucks," reasons Cooper. He explains that the Future Care value proposition revolves around the premise that proactively managing maritime medical problems from the inception of the incident to its conclusion, it can work with ship owners to avoid unnecessary course deviations and delays by managing an illness as efficiently as possible, and if the case does call for shore side care working to and through one of its thousands of approved facilities globally with the eye on top notch medical care for the mariner and efficient case and cost management for the owner.

"We feel that we can only get ahead of the field if we get out to the ship owners and let them know that we understand their pain points (when it comes to medical care for the crew and it's impact to overall ship operations and profitability)," said Cooper. "If you have a sick crewman and have to deviate to a port to get him to a hospital because he wasn't treated early enough, you could miss 2 or 3 days off of your itinerary and miss your next cargo. That could cost you millions of dollars. We understand that. We need the owners to pass that message down to their technical and crewing managers. That's the education. It's tougher today because investors don't understand this side of the ship operations."

"When you're out there in the Indian Ocean, ten days from last port and five days to the next port, you are very alone.

And if something goes wrong, your imagination can start to kick-in and make an illness seem much worse than it is."

Desimone points to a 'large tanker fleet' that she said uses the service to full effect. "If a crew member approaches and says he's having symptoms of illness or injury, scratch or cut, they contact FutureCare immediately" to share information and perhaps images, so that they get an accurate account of the problem and start working towards a solution. She said that in a majority of cases the medical problems are manageable, with just 12 to 15% falling under the "injury" category, and the rest falling in the dermatology, respiratory, gastro intestinal or muscle strain category.

Desimone is quick to stress the partnership nature of the service: "We are really physician advisors to the captain: he's the gatekeeper, he's the examiner, and it is the captain and the crew member that mutually determine when the mariner is again fit for duty."

Technology
VIRTUAL Software

When asked to discuss the defining technology that has impacted her business, Desimone was quick to cite "Virtual Software," as it has most significantly helped to improve the speed and accuracy of diagnosis, treatment and resolution.

Future Care has also started providing Wellness Exams for crews, creating and securely housing electronic medical records that can transfer to new companies and ships with the crew member, and also be used privately when the mariner is on vacation or at home. Most importantly perhaps, in the case of emergency that results in a shore side doctor or hospital visit it can save valuable time and minimize miscommunication with established records available electronically.

Case Study

Dr. Joseph T. Sera Jose, MD

Physician Medical Case Manager, Future Care

Recently a Future Care-registered vessel had an emergency issue while at sea, approximately four days from the nearest port. (The vessel, the captain and the female crew member's identity have all been withheld due to privacy and HIPAA regulations.) The female crewmember complained of abdominal pain, epigastric in location. The case started with the crewmember feeling anorexic with an apparent loss of appetite, and low-grade to moderate grade fever. This was initially treated as a case of Acute Gastritis, to rule out Appendicitis. Oral medication was advised, with accompanying supportive measures.The symptoms then progressed to moderate to severe abdominal pain located at the right lower quadrant, with intermittent vomiting episodes. Pain scale at 7-9/10 at its most intense. Treated with high dose antibiotics and supportive measures. No pain reliever was provided because the consideration was an Acute Appendicitis.

Future Care's physician rendered treatment instructions of High dose antibiotics, supportive measures and close monitoring every two hours until the vessel reached the nearest port. On medical debark and subsequent transport and admission into the hospital, a confirming diagnosis of acute appendicitis was made and subsequently surgically treated.

Future care received the commendation of the attending physician, that due to the primary care and immediate initial treatment and supportive measures provided to the crewmember, while onboard and in transit, this contributed to the delay in the progression of the illness for several days, and prevented a possible ruptured appendicitis incident, hence saving the life of the female crewmember.

Fume Extraction for Shipbuilding

How do you protect welders from dangerous weld fumes when working on or inside large ship hulls? The best option for many shipbuilders is a fume gun. The RoboVent Extractor is designed to provide high-efficiency fume extraction and excellent weld quality in a package little bigger than a standard weld torch. The Extractor captures up to 95% of weld fumes at the source. The lightweight, ergonomic handle reduces welder fatigue and ensures excellent visibility. Since extraction is provided right in the torch, welders do not have to continually reposition fume arms or other source caption equipment. The fume gun can be paired with a mobile hi-vac dust collection unit for extraction. Mobile units like the RoboVent ProCube come equipped with wheels and a handle for easy transport. At just 95 pounds and 42-in. high, the ProCube can be easily moved by an individual welder. Each unit supports one or two Extractor fume guns.

www.robovent.com

Image: RoboVent

Image: SBG Systems

SBG Systems Upgrades Its Ekinox Series

SBG Systems said it will soon present its new generation of advanced and compact inertial navigation systems, the Ekinox 2 Series. The Ekinox Series is a line of tactical grade MEMS-based inertial navigation systems first released in 2013. The newest is now twice more accurate in attitude due to a complete redesign of the in-house Inertial Measurement Unit (IMU) integrating cutting-edge gyroscopes and accelerometers.

www.sbg-systems.com

Image: Damen

Damen's Mobile BWTS: IMO Type Approval

Damen's mobile ballast water treatment system is an external ballast water treatment unit designed primarily for use in ports and harbors. Damen InvaSave treats ballast water to the IMO D-2 standard. It can also deliver water treated to the same standard to outbound vessels. Its mobile, containerized format means that it can be operated from the dockside or from onboard a vessel alongside, receiving or delivering water to a ship.

www.damen.com

Image: Ashtead

Ashtead Delivers Inspection Technology

Ashtead Technology expanded its equipment rental pool following a significant investment in the latest Pulsed Eddy Current (PEC) technology to deliver faster, more accurate asset integrity inspections. Ashtead will now supply the Eddyfi Lyft, an inspection tool for identifying corrosion under insulation (CUI), a major asset integrity issue for the oil and gas, and petrochemical sectors.

www.ashtead-technology.com

Image: Offspring International

Integrated Terminal Offloading

Offspring International (OIL) announces Offshore Ops, an integrated approach to oil terminal operations and tanker movements. With an increasing need to optimize terminal operations, the Offshore Ops Integrated Terminal Management system offers extended offloading availability and safer mooring operations for Single Point and Conventional Buoy mooring systems. Developed over 12 years' terminal operations experience, the Offshore Ops system is fully compliant with OCIMF SMOG 2015.

www.offspringinternational.com

Image: FCI Watermakers

Poseidon Meets Water Needs

Large offshore vessels and drilling platforms have atypical water demands. Daily personal use often pales in comparison to shipboard and production operation needs. FCI Watermakers' high-output Poseidon+ produces 54–103m3/14,265–27,210 gallons of fresh, pure water per day. Engineered and manufactured in the U.S., the Poseidon+ is built to run non-stop, 24/7.

www.fciwatermakers.com

Leco's New Aquaculture Vessel Launched

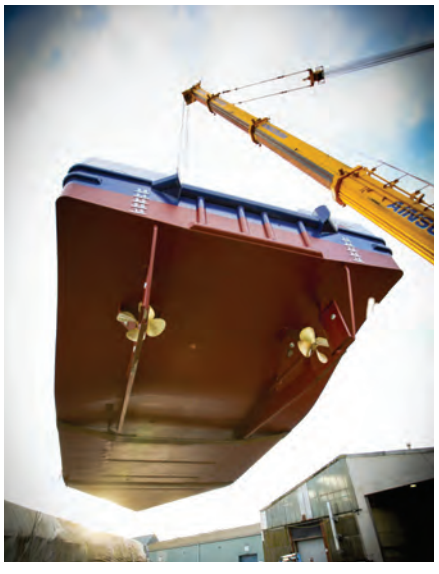
Southampton Marine Services launched its latest vessel, a new aquaculture service vessel for Leco Marine, at its Ocean Quay shipyard in Southampton. Designed by Argyll Maritime Design Services, the 23-m vessel, Alyssa, is an aquaculture service vessel built for Scottish commercial diving and marine services company Leco Marine to perform general fish farm work. It is equipped with a net-cleaning and inspection system for the maintenance of fish-farm nets.

Leco Marine's largest vessel, the Alyssa is a workboat platform with a spacious aft deck, high stability and excellent visibility of operations from the wheelhouse. The vessel features a large deck cargo capacity and deck crane for lifting and transportation of diving gear and net cleaning. This capacity allows the company to diversify into other fish farm duties should the need arise.

Twin marine diesel Doosan V158TIH engines drive twin four-bladed fixed pitch propellers via reverse reduction gear boxes. Each engine is fitted with dual station ZF electronic controls from wheelhouse and starboard forward side deck.

The vessel has also been designed to accommodate three crew overnight with single berth cabins and mess facilities.

The vessel is named after David Skea's three-year-old daughter Alyssa who will have the honor of christening her namesake at a ceremony on the Isle of Skye shortly after delivery.



Images: Southampton Marine Services

Pioneering Spirit

Drive & Control Challenges

While lifting a 48,000-ton platform in the open ocean is not an easy task, Bosch Rexroth components and control systems on board the Pioneering Spirit helped to command and control.

Photo: Bosch Rexroth

When the opportunity to provide the hydraulic components and associated local controls for the lifting system on board the innovative Allseas' Pioneering Spirit Bosch Rexroth proved ready for the task.

The request came from Allseas founder and owner Edward Heerema. A specially designed ship to lift entire offshore platforms off their piles in a single movement, for which Allseas had developed in-house a complete motion compensation system and associated control system. Allseas also wrote the software for the principle behind the motion system, and Bosch Rexroth was asked to further develop the design of the hydraulics and the arrangement of specific components of these lifting beams, and to supply specialist hydraulic components and drive systems.

"We had already worked closely with the Allseas engineers in Delft in the past, on other projects," said Ron van den Oetelaar, Managing Director of Bosch Rexroth Benelux. "So we had already supplied all sorts of components for special ships laying pipelines in the ocean. We were honored when Allseas gave us the engineering task of investigating the technical design for a new lifting system. Working closely with the Allseas engineers, who developed the unique form and functionality of the ship and the principle of the lifting beams for the 'topsides lift system,' our engineering team investigated various technical control options for the individual lifting beams. They looked at many different variations: hydraulic, electrical, and hybrid combinations of both technologies. The hydromechanics and electro mechanics were a challenge, but so was the digital technology (controls, software, bus systems, etc.). Allseas wanted the ship to be able to handle platforms weighing up to 48,000 tons. That's no easy task. Especially when you realize not only how accurately but also how fast it has to happen. During the development process countless tests were carried out and simulations performed so that, together with the engineers at Allseas, we could find the optimal solution. When after a couple of years' development we had got it right 'on paper', we were given the job of manufacturing and supplying the hydraulic components and drive systems for the individual beams."

While it used to take ships with cranes and dozens of workers weeks or months to construct or dismantle a platform piece by piece on the open ocean, Pioneering Spirit, at 1253 x 407 ft. (382 x 124 m), can lift the top section of a platform off its piles in 9 seconds. The motion compensation system is activated during preparations to pick up a platform. It consists of 16 lifting beams operated from the bridge of Pioneering Spirit. Using the lifting beams, a platform is raised 2.5m in a single swift movement so that the topsides of the platform becomes detached from the substructure. Then the ship moves away, and the topsides is carried towards the shore.

The technology applied in this situation by Allseas, also known as swell compensation, is exceptionally complex due in part to the simultaneous movements of the lifting beams along multiple axes.

"Standard components can rarely be used for special projects of this size," said Van den Oetelaar. "Apart from a few catalog components, such as valves and plunger pumps, most of the components and subsystems were developed specifically for this ship. This includes cylinders, control devices, generators, mounting plates, etc. The local digital control systems that we supplied for the lifting beams were also developed specifically for this assignment.

That applies to both the control hardware and the software. During the design process, we made intensive use of powerful simulation tools to predict system behavior, finite element methods to compute critical parts and components for strength, and analysis techniques to identify risks in the process flow. But it's always exciting when the first job gets underway. That took place last August, and involved lifting the 13,500-ton top section of the Yme platform, off the Norwegian coast. Everything worked perfectly. Since then, the remaining four lifting beams (including Bosch Rexroth components) have been installed on the ship for larger lifting jobs. It's great that our designers, production staff, service engineers and other technicians have been able to make such an important contribution."

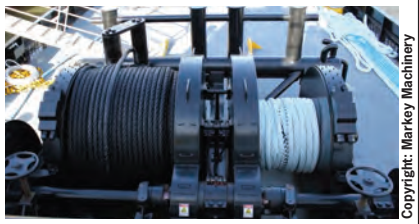
www.boschrexroth.com

JonRie Debuts its Tri-Winch Set

JonRie Marine Winches debuted its new Tri-Winch set on board Seabulk Towing's new ROTORTUG Trident. The 5,750 HP tug with a bollard pull of 78 Tons is the first of three new additions to the Seabulk Fleet.

www.marinewinch.com

Earl Redd Features Markey Winch



Copyright: Markey Machinery

The Earl W. Redd, the first Tier 4 tractor tug in the United States is equipped with a Markey Machinery two-winch suite of equipment consisting of a Markey TESD-34B-100HP double drum electric towing winch, and a DEPC-48-50HP electric bow hawser winch with Render/Recover.

www.markeymachinery.com

ACE Winches

ACE Winches designs and manufactures winches, marine deck machinery and the provision of hire personnel for the offshore oil and gas, marine and renewable energy industries.

www.ace-winches.com

Reduce Crane Accidents

Larson Electronics' set of red lasers helps to address industrial crane accidents, shooting out a sharp, red laser beam that can be seen clearly on the ground. The lines serve as boundaries for high-risk areas that are prone to falling objects and debris. This solution is simple to implement.

www.Larsonelectronics.com

SOUL: Heavy Lift Jack-up Vessel Design

SeaOwls and Ulstein launched a new heavy lift jack-up vessel design, the SOUL. According to the designers, the cruciform structural lay-out makes the patent-pending solution more than 10% lighter than conventional jack-up vessel designs. In combination with a high capacity crane, SOUL enables operators to take the next step in developing offshore wind farms. The concept aims to install the next generation wind turbines (10-12 MW) in the same time frame as currently used for installing 6-8 MW units, a significant efficiency gain over any jack-up vessel design currently available in the market. Scaling-up conventional heavy lift jack-up vessel designs proves challenging due to the disproportional weight increase compared to gain in Variable Deck Load (VDL). "We noticed this created uncertainty with turbine manufacturers, wind farm operators and installation contractors on how to install the future generation wind turbines, as floating vessels are not a viable alternative," commented Erik Snijders, founder and managing director at Rotterdam based SeaOwls. "So we went back to the optimal jack-up design, a square platform with the legs spaced out as much as possible. Rotating the platform by 45 degrees provided a natural bow shape with two legs and the crane on vessel center line."

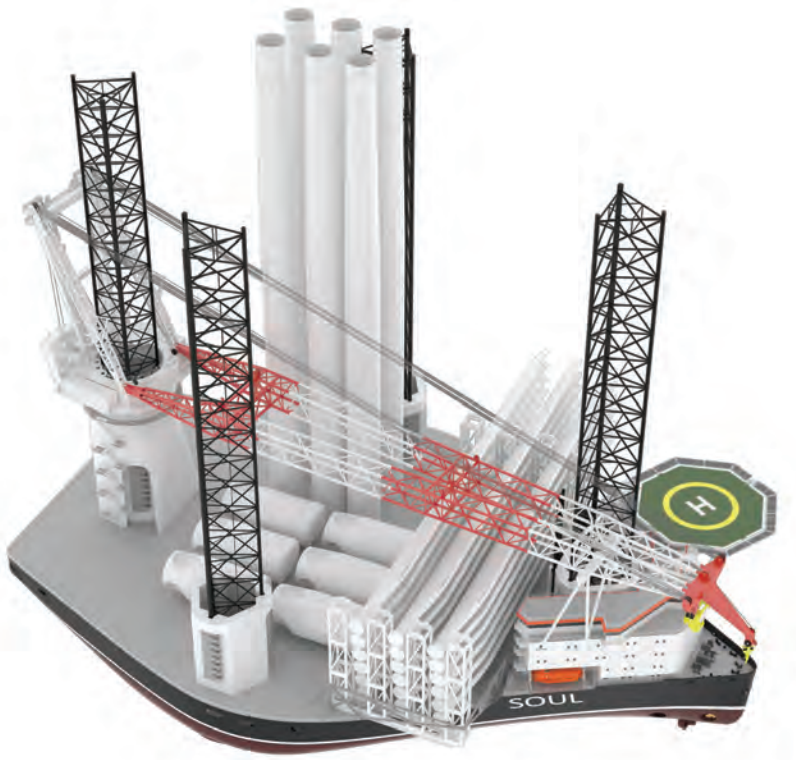


Image: Ulstein

"This seemingly simple twist in the design allowed to make a huge improvement in operational aspects as well," added Bram Lambregts, deputy managing director at Ulstein Design & Solutions BV. "With the main crane around the stern leg, optimal main deck reach and over-the-side lifting capabilities is created. And as the hull now houses much larger leg footings, bearing pressures on the seabed are reduced, while the wake of the spud cans does not interfere with the inflow to the propulsion thrusters." SOUL series will come in various sizes, allowing the transport of three up to six of the 10-12MW wind turbines.

Hyundai Heavy Industies Group

SunStone Ships

BigRoll Shipping

Crowley

Horizon Shipbuilding

First LNG-fueled Aframax Tankers Ordered

Hyundai Heavy Industries' shipbuilding affiliate Hyundai Samho Heavy Industries (HSHI) won a $240m order to build four 114,000 DWT Ice-Class IA aframax tankers from Russia's Sovcomflot. This is reportedly the world's first LNG fueled Aframax tanker. The vessels will measure 250 x 44 m, and are scheduled to be delivered from the third quarter of 2018 and to be chartered to Shell. By running on LNG, the Ice-Class IA tankers can emit 90%less SOx, 80%less nitrogen oxides NOx, 15% less (CO2) along with 50% reduced engine noise, according to HSHI.

SunStone Orders Four

SunStone Ships, Inc. and China Merchants Industry Holdings Co., Ltd. (CMIH) signed a framework agreement for the construction of four expedition vessels with options for an additional six vessels. The new vessels will be part of the SunStone Fleet and chartered to new and existing clients. CMIH has entered into an agreement with Ulstein Design & Solutions, who will supply the vessel's design and equipment package, as well as the supervision for the building of the vessels. CMIH has also entered into an agreement with Finland's Mäkinen, who will establish a cabin assembly plant and interior workshop at the shipyard's facilities in China and will be responsible for all interior spaces on the new builds. The hotel design of our new fleet will be done by Tomas Tillberg Design International. The project was brought together by Tillberg & Reyes Group Co. Ltd., who acted as broker. Carlos Reyes and Andrew Zhang developed the commercial and financial models.

BigRoll Beaufort Delivered

The heavy marine transportation provider BigRoll Shipping has reached a milestone. The fourth and final MC Class vessel for BigRoll shipping was handed over by Cosco Dalian Shipyard Co. Ltd to new owner BigRoll Shipping in Leiden, the Netherlands. BigRoll Beaufort completes this unique series of four identical deck carriers. The Finnish Swedish 1A Ice Class MC-Class vessels are explicitly designed for the marine transportation of major modules and equipment for large energy projects both on and offshore and can deliver in the most remote and inaccessible areas on the planet.

Jones Act LNG-powered ConRo Ship Launched

Crowley Maritime continues to order and incorporate into its fleet news ships with the latest environmentally friendly technologoeis, recently announced that the El Coquí, an LNG-powered ConRo, was recently launched at VT Halter Marine in Pascagoula, Miss. El Coquí is being built for the Crowley's service between Jacksonville, Fla., and San Juan, Puerto Rico. Named El Coquí after a frog native to Puerto Rico, the ConRo is one of the world's first to be powered by LNG. El Coquí, like her sister ship Taíno, will be able to transport up to 2,400 TEU and a mix of nearly 400 cars and larger vehicles in the enclosed, ventilated and weather-tight Ro/Ro decks. A wide range of container sizes and types can be accommodated, ranging from 20-ft. standard, to 53-ft. by 102-in.-wide, high-capacity units, as well as up to 300 refrigerated containers. Construction is being managed in the shipyard by Crowley Marine Solutions, which includes naval architecture and marine engineering subsidiary Jensen Maritime.

First Citywide Ferry Departs for NY

The first of 13 new passenger ferries being built by Horizon Shipbuilding, Inc. for operator Citywide Ferry by Hornblower has departed the Alabama

shipyard en route for its new home in New York. The ferry H200 departed from Horizon on March 21 and will travel approximately 1,700 nautical miles to New York City. The second ferry (H201) is scheduled to depart shortly. Each of the 13 vessels takes about eight months to complete and are scheduled to launch this summer. Louisiana shipbuilder Metal Shark is building six additional vessels for the ferry service.

Italian Frigate Launched

The seventh multi-purpose Italian FREMM frigate Federico Martinengo, was launched at a ceremony held at Fincantieri's Riva Trigoso shipyard in Genoa, Italy. All of the Italian Navy's new Carlos Bergamini-class FREMM frigates (10-ship program) feature the GE LM2500+G4 gas turbine in a COmbined Diesel eLectric And Gas turbine (CODLAG) propulsion system. In addition to the Italian FREMM frigates, the DCNS shipyard in Lorient, France, is well underway with a 10-ship program that also uses the same 35-MW LM2500+G4 gas turbine. Eight of the FREMM frigates are for the French Navy (three are commissioned), and single ships have been delivered to the Moroccan and Egyptian Navies. GE LM2500+G4 marine gas turbines also will soon power the Italian Navy's new Pattugliatori Polivalenti d'Altura (PPA) multipurpose offshore patrol ships. GE's contract includes an order for seven LM2500+G4 gas turbines. The ship's hybrid propulsion plant will feature small gearbox mounted-motors for low speed operations, two propulsion diesels for mid-speed service and the LM2500+G4 gas turbine to reach 32+ knots. GE also will be responsible for the electrical system integration of the hybrid system. The PPA project is an example of the GE Store: the LM2500+G4 gas turbines will be built in Evendale, Ohio; Avio Aero will manufacture the LM2500+G4 turbine control system at its facility in Brindisi, Italy; and GE Power Conversion will manufacture the drives.

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Gowind 2500

Navy builder DCNS annonced the first sea trials of the first-of-class Gowind 2500 corvette under construction in Lorient, France by DCNS. Ten Gowind 2500 corvettes, aimed at supplementing DCNS surface vessel product range, has been ordered so far by international navies. The first Gowind 2500 corvette is being built on the DCNS site in Lorient, France. Nine other corvettes are to be built in Egypt and Malaysia, via technology transfer by DCNS. Gowind 2500 incorporates the SETIS combat system, developed by DCNS for FREMM frigates and Gowind corvettes, the as well as "Panoramic Sensors and Intelligence Module (PSIM)" – an assembly which brings together the integrated mast with its various sensors as well as the Operational Centre and its associated technical rooms.

Federico Martinengo

Photo: Italian Navy

Federico Martinengo, the Italian Navy's FREMM multipurpose frigate.

Oceanicasub V

A state-of-the-art DSV is a marvel of modern technology and design

The DSV Oceanicasub V was delivered in February 2017 to her Brazilian owner Oceânica. Oceânica provides subsea services to the petroleum company Petrobras. The Oceanicasub V is the second in a pair delivered from the Arpoador Shipyard in Guarujá, Brazil, and the 43 by 9.3-m vessel was designed by Incat Crowther in cooperation with the shipyard and owner.

Builders believe that allying shallow diving to a wide range ROV performance, all contained in a light DP 2 vessel, will establish a new benchmark in subsea operations, reducing costs, increasing work flexibility and safety compared with the previous existing concepts.

For such a vessel, choice of engine power and propulsion method is of paramount importance. For reliable power the owners chose four Cummins QSK19M main engines and coupled them to ZF 2000 gearboxes driving Hamilton HM521 water jets. With each of the four engines delivering 660 HP, the vessel, at just under 500 gt, has a maximum speed of 12,5 knots and a cruising speed of 10 knots. The jets eliminated the danger that propellers can present for divers.

However the primary function of the four jets, along with three 150 kW Intermarine bow thrusters, is to provide precise and safe station keeping when divers are working below. The vessel is also fitted with a Kongsberg DP2, Hipap, Spot Track and Radius systems to automatically hold position as well. Zero speed stabilizer fins are also installed to reduce roll and make the working deck safer for crews.

Electrical power for the bow thrusters and a variety of deck cranes and winches is provided by three Cummins QSM11-powered 300 ekW gensets as well as a Cummins 6BT5.9-powered 92 ekW emergency genset. The vessel is also equipped with a hyperbaric chamber, Caviblaster, dive bell, one ROV for 1,500m and one for 300m, ROV A-frame and every conceivable piece of equipment required to handle a wide range of subsea tasks.

Accommodation is provided for 36 people including divers, dive support staff and ship's crew. The wheelhouse has fore and aft controls with excellent visibility down to the working deck and up for those times that the boat is working near an offshore rig.

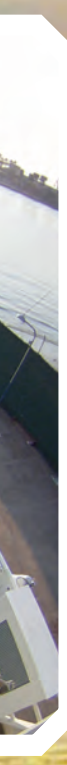
In the hull the main engines and jets are arranged in two pairs, port and starboard, with the three QSM11-powered gensets forward of the propulsion engines. Forward of the engine room an auxiliary machinery room contains, among other equipment, the main switchboard, five compressors, the ROV power pack, and three water makers. Forward of that, six 4-person cabins, with a head in each cabin, share a companionway and stairs up to the main deck.

The main deck cabin includes a large galley and pantry forward on the starboard side with two dinning areas, one of which can double as a meeting room. Aft of the galley and mess area, a large TV room provides for relaxation to port with an office and laundry room to starboard. Aft of the office is a workshop and aft of the TV room is the dive operations office with a separate computer room and access to the main deck.

Just aft of the main deck house are two A-frames, one for a dive bell and one for the ROV. Both can extend over the starboard side while on the port side is the hyperbaric chamber. An open work area aft supports port and starboard deck cranes.

Above the main deck house, and just below the wheelhouse, a mid-deck cabin contains two single berth cabins for the captain and a charterer's representative. Two 4-person and one 2-person cabin, all with their own head, are also located on this deck.

The vessel is classified by RINA C + Special Service, DYNAPOS AM/AT R, DIVING SUPPORT, AUT-CCS, Unrestricted.



Oceanicasub V

Photos Left, from top:
The foreward navigation bridge is impressive.

The view of the main deck from the bridge.

The central control has a host of monitors to follow both deck and subsea activities.

All Photos: Oceânica

DEME

Ulstein

Subsea 7

Subsea 7

DEME's Orion

C-Job Naval Architects will provide Cosco Offshore Co. (Qidong) with the Basic Design package for DEME Group's offshore installation vessel Orion. This contract follows C-Job's recent conclusion of Orion's Concept Design. To be operated by DEME subsidiary GeoSea, it will service offshore wind installation, oil & gas and decommissioning activities. C-Job recently completed the Concept Design for DEME's Orion. While working on this subsequent phase of ship design, C-Job's dedicated Orion project team will be able to draw on the extensive knowledge that they have built up. This will yield efficiencies in overall project timing as well as maritime engineering and vessel optimisation. "The same team will be involved, so it is really a natural progression for us," said C-Job Project Manager Rafael Novas Garcia. DEME will build Orion at Cosco Shipping Heavy Industry in China. After her 2019 delivery, Orion will be mobilized by DEME subsidiary GeoSea for offshore wind farm installation activities. To this end, the vessel's DP3 capability and accommodation for up to 131 will both be an assets in performing offshore contracts. The 216.5-m vessel's loading and lifting capacities will also mean that GeoSea will be able to operate in the oil and gas industry and for the decommissioning of offshore installations.

Windea Leibniz

The new wind farm service vessel Windea Leibniz was delivered from Ulstein Verft to Bernhard Schulte Offshore and ICBC Leasing last month. Beginning in April, the vessel will work at the Sandbank wind farm in the German Bight for Siemens Wind Power Service to help ensure energy production from the site's 72 wind turbines. Windea Leibniz is the second wind farm service vessel in a series for Hamburg based shipping company Bernhard Schulte and the Beijing based financial company ICBC Leasing, following on the delivery of sister vessel Windea La Cour which has been working at the Dutch Gemini wind farm since August 2016. Both vessels were designed by Ulstein Design & Solutions AS and built at Ulstein Verft in Norway.

According to the builder, the usage of the service operation vessels (SOV) will improve the efficiency of service operations at offshore wind farms. The vessel functions as a platform for wind farm operations and maintenance support, technician accommodation and transport, as well as the provision of exceptional levels of safe and reliable access to offshore installations.

Subsea 7 Invests

Subsea 7 took delivery two new builds: a heavy construction flex-lay vessel Seven Arctic and dive support vessel Seven Kestrel, completing its fleet investment program that has added six newly constructed vessels to its fleet since 2014.

Designed to meet the demands of deep water and harsh environments, including both tropical and winter conditions, Lloyd's Register classed Seven Arctic is capable of working at depths of 3,000 m and features a 1,000 ton offshore crane and a 600 ton top tension (tiltable) lay system. The other new build, dive support vessel Seven Kestrel, is certified by DNV-GL, encompassing an 18-man twin-bell saturation diving system rated to 300m water depth. It is optimized specifically for work in the North Sea.

Subsea 7 said its engineers designed the two vessels in collaboration with Hyundai Heavy Industries Shipyard in Ulsan, South Korea and Wärtsilä Ship Design, Norway, to maximize efficiency, capacity and economy. Both vessels will transit to the North Sea for further crew familiarization before commencing operations in the spring.

Seven Arctic

Type: ..... Heavy Construction/Flex-lay

Classification: Lloyds Register, X100A1, Offshore Supply Ship, Helicopter Landing Area, WDL(+), ShipRight (ACS(B)), *IWS, ECO(IHM, OW, P), iceclass 1D, Winterisation H(-30) SC, XLMC, CAC 3, UMS, DP(AAA), Descriptive note ShipRight (BWMP(method)), 2008, SPS

Built: ..... Hyundai Heavy Industries, 2017
Flag: ..... Isle of Man
Length Overall: 162.3m
Breadth: 32m
Depth Main Deck: 13.5m
Operating draft: ..... 8.5m (8.7m max)
Transit Speed: ..... 15 knots
DP Classification: ..... DP Class III, DP HIL Certification
Reference System: ..... 2x taut wires, 3x Veripos DGNSS, 2x HiPAP 500, 1x CY Scan
Engine Rooms: 2
Main Engines: ..... 6 x HiMSEN 9H32/40
Power: 4,500kW
Generators: ..... 6 x HHI HSJ7 915-10P; 4,220kW
Propulsion: 2 x Controllable pitch propeller shafts; 9,200kW
Thrusters: ..... 4 x Tunnel Thruster (2 Fwd, 2 Aft); 2,600kW
Azimuths: 2 x Retractable Azimuth Thruster (Fwd); 2,300kW
Clear Deck Area: 2,600m²
Deck Strength: 15t/m² aft of main crane, 10t/m² elsewhere

Accommodation

Berths: 132
Cabins: ..... 52 x single cabins, 40 x double cabins

Tank Capacities (100%)

Fuel Oil: 3,700m³
Potable Water: 1,200m³
Ballast Water: 7,500m³
Anti-Heel Tanks: 3,000m³
Anti-Roll Tanks: 800m³

Cranes

Main Crane Capacity: 1,000t
Manufacturer: ..... Huisman
Operating Water Depth: ..... 3,000m (Double Fall)
Main Lift Wire: 6 ..... ,350m / 109mm
AHC: ..... Yes
Auxiliary Hoist: ..... 40t, certified for man-riding
Auxiliary Cranes: ..... 1x 100t AHC, 1x 25t AHC
Operating Water Depth: ..... 3,000m (Single Fall)

Moonpool

Number: 1
Dimensions: ..... 8.75m x 7.2m

The Maritime Industry's Largest
Social Media Presence

Maritime Reporter is a member of the Marine Media Network of websites, publications, and social media sources for news, editorial and information including the Maritime Network, the commercial marine industry's largest dedicated Linkedin group.

63,864
Facebook Page Likes

128,718
Linkedin Group Members (industry's largest)

27,505
Twitter Followers

MARITIME REPORTER AND ENGINEERING NEWS

THE MARITIME NETWORK

@ShipNews

Also part of the Marine Media Network

Page	Likes
Marine Electronics	34,849
Marine Technology Reporter	57,604
Maritime Global News	27,015
Maritime Jobs	46,961
Maritime Logistics Professional	31,807
Maritime Propulsion	23,378
Maritime Reporter & Engineering News	63,864
World Energy News	51,176

All stats from 02/14/2017


Horizon Shipbuilding

Hotz


Torqueedo

Kull


Radio Holland

Post


Polarcus

Eley


Bureau Veritas

Paul Shrieve, Bureau Veritas and Graeme Reid, MAC


OCIMF

Cassels


Global Maritime

Thomassen


U.S. DOT

Chao

Fortuny


RSC Bio Solutions

DeVivo


RSC Bio Solutions

Lionberger

Horizon Names Hotz VP

Horizon Shipbuilding hired John Hotz as Vice President of Business Development. Hotz brings to the role a background in business development and industry experience, having worked within the commercial and government marine sector for more than 27 years.

Kull Named President of Torqeedo

Marcia Kull has been named President of Torqeedo Group, Inc., and will direct global sales and strategy for the electric and hybrid marine propulsion systems manufacturer. Kull will oversee Torqeedo's growth activities in the Americas, EMEA and Asia-Pacific regions. The newly created position is an expansion of the current management team. She will assume her new role on May 1, 2017.

Post Appointed COO of Radio Holland

Maarten Post has been appointed Chief Operating Officer (COO) and member of the General Management Team of the Radio Holland Group. He is responsible for the management of the global operations of the Radio Holland Group and further building the global service network.

Eley to Take over as Polarcus CEO

Duncan Eley has been appointed chief executive officer of Oslo listed offshore geophysical services company Polarcus Limited, replacing Rod Starr, who has resigned following a two year reorganization period.

BV Acquires MAC

Bureau Veritas (BV) announced the acquisition of Marine Assurance & Consulting (MAC). Based in Aberdeen, MAC was established in 2010 and now has 30 employees as well as more than 40 associates. This transaction is in line with BV's recent developments in the North Sea offshore sector, where it has reaffirmed ambition to strengthen its local presence and increase its service provision capabilities for clients in spite of challenging market conditions.

Cassesl: OCIMF Encourages Adoption of Inert Gas Systems

The Oil Companies International Marine Forum's (OCIMF) latest information paper, released on March 13, addresses the use of inert gas for the carriage of flammable oil cargoes.

In the paper, titled *Inert Gas Systems: the use of inert gas for the carriage of flammable oil cargoes,* OCIMF fully supports the IMO introduction (from January 1, 2016) of the mandatory fitting to new build tankers 8,000 DWT and over, of an inert gas system when carrying flammable cargoes. "The safety benefits of inert gas in cargo tanks are well recognized throughout the tanker industry," said OCIMF Director, Andrew Cassels,

Global Maritime Names Thomassen

Global Maritime Consultancy & Engineering has appointed Espen Thomassen as Regional Manager for the Americas. He will lead Global Maritime's involvement in providing Sub Chapter M compliance services to inland towing vessels.

Chao Welcomes Liberty Ship to MSP

U.S. Department of Transportation Secretary Elaine L. Chao welcomed the newest vessel to the Maritime Security Program (MSP) at Beaumont, Texas. Renamed the M/V Liberty Passion, it is the third ship owned by Liberty Global Logistics to join the MSP fleet.

Fortuny Joins Viega

Viega LLC announced Yasmin Fortuny as its new technical manager for its shipbuilding and cruise business development division. Fortuny is now responsible for positioning Viega as the primary choice for marine applications within the commercial-vessel and military markets.

RSC Bio Solutions Expands

RSC Bio Solutions announced a new market-oriented organizational structure with two focused teams around the marine and land markets. At the same time, the firm welcomes:

- Lauren Lionberger joins the team as global commercial director for the marine market.
- Paul DeVivo joins the team as an independent strategic advisor. DeVivo is the retired former CEO of Gulf Oil International and has a BS from the U.S. Merchant Marine Academy, along with a MBA from University of Miami.
- Damian Seipel in the role of account executive. Seipel has over 16 years of experience working in the chemicals and lubricants industry
- Chris Griffin and Mark Fretz join RSC Bio Solutions as business development managers.
- Paul Treese has been hired as regional sales manager.

Bahri Opens Houston Office

Bahri, a global leader in transportation and logistics, announced the opening of its second North American office in Houston, Texas, home to the Port of Houston, one of the busiest ports in the world. Bahri Logistics (America), which has been operating out of Bahri's U.S. headquarters in Baltimore since 1992, has further strengthened its presence and position in the country's largest breakbulk and general cargo port.

Subsea 7 Acquires SHL

Subsea 7 said it acquired the remaining 50 percent shareholding in Seaway Heavy Lifting Holding Limited and its subsidiaries on March 10, 2017 for a cash consideration of $279 million on completion and an additional consideration of up to $40 million to be paid in 2021 on the condition that certain performance targets are met.

Tauck Doubles Ship Cruising Capacity

Tauck announced a four-year plan for doubling its small ship cruising capacity through strategic fleet expansion, deepened partnership programs and new itineraries. "We're destination explorers at Tauck and some destinations are best explored by both land and sea," said Jennifer Tombaugh, president of Tauck. "Tauck Small Ship Cruising is our first product line to sell out each year. By adding new destinations and expanding our capacity with Ponant, we're able to provide more choice and more availability in order to better serve the current and growing demand." Ponant, the French-owned cruise line, will debut four new luxury expedition yachts in 2018 and 2019. As part of an expanded partnership, Tauck will leverage all four

Ponant new builds starting with Le Lapérouse in summer 2018.

Roxtec Expands in North America

Roxtec launched its second specialized service company offering inspections and maintenance of cable and pipe transits. The new Roxtec Services US LLC is a subsidiary of Roxtec Services AB. It is based in Houston, Texas, and will cover ships and offshore units all over North America.

Rolls-Royce, Stena Line Partner on Ship Intelligence

Rolls-Royce

Rolls-Royce signed a deal with Stena Line AB to collaborate in the development of its first intelligent awareness system. Intelligent awareness systems are designed to make vessels safer, easier and more efficient to operate by providing crew with an enhanced understanding of their vessel's surroundings, according to Rolls-Royce. This will be achieved by fusing data from a range of sensors with information from existing ship systems; such as Automatic Identification System (AIS) and radar. Data from other sources, including global databases, will also have a role. Rolls-Royce said it expects to be able to undertake an Approval of Concept and have its intelligent awareness product commercially available later in 2017.

Marlink Acquires Palantir

Marlink has acquired Palantir AS, a Norway-based maritime IT company specializing in remote IT management solutions. The Share Purchase Agreement whereby Marlink acquired 100 percent of Palantir AS shares was completed on March 17, 2017.

Tradewinds Towing Returns to Laborde for Repowers

In September of 2006, Dominique Smith of the then one tug company Tradewinds Towing came to Laborde Products, to look at the S12R engine for the repower of the Miss Lis, an Alaskan built low profile tug he planned on repowering. Later that same month, the deal was made, and shortly thereafter, the Miss Lis set sail with new Mitsubishi engines and Reintjes transmissions supplied by Laborde Products. Since then, the engines have logged over 30,000 hours travelling throughout North, Central and South America. Fast forward 10 years, and Smith has again come to Laborde Products looking for the Mitsubishi S12R to repower two sister built tugs he recently purchased to be employed on a long term charter. The addition of the two new tugs will now bring the Tradewinds Towing fleet to seven vessels. The Rebekah and Hannah, ex Benjamin Foss and David Foss were built in 1980 at Main Iron Works and both are 80 x 26 ft. Originally built with CAT D398 engines, both tugs will be fitted with fully mechanical, EPA Tier 3 Mitsubishi S12R-Y3MPTAW-4 rated 1,100HP at 1,600RPM, along with Reintjes WAF 562 transmissions.

MARITIME REPORTER AND ENGINEERING NEWS

2017 EDITORIAL CALENDAR

JANUARY

AD CLOSE: DEC 21

The Ship Repair & Conversion Edition

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

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

FEBRUARY

AD CLOSE: JAN 24

The Cruise Industry Edition

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

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

MARCH

AD CLOSE: FEB 21

The Green Marine Technology Edition

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

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

APRIL

AD CLOSE: MAR 21

The Offshore Annual

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

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

MAY

AD CLOSE: APR 21

The Marine Propulsion Edition

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

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

JUNE

AD CLOSE: MAY 24

The Annual World Yearbook

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

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

2017 EDITORIAL CALENDAR

MARITIME REPORTER AND ENGINEERING NEWS

JULY

AD CLOSE: JUN 23

The Marine Communications Edition

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

AUGUST

AD CLOSE: JUL 25

The Shipyard Edition

Market: Shipbuilding: The World Report
Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan
Product: Ballast Water Technologies
Design: Icebreakers
Roundtable: Big Data
Special Report: Cruising Europe
Region Report: Russia

BONUS DISTRIBUTION:
Seatrade Europe: Sep 6-8, Hamburg, Germany
NEVA 2017: Sep 19-22, St. Petersburg, Russia
Offshore Marine & Workboats: Sep 25-27 Abu Dhabi, UAE

SEPTEMBER

AD CLOSE: AUG 24

Maritime Port & Ship Security Edition

Market: U.S. Navy Quarterly
Technical: Drones
Product: Clean Water Technologies
Design: Interior Design: Onboard Amenities
Roundtable: Environmental
Special Report: Offshore Deepwater: Structures & Systems
Region Report: Denmark

BONUS DISTRIBUTION:
Shipping Insight
Danish Maritime Days: Copenhagen, Denmark
OTC Brazil: Oct 24-26, Rio de Janeiro, Brazil
KORMARINE: Oct 24-27, Busan, Korea

OCTOBER

AD CLOSE: SEP 22

The Marine Design Annual

Market: Fishing Vessel Quarterly
Technical: Marine Firefighting, Safety & Salvage
Product: Software Solutions: CAD/CAM
Design: Naval Architecture & Marine Engineering
Roundtable: Ship Classification Societies
Special Report: Propulsion, Thrusters & Gears
Region Report: The Netherlands

BONUS DISTRIBUTION:
SNAME: Oct 23-28, Houston, TX
Europort: Nov 7- 10, Rotterdam, Netherlands
Marintec China: Dec 5-8, Shanghai, China

NOVEMBER

AD CLOSE: OCT 25

The Workboat Edition

Market: Shipbuilding: Workboats
Technical: Alternative Marine Fuels
Design: Offshore Wind Power
Roundtable: Marine Coatings & Rust Control
Special Report: Top 50 Marine Equipment Distributors
Product: Deck Machinery, Winches & Ropes
Region Report: U.S.A.

BONUS DISTRIBUTION:
Workboat Show: Nov, New Orleans, LA
Interferry 2017: Split, Croatia
Clean Gulf: Dec 4-7, Houston, TX

DECEMBER

AD CLOSE: NOV 22

The Great Ships of 2017

Market: U.S. Navy Quarterly
Technical: The Autonomous Ship
Design: Marine Engine Guide (MaritimePropulsion.com)
Roundtable: Ship Registries
Special Report: Prolific Ship Owners & Buyers
Product: Welding & Cutting Equipment

BONUS DISTRIBUTION:
Surface Navy Association 2018: Jan 2018, Crystal City, VA

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