

April 2016

MARITIME REPORTER AND ENGINEERING NEWS

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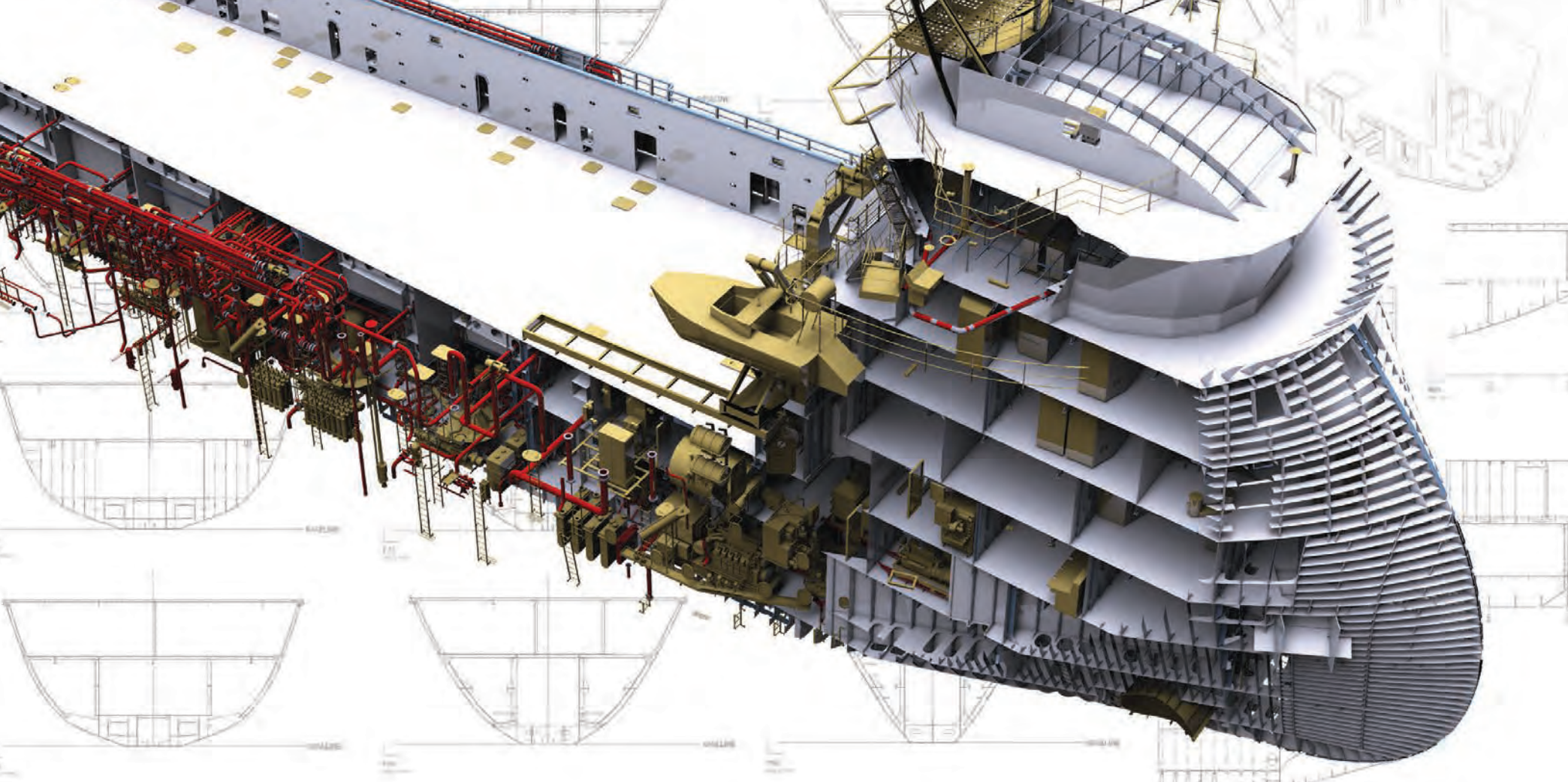
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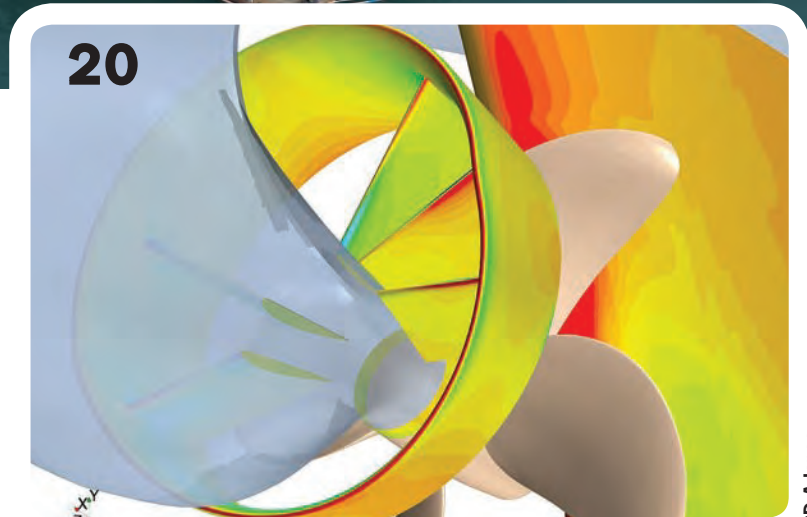
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THE COVER

Finland Breaks the Ice

Arctech delivered Baltic icebreaker Murmansk to the Russian Ministry of Transport in December 2015. Due for delivery in Q2 2016 is Finland's new icebreaker Polaris is the world's first to feature dual fuel liquified natural gas (LNG) and diesel propulsion, earning the icebreaking vessel designations as the Finland's most powerful and the world's greenest.

(Photo: Arctech Helsinki Shipyard)



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LNG Breakthrough

Finland has long been regarded as a hotbed of maritime innovation, particularly in matters regarding ice. POLARIS singularly ties is maritime and Arctic heritage together in one neat package.

By Eric Haun



Airswift



Becker



Photo: Bouchard Transportation Co.

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William Stoichevski

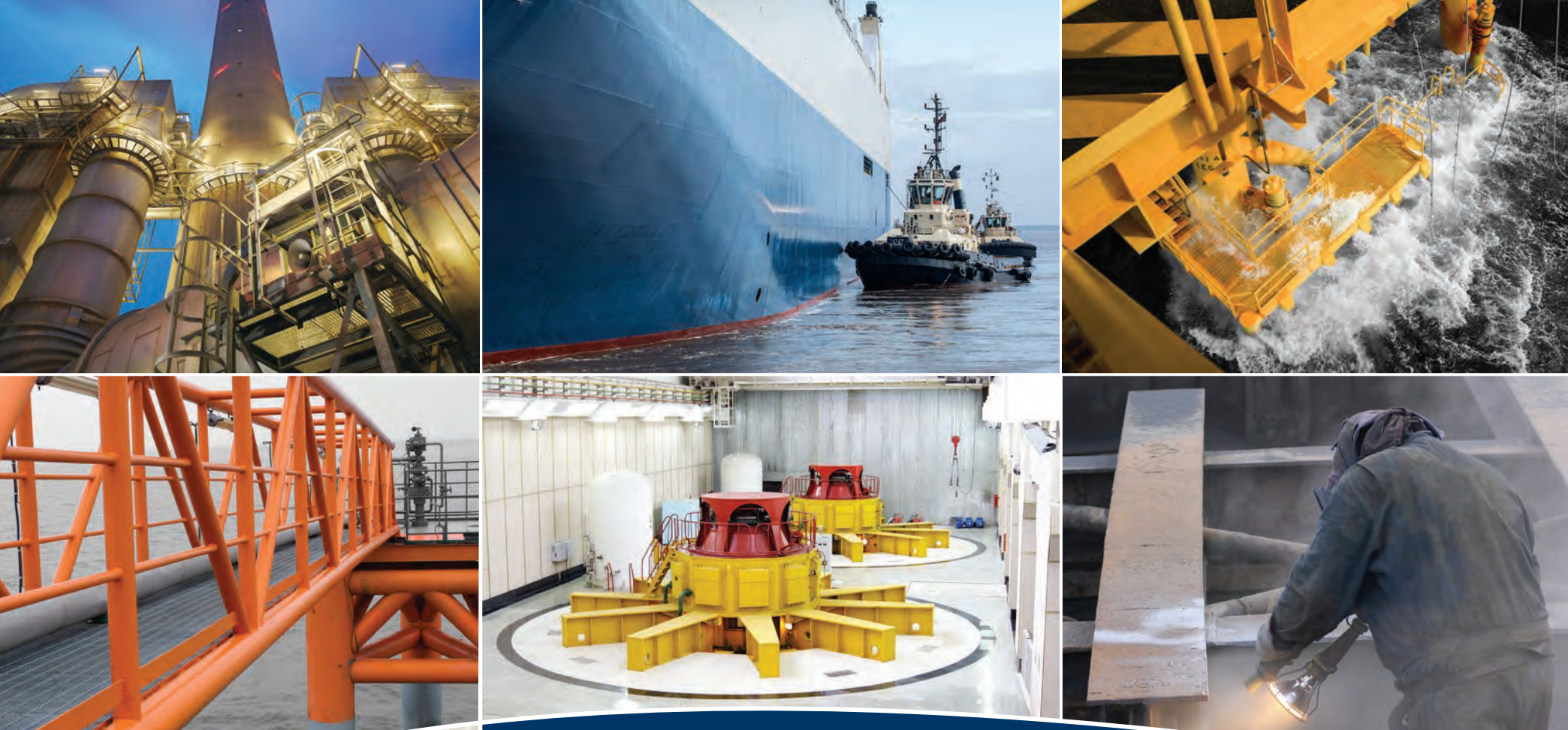
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Seaperch The Future is Now

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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

While the continued low pricing of energy deeply impacts the collective maritime and energy markets, and I refuse to hazard a guess as to when the price of oil will stabilize and return to steady growth, the current down cycle gripping the market can perhaps be seen as a ‘glass half full’ ... if you look really, really hard. The breadth and depth of pain is undeniable, particularly the human toll of the many that have lost their jobs.

Many of the larger, long-term players in the market are using current market conditions to hit the reset button, and as we have seen in down markets past, there is a proliferation of technology and technique providers coming out of the woodwork proposing system and solutions that purport to streamline the multiple process inherent in the discovery and recovery of energy in the offshore sector, helping to make companies, leaner, meaner and positioned to prosper when the rebound hits.

Kicking off our offshore coverage is an interview on Energy Employment with Peter Searle, CEO of Airswift Holdings Ltd. Searle leads this \$1.2B turnover company and is well versed in all matters recruitment. He, and many throughout the industry, are sounding the warning bells long, loud and often to avoid mistakes of the past, namely the dreaded “Brain Drain” common with an industry sector collapses and employees on the street are forced to find paychecks in other fields, perhaps never to return. A delicate balance for sure, but one that must be struck.

We welcome to our pages again a familiar face, Jim McCaul of IMA/World Energy Reports, for his insights and updates on the Floating Production System market. It is no secret the deepwater offshore is one of the more costly means to find and recover oil and the market downturn coupled with the implosion of Petrobras – a major global player in the floater market – have conspired to change the complexion of this industry almost overnight. But while the outlook is foggy, it is far from black. The market will change, evolve and survive, and McCaul offers insights on the “6 Things You Need to Know Now.”

Last month our man in London, Tom Mulligan, was afforded the opportunity to attend a conference entitled “Disruptive Sustainability.” When the topic first crossed my desk, my response was, in not so many words, “what in the world is ‘disruptive sustainability?’” As Mulligan found and reports, the issues of disruptive sustainability is deep, broad and important throughout the maritime world, and while it may not have direct impact on your business in 2016, you can bet it will in the coming 5 to 10 years. A group of influential maritime leaders weigh in via Mulligan’s report, which starts on page 66.

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A Vessel Owner Dilemma During This Uncertain Time

Ballast Water Regulations are causing a great deal of vessel owner confusion



By Steve Candito

IMO Ballast Water (BW) regulations have been pending for 12 years. In the U.S., it's been over four years since the U.S. Coast Guard (USCG) regulations were passed, but even the USCG regulations are not fully implemented. These delays confirm BW Treatment and BW regulatory compliance is complex. Upon full implementation of the BW regulations, compliance will be achieved by using a treatment system or approved alternative and increased record keeping – some of which is appropriate today.

Background

Over this 12 years 60 different Ballast Water Treatment Systems (BWTS) have entered the market, which has led to high pressure sales and significant confusion. Unfortunately, BWT is expensive, complex and does very little, if anything to improve vessel operations. For many, the issue has become tiresome.

Implementation Dates Likely in 2016

It is likely the IMO Convention will be ratified during or before MEPC 70 in October 2016. Ratification appears likely because 30 countries with 35 percent of the world's Gross Registered Tonnage (GRT) are required for passage and 49 countries comprising 34.8 percent GRT have already ratified the Convention. It also appears a BWTS will be approved by the USCG in Q2 or Q3 2016. Implementation of the IMO and USCG regulations places every vessel on a timetable for compliance. The fact USCG approval of a BWTS will come four years after US regulations were published and 12 years after IMO regulations were finalized, is a clear indication that choosing and installing a reliable BWTS will be a complex and difficult endeavor.

What is Required Now?

For most vessels, nothing. However, doing nothing is likely a costly option, in dollars and operational flexibility. Once ratified every vessel is on a timetable for com-

pliance. Delayed IMO ratification has effectively compressed the compliance schedule for 35,000+ vessels. A compliance schedule planned for 12+ years is now 6+ years. The USCG extension program is complex and will be even more of a challenge once a certified BWTS is available. Although the USCG offered guidance in its Marine Safety Information Bulletin (MSIB) No. 13-15, issued October 20, 2015, the process is not clear. The MSIB 13-15 notes extensions will be granted to the vessel's next scheduled drydocking, after the vessel's required implementation date. Further, the vessel's first scheduled drydocking date will be determined based on when the vessel enters the drydock. Existing extensions with a January 1 date will not be re-issued. The change will be made when a vessel applies for a supplemental extension. Supplemental extensions are required (i.e. there will be no blanket extension). The process is further complicated by the fact that the EPA does not know if its "low enforcement priority" will remain an unchallenged practice.

Solution

Many owners have completed some BWT planning, some have already installed BWTS – some have installed systems and already removed them because they failed, other BWTS will follow – a high price to pay for an owner being proactive. With every vessel on a known compliance timetable, a complex BWTS has to be selected and installed timely and cost effectively. The system will be chosen from a limited set of credible BWTS manufacturers and engineering/ installation resources. The regulatory landscape is established. The tools for compliance are available. Planning for effective economic operationally compatible compliance should be started now to:

1. **Determine which type of BWTS is best for your vessels**
2. **Ensure there is sufficient space to install the selected BWTS**

3. **Establish engineering and installation resources**
4. **Request an extension from the USCG**
5. **Request the issuance of a new MARPOL Annex 1 IOPP Certificate, and**
6. **When available, purchase a USCG approved BWTS that meets the parameters identified for your vessels.**

Posted on MaritimeProfessional.com to Ballast Water Regulations Blog by Steve Candito on April 1, 2016



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Steven Candito is Founder, President and CEO of Foresea. Foresea provides various advisory services including strategic planning, regulatory compliance and crisis management to the maritime and environmental communities. Previously, Candito was President and CEO of NRC. During his over 20 years career with NRC he grew the business from a start up to the leading global emergency response and environmental services firm. Candito has also served as a marine engineer aboard Exxon USA's domestic tanker fleet from 1980 to 1985. Candito is a graduate of Hofstra University School of Law and the United States Merchant Marine Academy. Candito is also a past President of the Spill Control Association of American (SCAA)



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Verified Gross Mass

New rule enters force July 1, 2016



DENNIS BRYANT

The requirement that shippers of marine containers in international commerce provide the carrier with the verified gross mass of each container prior to loading enters into effect on July 1, 2016. Some shippers are asking that the effective date be delayed or that the requirement be repealed or, at least, not enforced. These shippers seem to be arguing that the requirement has caught them by surprise and that it is unnecessary.

Development of the so-called container revolution greatly increased the speed and efficiency with which cargoes could be transported, particularly in the marine environment. Someone acting on behalf of the shipper ‘stuffs’ a container, fills out the necessary paperwork showing the nature of the cargo, its weight or mass, the sender, the receiver, the destination, and other details. The container and the paperwork are then provided to the carrier, who assumes responsibility for getting the container to its destination (or at least the port of disembarkation).

This efficiency sacrificed two important items: the actual nature of the cargo and the actual weight of the cargo. To accommodate the speed required by the modern maritime transportation network, the carrier took the shipper at his word that the cargo was that shown on the manifest and that the mass of the container was also as shown. There have been a number of incidents where containerized cargoes listed as non-hazardous have been found to be hazardous, presenting unexpected dangers to the crew of the container ship, the ship itself, salvors, and the marine environment.

In addition, there have been numerous incidents where the actual mass of a container has far exceeded the mass declared by the shipper in the paperwork provided to the carrier. Since the cost charged by a carrier to transport a container is largely based on the size of the container (not its mass) and because the container vessel trade is highly competitive, carriers have generally turned a blind eye to this latter issue.

Loading a container where there is a significant disparity between the declared mass and the actual mass can be fraught with danger. Ideally, heavy containers should be placed low in the hold and distributed so as not to put excess stress on the hull. Heavy containers should not be placed atop light ones and should not be placed outboard, where lateral stresses experienced in a seaway are greatest. The ship (generally the chief mate) makes stowage decisions based in large part on the information provided by the shipper. Like misdeclared hazardous cargo, misdeclared mass can place the crew, the ship, and others at unnecessary risk.

- On 11 June 2011, the container ship DENEBA, while loading containers at the port of Algeciras, listed heavily to port, coming to rest at an angle of 50° against the pier. Investigation by the Spanish Standing Commission for Marine Accident and Incident Investigations found that the excessive listing and near-cap-sizing of the vessel was due in part to the fact that the weights declared for many of the containers were much lower than the actual weights.

- On 27 January 2006, during heavy weather in the North Atlantic, the container ship P&O NEDLLOYD GENOA incurred the loss of 27 containers overboard and the collapse of 28 other containers. Subsequent investigation revealed that two of the damaged containers were significantly over their declared weight. The UK Marine Accident Investigation Branch (MAIB) noted that no mechanism existed for verifying declared container weights.

- On 18 January 2007, during heavy weather in the English Channel, the container ship MSC NAPOLI broke its back. Taken under tow, the ship was intentionally grounded in Branscombe Bay, Devon, UK. During the complex salvage operation that followed, 660 containers that had been stowed on deck and remained dry were weighted. The weights of 137 of those containers (20.8%) were each more than three tonnes greater than their

declared weights. The largest single difference was 20 tonnes and the total weight of the 137 misdeclared containers was 312 tonnes heavier than on the cargo manifest. The MAIB investigation went on to state:

This discrepancy is widespread within the container ship industry and is due to many packers and shippers not having the facilities to weigh containers on their premises. It is also due to shippers deliberately under-declaring containers' weights in order to: minimize import taxes calculated on cargo weight; allow the over-loading of containers; and to keep the declared weight within limits imposed by road or rail transportation.

The container ship sector has been complaining about under-declared container weights for years. It has prepared and distributed to shippers guidance on how to determine the weight of containers, either by actually weighting stuffed containers or by exercising more care in calculating the weight of cargo placed into a container. These efforts have been unsuccessful. In recent years, the sector (with assistance and support from other, larger carrier groups) has taken the problem to the IMO. After several years of study, a correspondence group of the IMO Sub-committee on Dangerous Goods, Solid Cargoes and Containers (DSC) in 2013 recommended that the International Convention for the Safety of Life at Sea (SOLAS Convention) be amended to include provision for mandatory verification of the gross mass of packed containers. After deliberation, DSC approved the recommendation and forwarded it to the Maritime Safety Committee (MSC) for consideration.

On 30 May 2014, the 93rd Session of the MSC approved a proposed amendment to the SOLAS Convention to make verification of the gross mass of containers mandatory prior to loading of the containers on ships engaged on international voyages subject to the Conven-

tion. This was followed shortly by the issuance on 9 June 2014 of guidelines regarding the determination of the verified gross mass of a container carrying cargo (MSC.1/Circ.1475). On 21 November 2014, the 94th Session of the MSC formally adopted the SOLAS amendment [Resolution MSC.380(94)] and, under the tacit approval process, provided for an effective date of 1 July 2016 so as to give all stakeholders sufficient time for implementation.

There are several process issues that remain unresolved. These involve the actual calculation of the mass of individual containers, the recordation of that mass, and the transmission of that calculation to the ship master. Uniformity may not be desired or even possible, but procedures must be developed. There is also the question of identifying the ‘shipper’ of a particular container. In many cases this will be obvious, but in other instances as where cargoes are aggregated, less so. Finally, there is the question of who will pay the added costs.

In recent months a shipper group has vocally complained about the upcoming requirement. Arguments have been brought forth that this world-wide requirement will cause a significant competitive disadvantage to US exports; that the process does not account for container or weight variance; and that it imposes new costs on all participants in US export supply. A shipper position paper also states: “The amendment was created as a response to claims that there have been incidents of damage caused by overweight containers, although the International Maritime Organization’s SOLAS committee (sic) did not reference any instance where a ship had been damaged or sunk exclusively due to overweight under (sic) reported containers (emphasis added).” We don’t stop making incremental improvements to highway safety just because each individual improvement won’t prevent all accidents!

There have been assertions (with some degree of validity) that the IMO and the

SOLAS Convention lack the authority to impose conditions on shippers of cargoes in international commerce. This ignores the reality that a carrier that loads a container for carriage in international commerce where a verified gross mass of the container has not been provided will be in violation of the SOLAS Convention. Since substantial compliance with applicable conventions is a standard condition of marine insurance, a carrier that does not require documentation of the verified gross mass runs the risk of loss of insurance coverage.

As with any change, there will be a certain amount of confusion and misunderstanding initially. Soon though, providing the verified gross mass of containers will be the new normal.

The Author

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New SOLAS Compliant Container Weighing System

In response to the new SOLAS regulations due to enter force on July 1, 2016, LCM Systems launched a new SOLAS compliant container weighing system.

The company has been supplying container weighing systems for about five years. It designed what it believes is a flexible modular system that can be easily and quickly retrofitted onto straddle carriers, container cranes and telehandlers.

The new system verifies the container weight in real-time to an accuracy of 1% of rated load, although higher accuracies can be achieved with on-site calibration and by using the built-in linearization facility. The standard package is a complete stand-alone system that comprises of four load measuring pins that replace existing load bearing pins on the spreader block, an interface module and a ruggedized 8-in. tablet. Pre-wired cable assemblies are supplied for system connection, which allows installation to be carried out by untrained personnel as no wiring is required. This also reduces installation time and consequently equipment downtime, as well as facilitates fast and simple replacement of cables in the event of any becoming damaged.

The ruggedized tablet displays the load on each twistlock



and the percentage of the overall weight it is carrying. This allows for the detection of possible damage to twistlocks due to overloading or unequal weight distribution during container engagement and lifting. Also displayed is the combined weight on all four twistlocks. There is a tare function and the facility to enter container numbers and generate reports. A calibration button on the main screen takes you to a new

display screen that enables on-site calibration for optimal accuracy. The tablet is rated to IP67 and drop tested to 1.2m, making it suitable for harsh port environments.

The system can be tailored to meet the specific needs of each individual port. In addition to the standard package a system is available that can be fully integrated into the port Terminal Operating System (TOS) that offers flexibility in terms of data output and data provision. Other types of load cell systems are also available, including annular load cells that are placed around the twistlock assembly or arrangements that utilize the twistlock by turning it into a load measurement device in its own right. Wireless options are also available.

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Energy Employment

The big picture for 2016 & beyond



P*eter Searle is CEO of Airswift Holdings Limited, a firm created by the merger of Air Energi Group Limited and Swift Worldwide Resources Limited, a \$1.2B turnover company specializing in global workforce solutions for the energy, process and infrastructure industries. Airswift brings together two of the world's leading names in energy recruitment. Searle, the former chief executive of Adecco in the UK and Ireland, brings more than 28 years' experience in the global recruitment sector. Searle's firm will have a total of 57 operating locations, employ more than 800 people globally and manage a deployed workforce exceeding 6,000 worldwide. Airswift will have three corporate hubs in Manchester, UK, Houston, US and Singapore. In this edition of Maritime Reporter & Engineering News, Searle weighs in on the current state of energy employment, its future and also provides insight on today's energy business and where it could be headed next.*

Give us your broad assessment of the state of the energy business today.

The oil and gas industry can be incredibly volatile and the latest move by Saudi Arabia, Russia and Venezuela to cap production demonstrates how much the world's oil producing nations are suffering. The impact of the oil price has been felt globally, with major project cancellations, rate cuts and redundancies throughout the sector. However, this has led to an increased focus on other areas of the project life cycle, such as decommissioning, which will create new opportunities. Downstream, we have seen a surge in onshore oil refinery development as companies seek to take advantage of the high margin environment.

Energy faces big challenges this year – arguably as big (or bigger) than that which occurred in 2008. What's your assessment of the industry's prospects

for recovery in the coming months?

Currently the industry's priorities are around reducing costs and improving operational efficiencies for existing assets. At the point when the oil price recovers to around \$50-\$60, we anticipate this will trigger the sanctioning of a number of new projects. However, if we remain in this 'lower for longer' environment for a sustained period of time, then the estimated \$400bn of cancelled or delayed projects will remain on the shelf for the foreseeable future. We can also expect to see a rise in M&A activity, insolvencies and a general rout in the industry.

In the mid-1980's – the energy industry faced the same sort of issues that it is tackling now. Tens of thousands of good employees left the business and never came back. That brain drain arguably plagues the industry to-

day. But, what can we do to avoid the mistakes made back then, as we look ahead to better times to come?

A recent report by DNV GL (see related story on page 36 of this edition) suggests that companies which carefully manage costs in the boom time are in a stronger position to retain their staff in the downtime, but the reality is that these organizations are in a minority. Globally, the majority of oil and gas companies are reducing their headcount across the board (Airswift estimates around 250,000 worldwide) as well as cutting pay rates. As a result, we have seen a major shift from a candidate-led to a client-led market. Prior to the downturn it was difficult for companies to find and retain top talent but as the price of oil declined, more talent became available. However, we predict that – pending a recovery – this balance will tip very quickly in the other direction and the tal-

ent shortage will resume. There is a risk that this issue will be further intensified because individuals currently seeking jobs are turning to other, related industries that offer more stability. For example, project management and engineering talent is moving into other industries including mining, nuclear, renewables, downstream, chemicals and infrastructure. This could result in an even more pronounced, long-term talent shortage if a significant percentage of the workforce exits the industry permanently. To mitigate this risk, companies across the board need to improve their retention strategies. For example, by offering flexi-time and additional benefits to keep talent engaged. In terms of surviving the downturn, companies should prioritise the retention of their top performers, as they will need them when the inevitable recovery occurs. This is also crucial to ensure that companies have the right



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At the point when the oil price recovers to around \$50-\$60, we anticipate this will trigger the sanctioning of a number of new projects. However, if we remain in this 'lower for longer' environment for a sustained period of time, then the estimated \$400bn of cancelled or delayed projects will remain on the shelf for the foreseeable future.

resources in place to train the next generation of talent and ensure knowledge transfer. Skills and talent will always be a critical enabler for organizations looking to succeed in the industry.

Arguably, energy is today facing 'the perfect storm' in terms of internal expertise: a rapidly greying management workforce, a soft middle management group not quite ready to take the reins and the added peril of still deeper talent losses from those who get laid off now, and are reluctant to come back when oil bottoms and heads up again. Where can firms like yours be of service in solving these complex issues?

The breadth of Airswift's global operations and the depth of our talent pool mean we can mobilize, extend or adjust workforce solutions quickly and efficiently so our clients get the people and service they need whenever and wherever they need them. We stay ahead of the curve so our clients can deliver new strategies, launch new services, streamline their cost structures, and re-

main competitive. This focus on innovation means that whatever hurdles our clients face, we can develop the solution to meet them. Airswift has the economies of scale and the global reach to create and deliver workforce solutions for clients looking to enhance operational efficiency, reduce costs or grow their business.

What is the biggest challenge facing the energy business right now and more importantly, what can industry do to meet that challenge?

The biggest challenge facing companies today is reducing costs while retaining talent. We believe that there is still considerable scope for cost reduction and that the impact of cost reduction initiatives is still to be felt at the bottom line.

Is insurance – specifically medical and health – becoming a bigger headache for employers in the energy sector? If so, what can be done to simplify those issues for everyone – employees and

employers alike?

We benchmark and review our health insurance cover annually and believe ours is among the best in the marketplace. It is incredibly easy to use and individuals can submit claims and recover costs directly from a smartphone. But the main attraction for our contract workforce is the ability to join without having to declare pre-existing conditions. This simply means that contractors can join our organization without headaches about their medical history. If this approach was replicated across the energy industry, then it would increase the general mobility of workers worldwide.

Some human resource (HR) experts say that the key to successful, future energy employment is to increase the use of so-called 'contract talent' as opposed to full-time, salaried workers. What is your take on that strategy? Does the 'contract formula' work well for labor? Will (have) they embraced the concept?

Airswift currently manages a deployed workforce of over 6,000 contractors worldwide. Sourcing, placing and mobilizing contract talent is a significant part of what we do and this model is particularly suited to project-based industries, such as oil and gas. We have created a mechanism to engage a wholly flexible yet committed workforce that is accountable for performance and receives support in the form of training and mentoring.

It is indeed a rapidly changing business climate. You say that Airswift's size and global reach will allow flexibility to "scale workforce solutions as clients' needs evolve." Give us a few garden variety examples of these 'workforce solutions' as they relate to today's energy situation.

In this rapidly changing business climate, we are continually looking for new ways to respond to workforce challenges. Airswift's services range from filling a single permanent role or mobilizing a contingent workforce for a particular project, to handling the entire recruitment process. Whatever our clients' workforce needs, we have the solution to support them. We work closely with clients to help develop their workforce strategies. From finding the right candidates for short-term projects to advising on long-term recruitment requirements, our focus is on enhancing clients' long-term financial and operational positions.

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Energy



Process



Infrastructure

The Author

Peter Searle, CEO of Airswift, one of the world's biggest companies involved with global energy workforce solutions and talent acquisition, weighs in on the current and future energy employment situation.





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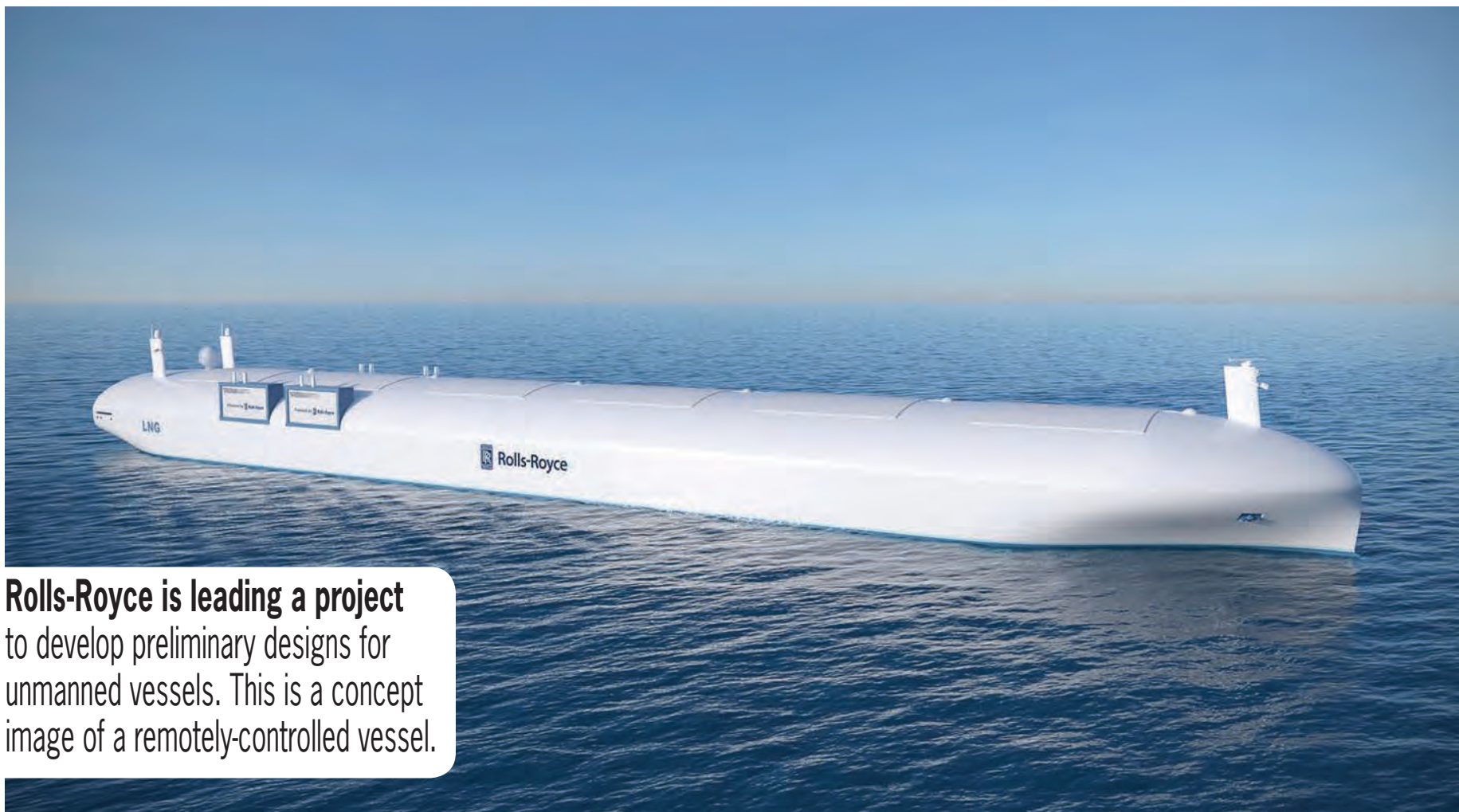
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Rolls-Royce is leading a project to develop preliminary designs for unmanned vessels. This is a concept image of a remotely-controlled vessel.

(Image: Rolls-Royce)

Unmanned Transport

Researchers Explore the Future



YVONNE KOLDENHOF

With an increasing interest in the possibility of autonomous sailing ships, several initiatives are underway. MARIN is carrying out unmanned ship simulations with the help of the Automatic Identification System (AIS).

Today it is common to use the cruise control of your car when driving along the highway and there are even cars that can park themselves. In the aviation industry the introduction and further development of drones has made unmanned flying possible. But what about the shipping industry? Over the last few years there have been a number of initiatives concerning autonomous or unmanned ships. Those of Rolls-Royce, the Mayflower Autonomous Research Ship, Autonomous Work Boat and the

Unmanned Surface Vessel are just a few examples.

Combined Roadmap

And because there are many common factors involved in autonomous driving, flying and sailing regarding the technology, regulations, acceptance, human factors and certification, a project was launched in early 2015 to explore these similarities. The project is funded by the Dutch government and is designed to stimulate cooperation and knowledge sharing between three leading research institutes: MARIN, the National Aerospace Laboratory (NLR) and the Netherlands Organisation for Applied Scientific Research (TNO). This cooperation will lead to a combined roadmap of autonomous transport, including an overview

of expertise and developments for the different modalities.

Unmanned Ship Simulation

As well as this, MARIN is currently carrying out research simulating an unmanned ship sailing in an AIS-based traffic situation. In order to do this, MARIN will use its existing real-time, DOLPHIN simulation technology and implement a new tool to read AIS data, simulate this large number of ships and develop an auto-captain. The real-time dynamic risk index, which has been developed by MARIN and will soon be part of DOLPHIN, monitors the nautical safety of all ships with a focus on the unmanned ship. The simulated, unmanned ship will navigate according to the International Regulations for Preventing

Collisions at Sea (COLREGS). In more complex situations the auto-captain may use a dedicated decision support tool to find a more efficient solution to pass safely. This approach will be analysed and improved using the real-time dynamic risk index.

The Author

Yvonne Koldenhof is Senior Project Manager at the Nautical Center of MARIN, the Maritime Research Institute Netherlands. MARIN offers simulation, model testing, full-scale measurements and training programs, to the shipbuilding and offshore industry and governments.

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The Becker Mewis Duct

Designed with STAR-CCM+

(Image: Becker)

Energy saving devices offer fuel savings of hundreds of thousands per year to owner/operators. We talk to IBMV's Steve Leonard who explains how STAR-CCM+ allows Becker Marine to guarantee those savings across a range of vessels.

BY STEPHEN FERGUSON, CD-ADAPCO

The single biggest concern facing ship builders and operators is that of energy efficiency, both in terms of reducing the operating cost of vessels, and in meeting legislative standards on CO₂ and NO_x emissions. To a certain extent, these fuel savings can be achieved using modern, efficient hull designs that direct the flow smoothly around the vessel and into the propeller. However, most of the world's commercial trade shipping is dominated by older vessels that were designed without the benefit of modern tools such as Computational Fluid Dynamics (CFD) and Design Exploration.

In order to obtain a desirable level of fuel economy and reduced emissions, ship owners and operators often choose to fit Energy Saving Devices (ESDs) to their vessels. ESDs are most commonly stationary flow directing devices that are positioned near the propeller, either ahead of the propeller, fixed to the ship's hull, or behind, fixed either to the rudder or the propeller itself.

Experience has also shown that even the most recent hull designs show significant potential for improving the power-

ing performance by fitting ESDs.

Arguably one of the most successful ESD currently in operation is the Becker Mewis Duct, a novel power-saving device which has been developed initially for full-form slower ships that allows either significant fuel savings at a given speed or alternatively for the vessel to travel faster for a given power level.

The Becker Mewis Duct

At first glance, the Becker Mewis Duct is a relatively simple piece of equipment, consisting of a duct containing a number of integrated angled fins. The main benefit of the duct is that it produces a net forward thrust, as well as straightening and accelerating the hull's wake into the propeller. The fin system introduces a pre-swirl to the ship's wake which reduces losses in the propeller slipstream, resulting in an increase in propeller thrust at a given propulsive power. Both effects contribute to each other. However, in order to function correctly, both the duct section properties and the orientation and design of each of the fins has to be specifically optimized for each new hull form in order to improve the wake

flow from the hull.

In simple terms, this can be described as "something for nothing"; the Becker Mewis Duct harnesses energy contained in the frictional boundary layer of the hull and uses it to increase the overall hydrodynamic efficiency of the vessel. The power savings that can be achieved from the Becker Mewis Duct largely depend on the hull block coefficient and propeller's thrust loading. Typically, power savings in the range of 3% for multi-purpose ships, up to 8% for tankers and bulk carriers can be expected. Fuel savings are on average 5-6% rising up to 8% in combination with a Becker Rudder. The savings in fuel/power that can be achieved are independent of the draft of the ship and her speed. NO_x and CO₂ emissions are also reduced.

Such is Becker Marine's confidence in the duct that they are prepared to offer a full refund on any device that does not deliver pre-agreed fuel savings during model testing. With this sort of guaranteed performance, investing in a Becker Mewis Duct is a low-risk investment for most ship owners and operators, as return on investment is typically achieved

within a year of installation, and is certainly much cheaper than investing in a new 'eco-ship.'

This has proved to be an excellent business model for Becker Marine Systems who, since the product was launched in 2008, have now installed over 1,000 of the devices.

Designed with STAR-CCM+

Steve Leonard is the Head of Research & Development at IBMV who are a wholly owned subsidiary of Becker Marine Systems, tasked with developing, engineering and launching innovative technological solutions into the maritime market. Leonard and his team performed the CFD calculations for the first Becker Mewis Duct in 2008, and have subsequently developed a process which employs 13 engineers and naval architects, delivering 100s of ducts per year. "The success of the Becker Mewis Duct depends almost entirely on the CFD process that we use to define it," said Leonard. "Without accurate CFD simulations, we wouldn't be able to tune each duct to the specific flow conditions generated around each hull. Although there are



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Figure 1

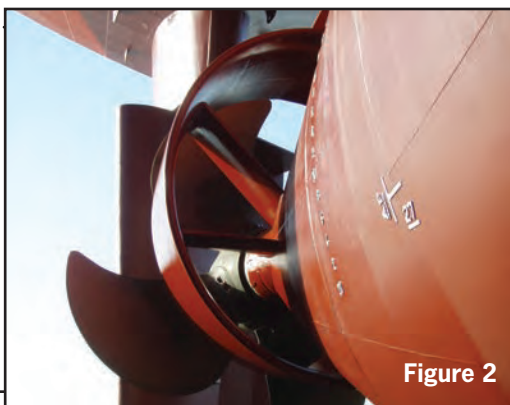


Figure 2

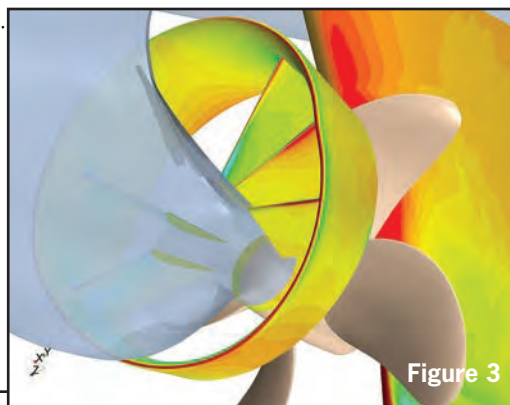


Figure 3

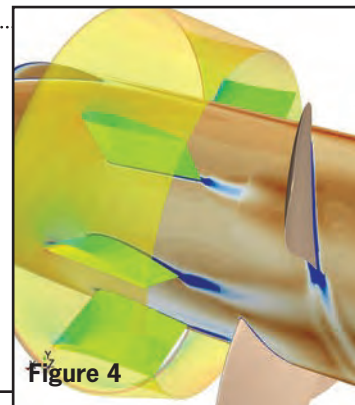


Figure 4

Figure 1: The installation of a Becker Mewis Duct.

Figure 2: Becker Mewis Duct, Bow Flora, 37,000 dwt chemical tanker from Odfjell.

Figure 3: Dynamics pressure distribution on the duct and rudder.

Figure 4: Vorticity magnitude on a cylinder section inside the duct showing the effect of the rotating propeller.

Figure 5: Nominal wake behind the duct colored by axial (longitudinal) component of velocity.

(All images courtesy CD Adapco)

similarities, the duct that we design for each vessel is absolutely unique and a result of the careful tuning of over 40 design parameters. No two are ever alike.”

Not only does Leonard’s team have to deliver guaranteed energy savings they also have to deliver them within a strict timescale. “From the moment we receive a new order, we have typically six weeks to find the required energy savings,” says Leonard. “This timescale is strictly fixed, by the fact that the towing tank slot is reserved well in advance and cannot be moved. If we can’t improve the energy efficiency of a given vessel within that time, then we’ve basically failed. There are no second chances.”

The marine industry tends to be conservative, and self-propulsion tests remain the benchmark for proving the powering performance of vessels for most shipbuilding contracts. Few customers are even aware of the intensive CFD effort that goes into designing and tuning their Becker Mewis Duct, concentrating only on the final fuel savings demonstrated during model testing. Any variation between CFD and towing tank predictions is investigated thoroughly using further CFD calculations.

The vast majority of CFD calculations are performed at model scale. To verify that scaling effects do not have a significant influence and also ensure good

cavitation performance, the IBMV team runs a series of final full scale calculations. Although this problem seems well suited for an automated “optimization” process, in which a computer algorithm chooses the next design configuration (rather than an actual human), based on the parametric exploration of previous iterations, the Becker Mewis Duct does not lend itself easily to automated design exploration.

The reason for this, Leonard explains, is that it is almost impossible to reduce the flow around the duct to a handful of numerical parameters that could be used to fully define the next design iteration. Instead, Leonard relies on a team of ex-



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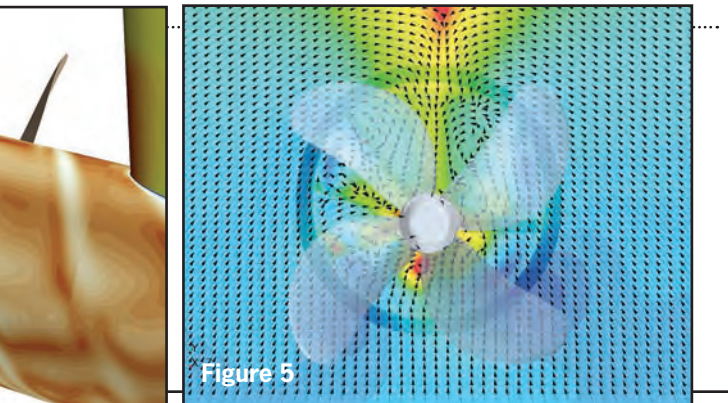


Figure 5

The Becker Mewis Duct

The Becker Mewis Duct was first introduced in September 2008. The first full-scale installation was completed on the 54,000 dwt multi-purpose carrier STAR ISTIND of the Grieg Shipping Group, Bergen, Norway in September 2009. **The estimated power saving for that ship is about 6%.** The AS Valeria, a 57,000 dwt bulk carrier, achieved fuel savings of 5% (predicted by CFD and confirmed in sea trials) resulting in the reduction of 1,002 tons of CO2 per year. A vessel of 55,000 dwt will use about 160 tons of fuel per day at normal cruising speed. Over the course of a year, a 5% improvement in fuel consumption would save over 2,000 tons of fuel over.

perienced Naval Architects and Hydrodynamicists who are tasked with visually inspecting all data that are automatically generated at the end of each STAR-CCM+ simulation, and identifying adverse flow features through the duct, fins and propellers, and suggesting a corrective action for the next iteration.

In most cases, the team is able to obtain optimal energy savings within about 10 design iterations, although some credit here must also go to the experience of Leonard's team, who through the experience of fine-tuning many hundreds of these ducts are able to use their engineering judgement to define an initial design that offers a solid foundation for further improvement. The better designed the hull of the vessel is, the less energy is wasted in the wake, and the harder it is for Leonard's team to obtain big savings.

With some excitement, Leonard fondly recalls the team's solitary "one and done" duct design, in which it was subsequently shown that the initial design iteration delivered the required energy saving without the need for any further optimization. In reality, this is also a victory for the IBMV process, as the initial design was configured by an engineer who used knowledge from the hundreds of previous duct design studies when choosing the design parameters for this particular duct.

The success of IBMV in delivering over 1000 Becker Mewis Ducts demonstrates the value of engineering simulation (and in particular CFD) as a tool in the marine design process, informing decisions, and providing a constant stream of data to improve the real-world performance of vessels. Without intensive design exploration, driven by experienced engineers, it would be impossible for Becker Marine Systems to deliver finely tuned energy saving devices that offer guaranteed performance within a strictly controlled time scale. Not only has this delivered multiple millions of dollars of fuel savings to their customers, but it has also played a significant role in reducing harmful CO2 and NOX for the shipping industry as a whole.



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Matt Granitto

Business Manager, Evoqua Water Technologies



With ambiguous industry legislation around ballast water treatment confusing the issue for ship owners and operators, Matt Granitto, business manager at Evoqua Water Technologies, explains how businesses can best ensure compliance in this area.

Please tell us a bit about yourself and your position with Evoqua.

I've held various technical and management positions throughout my career in sectors including industrial power, automotive and water treatment for both industrial and municipal users. I first became involved with ballast water treatment in 2002 when I collaborated on the design of one of the first ballast water treatment systems (BWTS).

In 2003, I successfully oversaw the installation of that system. Since then, I've been personally involved in more than 25 installations of BWTS on both new-build and retrofit ships. As the chief executive of Hyde Marine, one of the original BWTS companies, I led the organization through the first International Maritime Organization's (IMO) type approval process, which was completed by Lloyd's Register and the British MCA.

I am currently the business manager for Evoqua Water Technologies, with a focus on the company's SeaCURE Ballast Water Management System. In this role, I focus on building the infrastructure necessary to ensure that we can provide our customers with the after-sales support and service they need to ensure compliance for the life of their vessels.

As you know very well, Ballast Water Management technology is a hot topic of discussion. For our readers not in the know, can you explain Evoqua's offering in the BWM niche?

The SeaCURE Ballast Water Management System (BWMS) is a thoroughly tested and field proven system. It has evolved from an existing Evoqua product - the long-established Chloropac Marine Growth Prevention System, which has been servicing needs of the maritime and offshore oil and gas industries for more than 40 years. Electrocatalytic, the Evoqua brand behind the SeaCURE product, is a pioneer in the electrochlorination industry.

During ballast water uptake by the ship owner, the SeaCURE BWMS uses a combination of technologies to achieve the treatment standards. First, the larger organisms are mechanically removed via a highly efficient, self-cleaning filter. After filtration, the water

is treated with sodium hypochlorite, which is produced on-site by our electrolyzer. The electrolyzer uses a small side stream of about 1% of the ballast water flow to generate the sodium hypochlorite.

We offer a dual purpose system, where SeaCURE BWMS can also be used as a marine growth prevention system, saving costs on a second system for this function for the owner or operator.

At the true heart of the system is the electrolyzer cell, where the sodium hypochlorite is produced. We have been producing such items for decades for the marine industry. Our experience allows us to minimize the power usage and the hypochlorite production to meet the incoming water quality conditions.

What approvals, to date, has the Evoqua BWM offering received?

The SeaCURE BWMS has already attained alternate management systems (AMS) acceptance for fresh, brackish and full saline water. Indeed, SeaCURE BWMS was the first electrochlorination system to receive AMS acceptance for all three salinities. The system has also received IMO type approval from German flag state authority BSH Marine, and marine design approval by Lloyds Register.

Evoqua was also the first company to complete low salinity (brackish) water testing in the USA for ballast water management solutions as part of United States Coast Guard (USCG) protocols through an Independent Laboratory. SeaCURE BWMS testing was completed at the Marine Environmental Resource Center (MERC) in Baltimore, Maryland, under rigorous conditions that replicate the environment in which the system will be operating. We are in the process of completing land-based testing in the other two salinities, in addition to shipboard testing and we expect to have all USCG approvals before the end of the year.

From our perspective, there is a fair amount of confusion and concern among the ship owning community regarding the entire Ballast Water Management issue. How do you see it from your perspective?

The issue of ballast water treatment and leading regulations is one that is still unclear to many owners and operators. We continually try to keep up to date with the market developments so that we can provide the best counsel for our customers. At the moment, there are changes on an almost weekly basis. The recent USCG rejection on the most probable number (MPN) test method, the closer steps to ratification, and before Christmas the lawsuit initiated by environmental groups in the US Court of Appeals (Natural Resources Defense Council et al v. EPA et al, 2nd U.S. Circuit Court of Appeals, Nos. 13-1745, 13-2392, 13-2757), all combine to create confusion in this sector.

When you discuss Ballast Water Management systems with vessel owners, how would you characterize their main question and concerns?

Owners have a number of issues. As this is certainly a non-revenue generating expense, one of the questions will always be cost. Not only cost to purchase but also to install, run and maintain. The more savvy owners are definitely looking at the total cost of ownership. After the total cost comes the question of reliability and with that service. Ships operate worldwide around the clock 365 days a year. Owners want to know that if an issue arises, the manufacturer will be there to quickly resolve the problem and ensure the ship meets its schedule.

The most recent concern we are learning about is about the longevity of the company behind the system. Given that dozens of new companies have entered the market looking to capitalize on the upcoming demand, owners want to be sure that the company behind the technology is stable and going to be around for the lifetime of the vessel.

If you see confusion and uncertainty in the market, what do you see as the top ways in which this confusion and uncertainty could be removed?

Partnerships with a supplier who has vast experience within the market. Make sure that they are abreast of all changes and can advise you not just on a system for a single vessel but on an entire solution for your fleet. As long as there are competing regulations with different testing standards, there will always be some confusion. The only way to ensure worldwide compliance is by installing a system that meets the highest, strictest standard, which is the

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An Offshore Review:

First Signs of Life?

Photo credit: Songa Offshore

“Oil prices might have bottomed out,” the International Energy Agency whispered in March, a month after saying, “The glut will continue.” For all the forecasts, there’s fatigue. More meaningfully, perhaps, an industry that admits ordering too many vessels, subsea kit and engineers is acting with oil at USD40 like it did when oil was \$24 (or \$78): it’s trying new technology, partnering and drilling. Whether maintenance and modifications (M&M); delayed project greenlights; new oil provinces or the “indies,” there’s some hum after 20 months of mayhem.

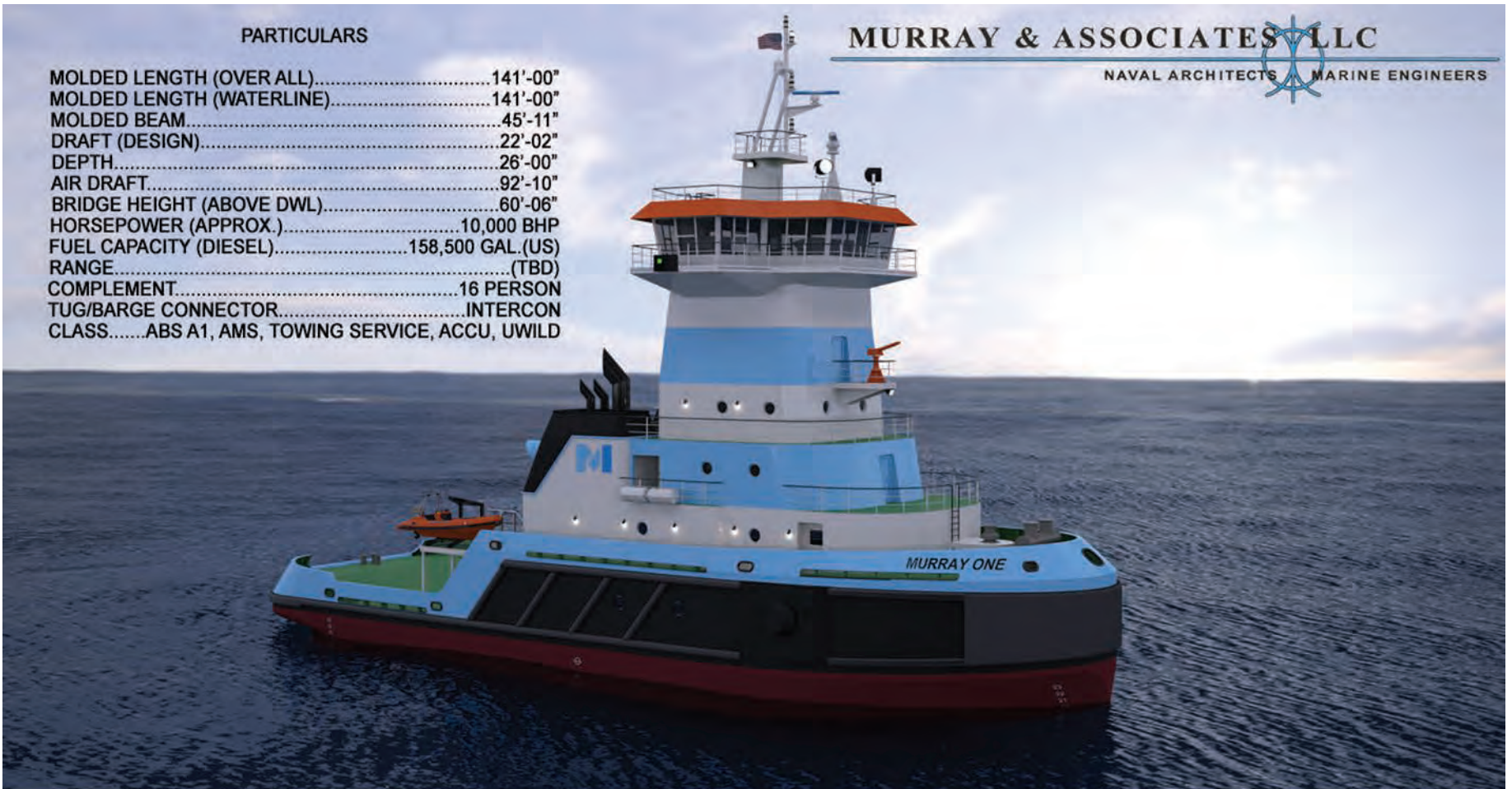
BY WILLIAM STOICHEVSKI

PARTICULARS

MOLDED LENGTH (OVER ALL).....	141'-00"
MOLDED LENGTH (WATERLINE).....	141'-00"
MOLDED BEAM.....	45'-11"
DRAFT (DESIGN).....	22'-02"
DEPTH.....	26'-00"
AIR DRAFT.....	92'-10"
BRIDGE HEIGHT (ABOVE DWL).....	60'-06"
HORSEPOWER (APPROX.).....	10,000 BHP
FUEL CAPACITY (DIESEL).....	158,500 GAL.(US)
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BP's mass order in March of subsea equipment from OneSubsea wasn't supposed to happen. Not yet. A consensus of numbers crunchers said it would be 2017 before subsea ordering again picked up. So much equipment had been bought and stored pending lower offshore vessel rates and higher oil prices, that subsea services — not subsea equipment — was expected to pick up first.

Yet, the Cameron and Schlumberger business OneSubsea will supply BP and partner DEA in Egypt with deep-water subsea production systems for the West Nile Delta Phase II project. The equipment, worth undisclosed millions, brings rewards of over \$750 million for services outfit Subsea 7. Company executive vice president, Oyvind Mikaelson, chalks the win up to investing in technology while downsizing by 30 percent the world's

largest offshore fleet and its corporate complement.

"We've significantly reduced our cost base, but we're continuing to invest in technology. Now is the time to invest in technology," Mikaelson asserts. Speaking at the Swedbank energy conference in Oslo, Mikaelson says Subsea 7's global project offices have recently been offering new heated pipeline technology: "Now we can do everything. Pipelines in Brazilian deep water or shallow water (in the Caspian Sea)."

It isn't just the heavyweights doing some major winning of late: Singapore's PACC Offshore Services in February 2016 secured \$85 million in Saudi M&M work and is readying its project people for five corresponding, chartered new-builds. Aker Solutions, too, just won over a billion kroner in ConocoPhillips M&M off Norway. Reality check: Viking Supply has laid up its last two

platform supply vessels; Swire Pacific Offshore notched a \$165 million deficit for 2015 on lost Brazil new-builds, and Farstad Shipping booked a billion kroner in losses and closed its Aberdeen office.

Supermajor tech

Hence the importance of Egypt, where drilling and surveying preceded oil's 2014 dip. Egypt offers deep, shallow and mid-water field work, and for OneSubsea, the strife-torn land offers long-distance gas fields that call for its new subsea kit: large-bore subsea trees and high-integrity pressure protection systems, or HIPPS.

HIPPS was jointly developed with BP and signals new tech adoption which, paradoxically, tends (historically) to happen when oil prices are low. In Norway this year, a record 77 companies applied for tech-pilot money via the Norwegian Research Council's Demo

2000 program, where suppliers and oil companies together spend the 100 million kroner allotted for technology trials in Oslo's 2016 budget. Energy companies provide 75 percent of pilot costs, the taxpayer 25 percent. At press time, the most "game-changing" demo looked like West Group's "continuous-motion (robot) rig", or CMR, aimed at saving money, energy and time while drilling (onshore, for now). Pilot parties are ABB Robotics, Statoil, ConocoPhillips and Shell.

Tax relief

Offshore Britain, where cash and well stream are being hoarded, oil town Aberdeen is being fortified by the kick-off in mid-2015 of Maersk's \$4.5 billion Culzean field plus 250 million sterling to keep skills in Aberdeen and 2016 tax relief and reform.

From March 2016, it is hoped a strong

Industry driver:
The Johan Sverdrup drilling platform.



Illustration: courtesy Statoil

Much of the \$5 billion drilling backlog of medium-water rig player, Songa Offshore, comes from the giant Norwegian discovery Johan Sverdrup. To secure Songa's remaining mid-water drilling business and its final two special Cat D new-build rigs, the company will issue a \$100 million convertible bond.

Bjornar Iversen,
Songa Offshore CEO



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Ready for business:

The Transocean Barents starts work again in May 2016 after a two-month pause.



Photo: Courtesy Transocean

rebound we be spurred by subsidized seismic surveys; a drop in corporate tax of three percent to 17 percent, and up to 17.5 percent less revenue tax. Just before the March budget, an email from indus-

try analyst Rystad Energy suggested U.K. Continental Shelf (UKCS) capex will drop 25 percent to 8.9 billion sterling in 2016 after falling 20 percent in 2015 to 11.6 billion sterling. Before the

new U.K. budget, Rystad warned UKCS producers needed a breakeven oil price of \$67.10 per barrel. None have proclaimed what post-Budget 2016 breakeven might be.

At Culzean, Britain the gas market was all Maersk and partners seemed to need. Similarly, local gas sales to pay for produced oil later — a Canadian idea from Tanzania's remote Rovuma basin — has

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also “lured” players to new hydrocarbon plays in Africa.

Indie race

By mid February, Subsea 7 in Aberdeen was announcing “sizeable” three-year frame agreements to bring diving support vessels, engineering, ROV maintenance and subsea construction to six North Sea clients and their oilfields: Chevron, Dana Petroleum, Hess, Nexen, Talisman Sinopec Energy and TAQA Bratani. Conspicuous among these contract parties are the smaller, independent oil companies, the “indies”. Of late they’ve been drivers of exploration and production (E&P) activity and investor favor. If U.S. mega investor Blackrock is heavily invested in “indies”, then it’s partly because the indie share of costs once farmed into a production license can be as low as \$10-\$15 dollars (capex and opex). That’s what Norway newcomer Tellus Petroleum will pay for 15 percent of the Gina Krog development and its jacketed platform atop 260 million barrels of oil equivalent. Tellus parent company Sequa says it helps that, “The Norwegian petroleum tax environment provides unparalleled downside protection, by giving companies the potential to recover up to 94 percent of their development costs.”

Some nations are still just contemplating their own model of public finance for energy: two Canadian provinces and Mexico are trying and are now often called the hottest centers of future activity.

Rig fortunes

Around the world, large oilfield project go-aheads still offer infield and appraisal drilling in order to mature prospects or ensure project designs are profitable. For rig fleet owners, rising oil prices might also lessen the blow from new-build rigs yet to set sail.

Much of the \$5 billion drilling backlog of medium-water rig player, Songa Offshore, comes from the giant Norwegian discovery Johan Sverdrup. To secure Songa’s remaining mid-water drilling business and its final two special Cat D new-build rigs, the company will issue a \$100 million convertible bond, said CEO Bjoernar Iversen. “It should be adequate to take the company through the current (difficult) cycle,” he tells a packed hotel room. “By Week 10,” Iversen says, all four Cat Ds — new designs built to enter old subsea templates and extend field life — will be earning day rates in-line with today’s \$360,000 to \$490,000. Iversen cautions those tracking the industry’s doom that, “Statoil’s current rig portfolio matches its trend not its (production) ambition (which requires far more

rigs).” Another CEO might have pointed to Chevron’s 2016 \$24 billion exploration and capex spend.

Lessons learned

For some operators, the time to order offshore work is nigh, as rates are down two-thirds for some vessel types. Reduced project scope is one of the engineered reasons for the drop, and a Statoil

report reveals breakeven prices for undeveloped fields are now down from \$70 (oil) to \$40, and from \$90 to \$45 in the deep-water GoM.

Better inventory controls and standard parts for subsea systems have helped the offshore industry learn and save in the current “sit-on-your-cash” cycle. “We had a tendency to gold plate everything we did,” says Mikaelson, adding, “And

we didn’t manage efficiency, we checked volumes. Now it’s (back to) ‘Price-per-pipeline mile’.”

For the rest of the supply chain, a chronicling of good signs might offer more avenues than “optimized” projects or forecasts, for the timing of finance; tech-adoption; project plan submissions and the start of M&M work is impossible to know.

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Floating Production Systems Contracts Hit by Market Downturn –



But the Cycle Seems to Have Bottomed

Photo: Courtesy Shell

JIM MCCAUL – IMA/WORLD ENERGY REPORTS

No question that the market for new floating production systems has taken a battering. The past 12 to 18 months have been a difficult period for everyone in the business sector. Absence of new contracts has forced fabricators and equipment suppliers to make huge cutbacks in personnel and spending. But deepwater production will rebound – oil demand keeps growing – and though the signs are mixed we see indications of the rebound starting.

1. Production Floater Inventory and Current Orders

First some numbers about the state of the business. 261 oil/gas floating production units are currently installed on offshore fields. FPSOs represent 64% of the installations, production semis 15%, ten-

sion leg platforms 10%, production spars 8% and production barges 2%. 19 LNG regasification units and 92 FSOs are also in service. No FLNGs are yet in operation - but this is about to change when *PFLNG Satu* is delivered in April.

Another 25 oil/gas production units are off field and available for redeployment, FPSOs account for 76% of the available units, production semis the remaining 24%. More than half of these production units are likely to be scrapped due to age and/or market conditions.

The growth in the number of production floaters in service or available is shown in the accompanying chart.

An additional 55 production floaters and 7 storage/offloading units are currently on order. Of these, 53% are FPSOs, 13% are another type of oil/gas production unit and 35% are LNG liquefaction or regasification units.

2. Oil Prices Hit Bottom in January and Appear to be Recovering

The continuing imbalance of oil demand and supply has weighed on oil pricing and has caused many oil companies to cut back on capital spending plans. Brent crude in March 2014 was trading around \$105 per barrel. By March 2015 the price had fallen to around \$55 per barrel – and in late March 2016 Brent was trading around \$40 per barrel. The nadir was on 20 January 2016 when spot Brent closed at \$26 – a level far below the breakeven on many oil fields.

As a result of the oil price collapse, daily announcements of lower capital spending have been common over the past six to 12 months – from majors like ExxonMobil to smaller upstream players like Premier, Cobalt, others. ExxonMobil, for example, in March said it will

budget \$23.2 billion in capital spending in 2016 – down 25% from the \$31.1 billion spending in 2015 and 45% lower than the peak spending of \$42.5 billion in 2013.

Over the past two months the picture has brightened a bit and some analysts (including this author) see a rebound beginning. By March 21, Brent had recovered to \$41 -- and the futures market is pricing Brent at \$44 at end 2016, \$49 at end 2018 and \$52 at end 2020. While higher than current spot, these futures prices are still far below the \$100+ price of Brent just two years ago. But the trajectory in oil prices has been upward since hitting bottom in January and the futures market has the upward trend continuing.

While no one can predict the price of oil, we see the worse being over – and recovery underway. The world produc-

ers are talking about a production freeze, drilling of new shale wells in the US has stalled and – most important – global demand for oil keeps growing. Sooner or later supply and demand will come back into balance. While many things can disrupt and delay this rebalancing (e.g., downturn in the Chinese economy), we see a gradual recovery in oil prices over the next 6 to 12 months. This is not to say there will not be further dips. Oil prices are volatile. But the long term trend is upward.

The huge inventory of oil in the market will limit near term price increases and the ability of shale production to rapidly ramp up will likely hold prices within the two digits over the next few years. But we see prices getting back to \$60 to \$70 by the end of the decade. We also see the potential for a supply shock that could send the price of oil into three digits within this time frame. A supply disruption in the Middle East is still a continuing threat. Mideast oil fields are in a volatile region.

Meanwhile the brakes have been firmly applied to deepwater project starts. The last major FPSO contract was awarded in January 2015 – an FPSO to be used offshore Ghana. There also was a tentative contract in July 2015 for a production semi to be used in the GOM. These two contracts – plus orders for a handful of floating regas vessels – have been the total order intake over the past 15 months. This is far below the historical order intake pattern. Contracts for an average of 12 FPSOs and 3 other oil/gas production floaters have been placed annually over the past ten years.

3. Petrobras Problems Have Taken a Major Player From the Market

Running in parallel with the overall market downturn has been an unprecedented implosion in Petrobras. The Brazilian oil company has been embroiled in a corruption investigation that has led to a financial and contracting meltdown. Petrobras' situation needs to stabilize and begin improving before the company can again be a major driver of production floater contracts.

Unfortunately, Petrobras' problems have not been easing. The company's credit rating was reduced to junk status in 2015 – and was further downgraded by rating agencies in Q1 2016. S&P in mid-February cut Petrobras' bond rating from BB+ to BB and Brazil's sovereign rating from B+ to BB with negative outlook. Moody's in February downgraded all ratings for Petrobras as well as ratings based on Petrobras' guarantee to B3 from Ba3.

The impact of the financial pressures

on Petrobras operations and capital spending are obviously being felt. In March Petrobras announced plans to lay off 12,000 staff – a 15% personnel reduction. Reports are circulating that the (already downsized) plan to invest \$93 billion in capital projects over the next five years looks about to be cut to

\$80 billion. The Brazilian government is dealing with many problems and is increasing unable to provide financial backup to Petrobras. The Brazilian economy is deteriorating at an alarming rate – with GDP falling 3.8% in 2015, expectations of a similar decline this year and unemployment nearing 10%.

One piece of good news is the deal Petrobras has negotiated with China to access financing. In late February Petrobras signed a term sheet with China Development Bank to access loans up to \$10 billion in exchange for supplying oil to Chinese companies. But this news is overwhelmed by bad news that seems to



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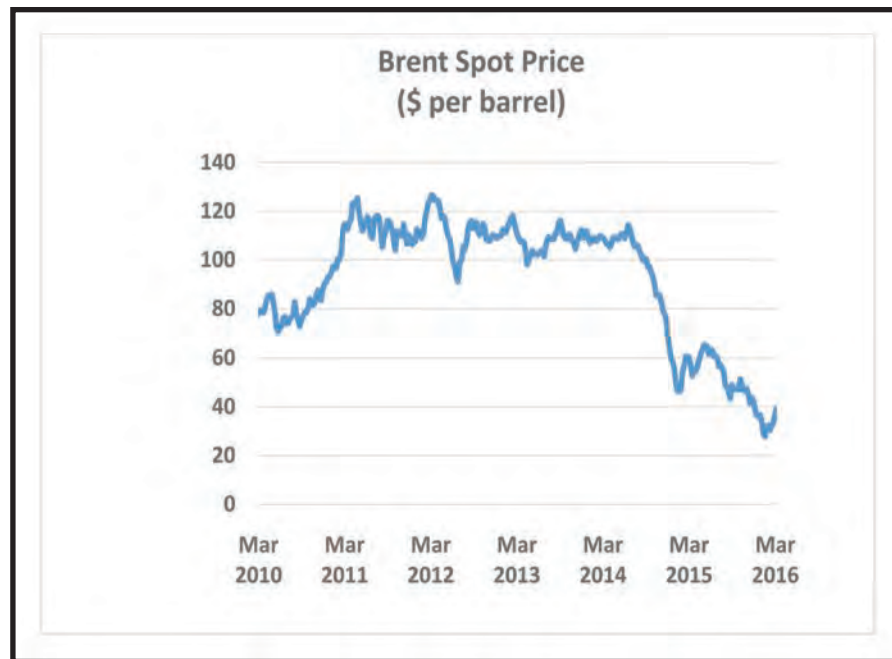
flow daily about the company – and the Brazilian economy.

The impact of this implosion on the floating production sector has been huge. Petrobras is the biggest player in the sector. It has more than 50 floating production units (mostly FPSOs) at various stages of planning. No other operator comes close to this projected procurement level.

At the moment it appears that the Petrobras situation is not going to be resolved anytime soon. The political situation in Brazil is deteriorating and no one seems to be able to bring closure to the corruption investigation. Resolution could extent into 2017 – maybe later. Meanwhile Petrobras will be a weakened player and its ability to invest in new production floaters will be severely constrained.

4. FLNG Contracts Have Been Impacted by the LNG Glut

The FLNG market is looking a bit weak as a result of the LNG supply glut that has developed over the past year. Two FLNGs under construction have hit ob-



stacles. One unit, the almost completed Exmar *Caribbean LNG barge*, is without a field as a result of the field operator's decision to terminate the LNG project in Colombia. The other unit, *PFLNG Dua* under construction in Korea, has been "re-phased" by Petronas to curtail capital expenditures – and construction will likely be suspended once the hull is finished.

Several planned FLNG projects have also run into barriers. In March 2016 Woodside decided to shelve its plan to use an FLNG to produce the Browse gas complex offshore Australia – saying market conditions did not warrant the

investment decision. In the same month the Indonesian government rejected Inpex' plan to use an FLNG on the Abadi field – saying a land based LNG plant is required.

Earlier, in mid-Feb 2016 Hoegh announced it was terminating its FLNG projects -- and took a \$37 million impairment charge against its FLNG assets. Hoegh joins Excelerate in exiting the FLNG sector. Excelerate in Sept 2015 decided to cancel its planned project to create an FLNG terminal in Texas, saying the project is not viable under current market conditions.

5. FSRU Contracts Have Been the Bright Light Over the Past Year

FSRU contracts have been the bright light in the floating production sector. Five contracts or term sheets for floating regas units have been signed over the past year. However, some pending contracts for FSRUs are proving hard to tie down. The price of LNG has fallen significantly – which should provide incentive to switch to natural gas and generate requirements for regasification terminals. But the price of fuel oil has fallen as well – reducing budget pressure on power plant managers to switch to cheaper fuels.

Then there is the difficulty of financing FSRU projects. An FSRU moored offshore can require \$500+ million investment in infrastructure. This can be hard to finance. Unlike FPSO and other oil/gas export projects, an FSRU feeds gas to a local off-taker. The ability to finance such deals is limited by the creditability of the off-taker and the willingness/capability of the government to provide a sovereign guarantee.

Overall, we see the FSRU market continuing to be strong – but given the financial barriers to these projects, closing deals will require patience and financial creativity.

6. Forecast of Production Floater Orders

Looking forward, 242 floating production projects are in various stages of planning. Of these projects, 59% likely involve an FPSO, 10% another type of oil/gas production floater, 24% a liquefaction/regasification floater and 7% a storage/offloading floater. 44% of the projects are at stage of planning where a production/storage system contract is possible within the next five years – provided the underlying markets drivers support the investment decision.

But obviously the underlying drivers need to improve before investment activity rebounds and planned projects turn into orders for floating production systems.

Until there is improvement in oil prices, field operators will be reluctant to invest in new production equipment.

In late March we examined the projects in the planning stage to identify those likely to reach an investment deci-

Potential Production Floater Contracts Over the Next 18 Months

Planned Project	Type Unit	Field Operator	Country	Region
Sepia	FPSO	Petrobras	Brazil	BRAZ
Jasmine	FPSO	Mubadala	Thailand	SEA
Libra Pilot	FPSO	Petrobras	Brazil	BRAZ
Ca Rong Do	FPSO	Repsol	Vietnam	SEA
Liuhua	FPSO	CNOOC	China	CHINA
Rosebank	FPSO	Chevron	UK	NE
Madura MDA/MBH	FPSO	CNOOC/Husky	Indonesia	SEA
Penguins	FPSO	Shell	UK	NE
Mad Dog 2	SEMI	BP	USA	GOM
Opti #3	SEMI	LLOG	US	GOM
Liuhua 11-1	TLP	CNOOC	China	CHINA
Liuhua 16-2	TLP	CNOOC	China	CHINA
Liuhua 20-2	TLP	CNOOC	China	CHINA
Coral LNG	FLNG	ENI	Mozambique	AFRICA
Sergipe regas terminal	FSRU	GPE Sergipe	Brazil	BRAZ
Ghana Regas Terminal	FSRU	VRA/GNPC	Ghana	AFRICA
Port Qasim Regas Terminal #2	FSRU	Gov't of Pakistan	Pakistan	SWA/ME
Abu Dhabi Regas Terminal	FSRU	ADNOC	UAE	SWA/ME
Block B8/32	FPSO	Chevron	Thailand	SEA

sion over the next five years – assuming underlying drivers improve. Of the 242 projects in the planning pipeline, we see 107 of these projects reaching the investment decision by end 2020.

Based on our analysis, we see near to mid-term projects in the planning stage potentially generating contracts for 82 production floaters between 2016/20. The forecast includes 46 FPSOs, 11 oil/gas FPU's, 4 FLNGs and 21 FSRUs. We also expect orders for around 25 FSOs.

In making this forecast, we have assumed that the price of oil will remain in the \$40 to \$50 range through 2016 – then climb to the \$50 to \$60 range in 2017/18

and to \$60 to \$70 in 2019/20. We have also assumed Petrobras' problems will continue through 2017 – limiting the company's capability to finance new projects. But from 2018 onward Petrobras will be fully back in the market and/or the operating rights to some pre-salt blocks offshore Brazil now managed by Petrobras will be contracted to international players.

Further, we have assumed there will be significant (20 to 30%) cost reductions in the deepwater supply chain as competition for available contracts tightens, local content requirements ease and operators negotiate more favorable revenue shar-

ing arrangement with resource owners. The result will be to lower the breakeven price of new deepwater projects.

A list of 19 projects we see potentially producing orders for production or storage floaters over the next 18 months is provided in the accompanying table. Details for these near term projects – as well as details for 88 other projects in the planning stage that have potential to produce EPC contracts over the next 18 to 60 months -- are provided in the March 2016 *WER Floating Production Report*. We indicate in the report when the EPC contract is likely to be awarded with the next five years – within the next

18 months, 18 to 36 months or three to five years out. **Readers of**

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Number of Production Floaters in Service or Available at the Beginning of Each Year

	FPSO	SEMI	TLP	SPAR	BARGE	FSRU	FLNG
1975							
1976		1					
1977	1	1					
1978	3	1					
1979	3	1					
1980	3	1					
1981	4	2					
1982	4	2					
1983	5	2					
1984	5	5					
1985	7	6	1				
1986	8	7	1				
1987	11	8	1				
1988	13	8	1				
1989	13	10	1				
1990	14	14	2				
1991	17	15	2				
1992	19	16	2				
1993	20	16	3				
1994	23	19	3				
1995	27	21	4				
1996	31	25	5				
1997	35	27	6		1		
1998	47	28	7	1	1		
1999	54	31	8	2	1		
2000	66	35	11	2	2		
2001	68	37	11	3	2		
2002	78	37	14	4	2		
2003	84	37	14	6	2		
2004	89	38	17	9	3		
2005	101	36	19	13	3		
2006	106	38	18	14	3		
2007	118	40	20	15	4		
2008	131	40	21	15	5		
2009	151	41	22	16	6	2	
2010	151	41	22	18	7	4	
2011	155	40	22	18	8	5	
2012	159	41	22	18	8	7	
2013	165	41	22	19	8	7	
2014	174	44	24	19	8	9	
2015	180	45	24	20	8	13	
2016	186	45	26	21	6	19	0

FSRU count excludes regas carriers not in terminal service

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O&G Outlook 2016

Last month DNV GL released its “A New Reality: The Outlook for the Oil & Gas industry in 2016,” its sixth annual industry benchmark study based on an extensive survey of nearly 1000 industry professional. MR recently visited with **Richard Bailey, VP Director of Division Inspection, DNV GL - Oil & Gas** – who has more than 37 years’ experience in general engineering and consulting, major projects, operations and maintenance and executive business management primarily in the oil and gas industry – to add scope and perspective to the numbers.

BY GREG TRAUTHWEIN

The “New Reality” study is a fascinating read, and I understand this is the sixth year in production. Since it started in 2011, how is the study the same, and how is it different?

In light of the current market challenges, the findings from our annual industry outlook research have evolved quite significantly between 2016 and the first edition of the research in 2011. At the time of the first edition of the research, the oil and gas industry had much to be bullish about: strong oil prices, rising Asian demand, and the rise of natural gas is a major new theme for the sector. Our research reported that 76% of senior oil and gas professionals were ‘highly’ or ‘somewhat’ confident about their prospects for 2011. This comes in sharp contrast to the outlook for 2016, which reports a drop in confidence to just 30%, as ongoing high supply has suppressed oil prices and forced the industry into a period of reflection and restructuring.

While confidence has dropped significantly since 2011, we see some themes reported by senior oil and gas professionals at that time which also appear in 2016. Cost management has become the industry’s primary focus in the face of the current market downturn, but it was also an issue for the industry six years ago. In 2011, rising operating costs were cited as the main challenge to respondents’ business, as operators were forced into more technically challenging regions where the financial requirements are considerably higher than for conventional projects. Until recently, these rising costs had been ‘hidden’ by the high oil price. Now it is in full daylight. In a \$100 per barrel scenario the industry had a margin. But in the current climate of around \$40 per barrel there is no margin.

30%

In the latest “New Reality” report from DNV GL, just 30% of senior oil and gas professionals were confident of prospects for 2016, versus 76% in 2011.

This energy price downturn is historic, and I’m assuming will be the topic of study and discussion for a generation. In your experience in this market, how is the downturn similar to downturns past? How is it different?

This is nothing out of the ordinary for the oil industry compared to other commodities which are also experiencing a downturn. Middle East tensions and the slowdown in the Chinese economy are also exacerbating the global market conditions. What we see from the results in our survey is that senior oil and gas professionals recognize that the industry is not implementing the lessons from previous downturns. Just in 2014, lack of skilled personnel was listed as the primary barrier to growth as it was in 2013 and 2012. Now most companies in the oil and gas industry are reducing their headcount because they have to cut costs urgently, thus losing valuable competence.

When the study was conducted late last year, the price per barrel was \$47, fluctuating lower since then. In regards to industry sentiment, and what do you see today?

We see from the results over the years that industry confidence is strongly correlated to the oil price (0.975 correlation), meaning that sentiment appears to be highly sensitive to the oil price. Not so strange really, as the oil price affects priorities, willingness and capabilities for investments, and of course the market’s competitiveness. Normally, we run the survey once a year, so the confidence has been measured on a yearly basis. However, for the industry outlook survey for 2015, we ran two surveys to follow up on the massive drop in oil price during late October 2014 from \$82 to \$49 in January 2015. It turned out that during these three months, the industry confidence followed the oil price closely – that gives a clear example on how fast the sentiment fluctuates.

Industry reaction to current market conditions, as the study clearly explains, differs widely by region, by company. But when you consider the recent cuts to CAPEX, what do you see might be the mid-term and long-term problems associated with this?

With the low oil price, the industry has taken painful short-term cost-cutting measures by reducing capex, headcount, and squeezing the supply chain. Although 74% say they achieved their cost-efficiency targets last year and 65% believe the industry will be successful in cutting costs in 2016, not all parts of the sector have been able to achieve lasting lower cost levels during downturns. There are some promising signs that the industry is adopting longer-term thinking on cost management: six in 10 (61%) respondents agree that operators will increasingly push to standardize their delivery globally, up from 55% in 2015 and 52% in 2014.

Even in the current price environment, 49% say their company is taking a long-term approach to innovation and R&D. However, nearly one in five companies (18%) does not have a strategy in place to maintain innovation. The most common strategy for maintaining innovation with lower budgets is to increase collaboration with other industry players (45%). Nearly one in three (30%) plans greater involvement in joint industry projects in the year ahead.

The pricing will always regulate the balance between supply and demand. Also we have seen that the world economy is less sensitive to oil prices now than earlier. However the current CAPEX cuts are not evenly distributed across the world’s oil provinces. Hence, we may see a decrease in flexibility in the world crude supply combined with a higher consumption of oil driven by current low prices. This could lead to greater volatility in the future oil prices.

Another effect which could be difficult to handle is

49%

Despite the current price environment, 49% say their company is taking a long-term approach to innovation and R&D.



In 2011, rising operating costs were cited as a main challenge ... Until recently, these rising costs had been 'hidden' by the high oil price. Now it is in full daylight. In a \$100 per barrel scenario the industry had a margin. **But in the current climate of around \$40 per barrel there is no margin.**

the effects of the great exodus of people from the industry. Many of these will not come back, and we may see several negative effects from lack of expertise and lack of people in the future. Competence and skills are key drivers for a sustainable business.

Negativity is rampant in the energy markets, but every situation has a 'silver lining'. What do you see as the Silver Lining(s) to this energy crash?

Although the market situation is very tough, it isn't necessarily a bleak one. We have a great opportunity to get inefficiencies through simplified value chains. The industry has added layers of complexity both within design and work processes which, when combined with high costs and scope creep, have resulted in projects failing to stay within budgets and timetables. Until recently, these inefficiencies were hidden by the high oil price. The best cure for complexity is standardization, but in order for standardization to work effectively, the industry needs to collaborate.

We also see the start of great prospects for digitalization, automation and using data in smarter ways to gain insight for better decisions. It is now possible to optimize the performance of an asset far more effectively than in

The Arctic has another set of challenges and concerns than deepwater production, and the breakeven price for projects is considered to be higher than for deepwater projects. **At the current price level, Arctic activity is quite literally, frozen.**



(Photo: DNV GL)

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the past. In this challenging, cost constrained environment, companies need to maintain a focus on collaboration to drive innovation. In DNV GL, we are committed to investing 5% of our revenue on research and innovation programs to help advance the industries we serve.

73%

As the industry seems to be in agreement about the oil price being lower for longer with 73% of respondents preparing for low prices, DNV GL believes it is time to let standardization be a key approach for long-term growth.

Do you see a place in the market for higher cost Deepwater (and perhaps even Arctic) exploration and production? If so, which world regions appear best suited to continue deepwater exploration?

We believe that in the longer horizon deepwater production and processing systems are going down to the seabed as an alternative for platforms and floaters. The subsea industry has been hit hardest in recent years with cost inflations and now the low oil price. However, subsea is the future and we can't forget that projects initiated now are highly likely to be capitalized on in a better market when entering operations after a few years.

There is still a way to go to make deepwater subsea developments profitable in terms of technology developments but also from a cost perspective. This is also why we currently drive several major innovation initiatives, both with the industry onboard through JIPs, but also through our own research. For example, we are currently leading a subsea standardization JIP with industry parties (such as Petrobras, Shell, Statoil and Woodside) to deepen industry knowledge and encour-

age progress in this area by examining the potential for standardization in subsea processing; this will begin with subsea pumping. Also, our strategic research and innovation department is publishing a position paper with recommendations for driving standardization of subsea technology qualification which is currently costly, time consuming and the process currently does not make it possible for different players to leverage one another's results.

Investment and innovation in subsea processing will be driven by the cost-efficiencies it delivers. For subsea processing to be an attractive solution, it must prove to be cost-efficient.

The Arctic has another set of challenges and concerns than deepwater production, and the breakeven price for projects is considered to be higher than for deepwater projects. At the current price level, Arctic activity is quite literally, frozen.

Can you give an overview assessment of where this industry is today, and likely will be tomorrow in the face of low oil, in regards to adopting more standardized systems and procedure?

DNV GL has more than 150 years' experience supporting various industries through the development of standards, frameworks and guidance on how to enable safe, sustainable and efficient design and op-

erations. Currently, we provide the oil and gas industry with around 170 recognized standards and recommended practices. Standardization is not about adding more requirements, rather harmonizing requirements and enabling synergies. This is also why the industry is striving towards standardization. Our survey showed that 61% of operators will increasingly push to standardize their delivery globally in 2016, an increase of 6% and 9% from respectively 2015 and 2014. This tells us that standardization is part of the solution in cutting down on complexity and costs.

For example, lack of confidence in the supply chain results in company specific specifications and leads to unnecessary complicated specifications, long lead times and reduced quality for key equipment (e.g. x-mas tree), followed with unnecessary inspections. This gives long hold-ups and the manufacturer is unable to produce to stock. The learning effect is also absent since all deliveries are customized. The solution for the industry is to do it smarter, simplify specifications and the standards and develop new technology that helps do things in a different way than in the past. Industry wide standards are the most efficient way of reducing transaction cost.

As the industry seems to be in agreement about the oil price being lower for longer with 73% of respondents preparing for low prices, we believe it is time to let standardization be a key approach for the industry to have a sustainable growth for the long-term. Even if the price kicks back up again, history has taught us that complexity in systems and processes is equal to wasting efforts and use of resources. We hope that this is a lesson learned for the foreseeable future.

What are the pros and cons of "Digitalization" in the offshore energy business? The report floats a number of "20% operational efficiency gain" via digitalization ... how?

We believe that by adopting coordinated, digital processes to analyze and understand the overwhelming amount of data being produced, operational efficiency and productivity could be boosted significantly. It could also unlock potential regions that otherwise wouldn't be profitable. For example, by building advanced digital controls on platforms, combined with improved connectivity, the industry is able to transfer tasks for data processing onshore, reducing manpower and increasing energy efficiency and operational effectiveness. Forty-five percent of respondents to our survey believed that digitalization and Big Data could substantially help cut costs in the year ahead.

Though oil companies have long been at the forefront of information gathering, the industry has been slow to adopt digital tools that could drive smarter decision-making. The journey from conventional to digital also takes time and the results are not often immediate, therefore time and long-term investment is needed alongside a new mind set to remove inherent skepticism.

Naturally, with the positives of moving into a digital era, there are drawbacks. A major challenge is ensuring the protection of highly sensitive and business critical information. Cyber attacks on the oil and gas industry have grown in stature and sophistication in recent years, making them more difficult to detect and defend against, and costing companies increasing sums of money to recover from.

We need investment in cyber protection technology and this seems to be lagging behind the perceived threat. Our survey found that although companies are



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45%

Forty-five percent of respondents to our survey believed that digitalization and Big Data could substantially help cut costs in the year ahead.

actively managing their information security, just over half (58%) have adopted an ad hoc management strategy with only 27% setting concrete goals.

Through collaboration and investment in innovation, the industry can overcome the challenge of extracting value from complex data streams. Nevertheless, effort is required to ensure data security and reliability. DNV GL is already exploring how we can leverage our reputation for trust and technical expertise to offer our customers an independent platform for key industry data and digital services. It's a potentially very exciting space for us.

In conclusion, is the history of boom and bust in the energy sector doomed to repeat itself? More importantly: what 2 or 3 habits, or areas of concentration, are critical to ensure "the industry" learns from its mistakes and evolves?

It is concerning that a majority of senior oil and gas professionals (56%) believe that the industry is repeating the mistakes of previous downturns and have concerns over the loss of jobs and experience and lack of efficiency. We believe a new phase of cost management is needed, as nearly three quarters (73%) of global respondents to our survey are preparing their company for a sustained period of low oil prices.

Four in 10 (41%) of those questioned put cost management as the top priority for 2016, alongside tougher decisions on capex, prioritizing headcount reductions and increasing pressure on the supply chain. It is clear that with the sustained low oil price, these short-term cost cutting measures are already firmly in place and look set to continue this year.

To prevent repeating past mistakes, real change is needed now - cutting complexity, increasing collaboration and driving standardization. These measures will enable the industry to adjust to the new reality and put it on a sustainable growth path for the long-term.

There are some promising signs that the industry is adopting longer-term thinking on cost management: six in 10 (61%) respondents agreed that operators will increasingly push to standardize their delivery globally, up from 55% in 2015 and 52% in 2014. Even in the current price environment, 49% said their company is taking a long-term approach to innovation and R & D.

However, nearly one in five companies (18%) does not have a strategy in place to maintain innovation.

Innovation and collaboration are even more important in this current price environment. It isn't just about finding the breakthrough technologies - although that's important too - it's also about making things simpler and more efficient and ultimately helping the industry to safely cut costs.

While many others seem to be slowing down on innovation, we in DNV GL are continuing to invest 5% of our revenue in R&D as we see this as a key enabler for sustainable long-term competitiveness.

56%

It is concerning that a majority of senior oil and gas professionals (56%) believe that the industry is repeating the mistakes of previous downturns and have concerns over the loss of jobs and experience and lack of efficiency.



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Fisheries Fleets Review: *Part II, the Americas*



Renewal and rebirth

After a period of neglect, regulatory turmoil and environmental catastrophe (real and man-made), fisheries fleets from Alaska to Argentina and from American Samosa to Nova Scotia are renewing their assets. Orders from surprisingly few designers of modern, powerful vessels are complemented by a float of versatile designs from smaller, “traditional” builders in species-rich coastal zones.

BY WILLIAM STOICHEVSKI

Nova Scotian Grizzlies:

The 67-foot Emry & Boys longliner out of Sambro (above); the Sherminator lobster boat out of Metegan and the scallop-hunting Predator fromn Digby.

Maritime Canuck

Declining lobster stocks offshore Maine are not being felt off Nova Scotia, where the solid, “snub-nosed” vessels of local builder Aylward Fibreglass have become the lobsterman’s choice for “lifestyle”, where trendy means returning to a cherished fishery for once all-too-migrant locals. The Aylwards have even started transporting cross country — a week’s drive — to buyers on Canada’s Pacific coast, where the large crab species are on the rise. Aylward’s peers dot tiny Cape Island off southwest Nova Scotia, where receptive lobsterman are keen to use 65-foot designs to “dump” for lobster twice a year and to longline, or “fish-drag”, in the summer. Aylward’s Grizzly hulls are uniquely broad-beamed and famously stable.

“Our lobster fishermen fish on average 375 lobster traps, so they want to get to the grounds in one load. They want to be able to go out and haul them in rough seas,” said owner Glen Aylward, explaining, “We have continued the keel line in the bow as far forward as we could ... This gives our hulls a very fine entry for a boat with this massive width. These hulls do not pound in heavy seas. They simply break through the waves, which also makes them more fuel efficient as the first wave is broken and the others have to follow.”

Northern eagles

Meanwhile, managed shrimp stocks off Atlantic Canada and a “cyclical” spike of Pacific Canadian *Pandalus Jordanii* shrimp means “The fishery is currently in full swing,” said MV Osprey chief executive Scott Nichols. Recent discoveries of new stocks in Quebec’s giant Ungava Bay and “strong markets” have generated enough optimism for MV Osprey to order the Osprey III after approaching “designer of choice” Skipsteknisk for another (their third) Norwegian-designed factory-freezer shrimp trawler.

“Skipsteknisk are our naval architects,” said Nichols. “Compared to our previous trawlers, the (79.5m) Northern Osprey III is much larger, more powerful and capable of much greater daily production in the shrimp factory. We are incorporating “green” ... heat recovery onboard. Making it as “green” as possible is important to us.” He confirms other owners in the region are having similar vessels built, and Skipsteknisk confirms more area customers. At least one Rolls-Royce open-ended trawler design has been built for Maritime Canadian customers. Neither Nichols nor Rolls will say who the client is.

“The Northern Eagle (1996) will be sold after the Osprey comes into service

in late 2017,” he says. The (used) overseas market for these vessels “is good” for factory-freezer trawlers.

One reason for this appears to be growing worldwide opposition to transshipment via “mother ships” among national regulators worldwide and vulnerable, underfunded fisheries like those

of the Pacific Island Forum Fisheries Agency, a group that includes Australia and Samosa but affects U.S. territory American Samosa, from where U.S. tuna boats have so very recently withdrawn on orders from the Department of Commerce’s National Marine Fisheries Service.

Familiar Designs

Among the companies supplying the Osprey III build are Danish Carsoe, whose stainless steel fillet line and freeze plant found its way aboard earlier Osprey vessels and at least one other Canadian and one French new-build freezer trawler (of Skipsteknisk and Rolls-



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Arctic shrimp:

Rolls-Royce's design for Canadian shrimpers.

Illustration: courtesy Rolls Royce Marine

New start:

ASMAR's new-build project, the wellboat Rio Dulce III



Photo: ASMAR/JOAQUIN VARELA JENSCHKE

Royce designs).

With Tier III emissions rules pressing, power specialists have increased their range, and from 2015 onwards, all from Rolls's Bergen B and CAT engines to MAN propulsion packs, motors and a new Tier III John Deere power system series of from 74 kW to 559 kW are available. In the Americas, all things are in flux equipment-wise, as Norwegian designs vie with those from North America — including VARD Design's new Canadian affiliate, Vard Marine. Meanwhile, Skipsteknisk has a new-build ST-155L underway at Dakota Creek Shipyard in Washington for Blue North Fisheries, and the same yard is building an ST-116XL factory trawler for Fisherman Finest Inc.

VARD's Presence

Asked if Norwegian yards were aggressively pursuing the Western Hemisphere to make up for the "standstill" in offshore service vessels or to capitalize on a weakened Norwegian kroner, Skipsteknisk managing director Hans Ove Holmoey said: "(The company) is 40 this year and started with the design of fishing boats for Norwegian ship owners. (The business) developed geographically and ... came to cover offshore and research. For 20 years, these three segments have been our basis and strategy ... to meet a downturn in activity in one or two segments."

VARD, too, might make it in America after growing its fortunes in Norway after a slew of projects the past five years: three stern trawlers of its own design

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Illustration: courtesy Skipsteknisk



Norway-America:

Skipsteknisk's ST-155L (above) and ST-116XL.



Rolls-Royce Design & Equipment for Spanish Trawler

Norway's has announced a contract for one fishing stern trawler to be designed and equipped by Rolls-Royce. The fishing vessel has been ordered by the Spanish company Pesquera Ancora S.L.U. The vessel is of NVC 374 WP design by Rolls-Royce and is scheduled to be delivered from Kleven's Myklebust yard in the first quarter of 2018. This is the fourth contract for the same Rolls-Royce design to be built by Kleven.

The vessel will be 80m long, with a hull of ICE 1A* class, and fitted with a wide range of Rolls-Royce equipment, including main engine, auxiliary engine, HSG propulsion system, automation, winches and the fuel efficient Wave Piercing design. Operational efficiency, low emissions, crew comfort, safety and excellent seakeeping capabilities were the main considerations in the development of the ship design and equipment package. Since the early 1970s Rolls-Royce has designed about 130 vessels of NVC design for the fishing industry. The current Rolls-Royce orderbook in this market now comprise seven trawlers and two live fish carriers.

for HAVFISK (ordered between 2011 to 2016) and the 2015 order of a Rolls-Royce design for an "undisclosed Canadian client" (delivery late 2016). Then came a Seacon gill netter design for Breivik of Norway (2016). Canadians (take it from this one) are fond of those.

In a letter to us, VARD admits "There are no U.S. orders so far," but hope lies in its recently embarked-upon diversification strategy (away from OSVs). "VARD has repositioned one yard, Vard Aukra, as supplier to the aquaculture industry ... (live fish carriers, fish feed carriers and) VARD will continue to offer fishing vessels such as factory trawlers and arctic trawlers, as we see healthy demand."

American Builds

U.S. vessel demand could be greater, but rules, species trouble and a rebounding South American fishery have had more than a psychological grip both potential owners and regulators.

New Coast Guard (and coming Canadian) MARPOL Annex VI emissions-control-areas rules mean "voluntary" fuel sampling from 2016. For many, it's a first step toward Europe-style mandatory performance testing.

The reeling stocks include shrimp off



Distant relatives:

Skipsteknisk fisheries research design, the G.O. SARS.

Illustration: courtesy Skipsteknisk

the eastern seaboard from Maine to the Gulf of Mexico, where the GOM Fishery Management Council continues to fight near-shore long-lining to stop a large bycatch of threatened species. Yet, unlike the agonizing, permanent collapse of Eastern Canadian cod stocks, U.S. scientists have successfully revived Washington pink shrimp, say the Marine Stewardship Council and Oregon-based Pacific Seafood say. Scientists are attempting the same operation off Maine.

Pacific Seafood and its peers are already delighted with the Oregon pink shrimp fishery, and it bodes well for vessel demand, even in a U.S. market pressed by imports. To stimulate renewal, the Shipbuilders Council of America has a small shipyard assistance program, or SSAP, of grant-giving for “quality” vessel construction. Some \$160 million was dispersed between 2007 and 2012. There’s also the Title XI loan-guarantee program for yards and operators to consider.

Detritus Cleared

After the devastating earthquake and tsunami of 2010, ASMAR shipyard of Chile brushed away the detritus to revive a famous yard via a stalled fisheries research vessel project. A shipyard man-

ager working on RIB boats at an affiliate yard tells us that area tuna boat owners “extend their boats here”.

ASMAR commercial manager, Joaquin Varela Jenshke, says new fisheries orders have sparked a comeback that started with the AGS 61 Oceanographic and Fisheries Research Vessel designed by, you guessed it, Skipsteknisk (as was a research vessel built in Bergen, Norway; one being built at Vancouver, Canada and another for the Swedes). A 2008 (design and construct) contract between ASMAR and Santiago produced the commission but delivery time in 2010 was extended “because of the huge damages suffered by our shipyard in February 2010,” Jenshke said, “Launch day coincided with the earthquake and tsunami.” Since then, ASMAR has subcontracted to build the hull and superstructure of a wellboat and has retrofitted or repaired 109 fishing vessels (between 2014 and 2015) at its Talcachuan Shipyard and 25 at Puna Arenas. That’s a lot of tuna long liners and seiners! In 2016, ASMAR expects to sign a design contract with the Chilean government for a coastal fisheries vessel, although the basic design could well come from “a company with a proven design,” Jenshke said.



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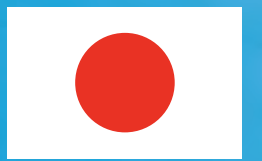
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Technical Features

- This OSV can be utilized for tophole drilling, well intervention and plug & abandon services.
- Enclosed module handling tower provides a safe and comfortable working environment when operating in harsh conditions.
- The highest level of positioning capability, driven by the seven thrusters, which is securing better redundancy than similar type of OSVs.
- Applying the high grade classification rule for comfort and vibration.

Principal Particulars

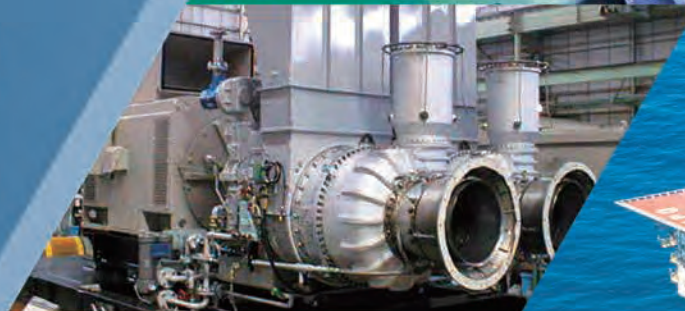
Length overall	Approx. 169m	Operation water depth	Around 2,000m
Breath moulded	28.0m	Complement	91 persons
Depth moulded	11.7m	Classification society	DNV · GL
Positioning capability	DP3		

For more information, please contact E-mail: kawasaki_offshore@khi.co.jp



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Kawasaki Heavy Industries, Ltd.

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Detailed Information on Product / Technology

◎ Forging Capacity

- Maximum diameter: Φ 30 inch, Maximum height:33 inch, Maximum length:53 inch
- Product weight: 2~2200 lbs/Monthly production capacity: 4000t

◎ Machining capacity

- [Lathe] Processing diameter: Φ 2~43 inch, Processing length:59 inch
- [Machining Center] 22 x 43 x 16 inch

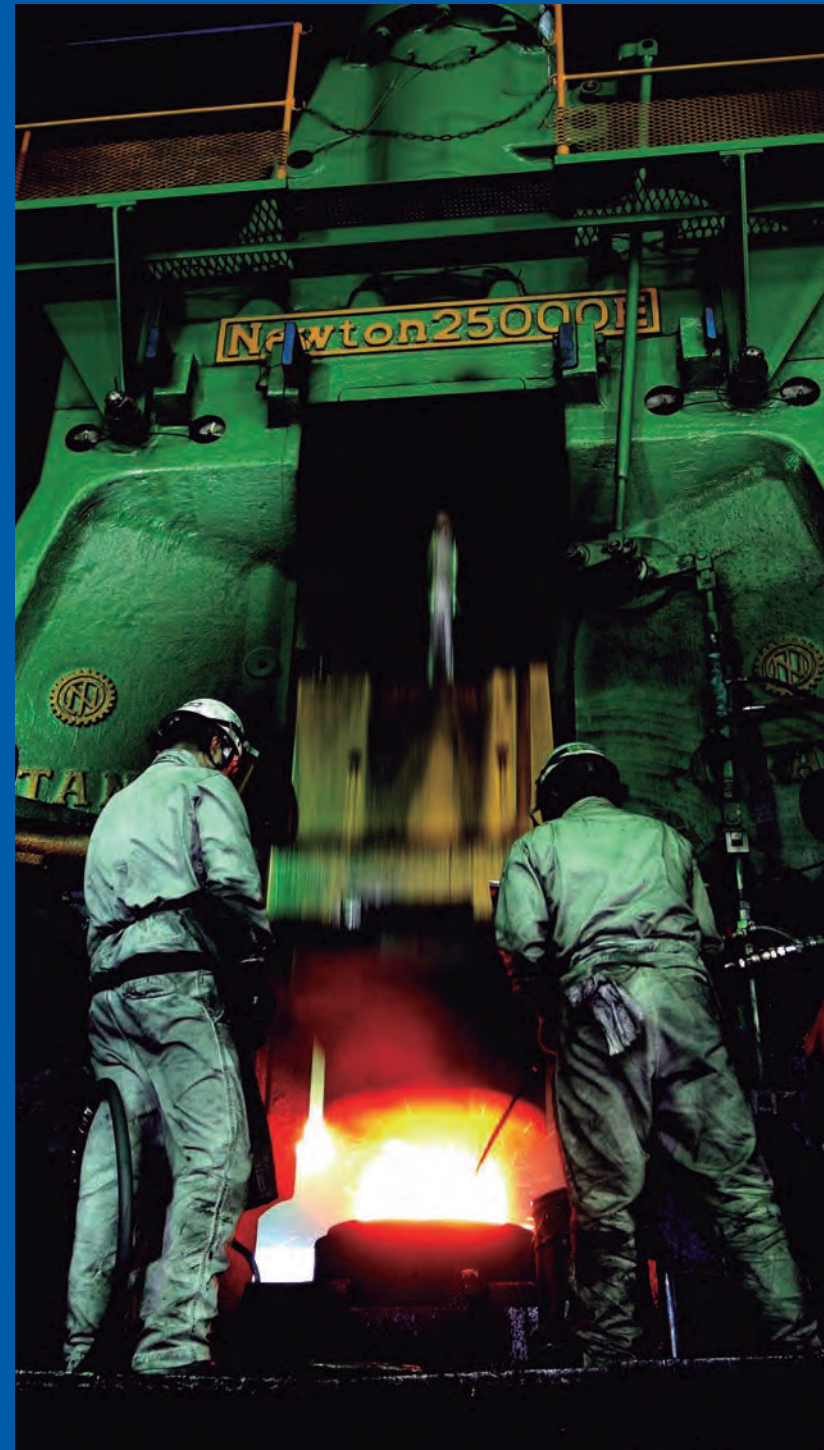


Company Overview

<Business Summary, Overview>

Inoue Special Steel Group:Established in 1920, President and CEO is Hisakazu Inoue, Total capital of 2.43 million us dollars, 516 Employees, Total revenue of 463 million us dollars

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- Petronas FLNG 1 & 2
- Petrobras FPSO MV24/26/27/29
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Water Management: Ulmatec Pyro's "Quantum Leap"



Palmar Bjornoy

Founder, Pyro

(Photo: handout)

"It isn't rocket science," says Ulmatec Pyro managing director, Jan Petter Urke, of his company's waste energy management system. Yet, his own brochure calls the company's waste energy management system "a quantum leap" and the "biggest change in energy efficiency since the shift from steam to diesel," no less. It may not be quantum physics, either, but the "Pyro" brand mechanics start in the psyche of a terrified World War II Norwegian seafarer.

BY WILLIAM STOICHEVSKI

Small business owner Palmar Bjornoy was smuggling people from Norway to The Shetland Islands across a Norwegian Sea and a North Sea that were mined by the British, patrolled by the Germans and made uncomfortably cold by winter. Bjornoy had three boats sink beneath him before deciding to join the British merchant marine, where he discovered cabins could have oil-fired heat instead of the coal-heating used in war time Norway. The merchant marine had hot water, too.

Bjornoy realized that a new type of element could also heat a ship's water lines, and, in 1951, he started selling heating systems. Today, about 15,000 vessels worldwide employ a version of Pyro heating systems.

A second realization came in 2011 — Why not mobilize waste energy?

Ulmatec quickly figured that by using half the heat lost to cooling water and half of that expelled by exhaust you could quickly get 30 to 40 percent extra energy for other purposes. Fuel was only needed for heat when there was no superfluous heat energy anywhere onboard.

A system that conserves the energy in fuel and batteries was engineered by connecting separate or parallel "temperature circuits" of heat generators and consumers aboard a given vessel. The

configuration allows for Pyro's custom-built central heating; anti-icing; waste-energy cooling; power-generation and management; "fresh water production"; sanitary hot water and a novel approach to ballast water treatment.

Recovering the energy lost as heat in exhaust gas or lost to cooling water is "an attractive proposition," Urke says. Recovered heat can warm cabins, de-ice decks and stairways or heat tanks. He says heat recovery of up to 60 percent and onboard waste energy recovery of up to 75 percent are possible with Pyro waste-energy management.

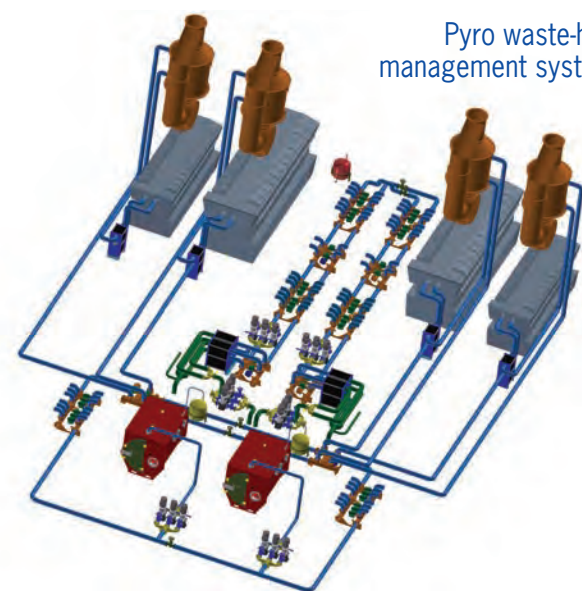
"That's a lot. For every 1,000 kW of energy supplied to a diesel engine, just 300 kW will normally be used to drive the ship," says Urke, adding, "By recovering waste energy, the marine industry can avoid burning fuel for heat, with great savings." On a ship, he says, the 1 kW amp effect of a simple water pump translates into 2,000 liters of fuel a year. Electrical heating or fuel-fired heating can cost 200,000 liters and 100,000 liters of fuel, annually. "Zero liters are used with heat recovery.

"Maersk (Drilling) was the first to buy (two of) the heat-recovery systems. They decided to buy it in five minutes, because they saw the benefits immediately," Urke says, adding that Ulmatec has since sold 80 Pyro waste-heat re-

Photo: William Stoichevski



Ulmatec Pyro managing director, Jan Petter Urke.



Pyro waste-heat management system.

Illustration: handout

covery systems. Company references are the standouts of world offshore shipping and include Bourbon Offshore, Edison Chouest and the fleets of Norway-based Farstad, Olympic, Subsea 7 and DOF Subsea.

Central heating

The modern version of that heating system inspired by the war has many uses. The Pyro central heating system comprises “exhaust gas economizers, fuel-fired heaters and heat exchangers”

as well as automation to run the flow-control unit for fluid pumped through the inevitable onboard “plumbing”.



Heat supplies and consumers in the system are connected as parallel links with their own control valves. “That

yields a significant reduction in pipe dimensions,” Urke says. Heat recovery from high-temperature sources like exhaust gas means parts of a vessel can get high heat if needed. A Pyro tank-heating system is one such use, an Ulmatec of-

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The Pyro main circulation pump.

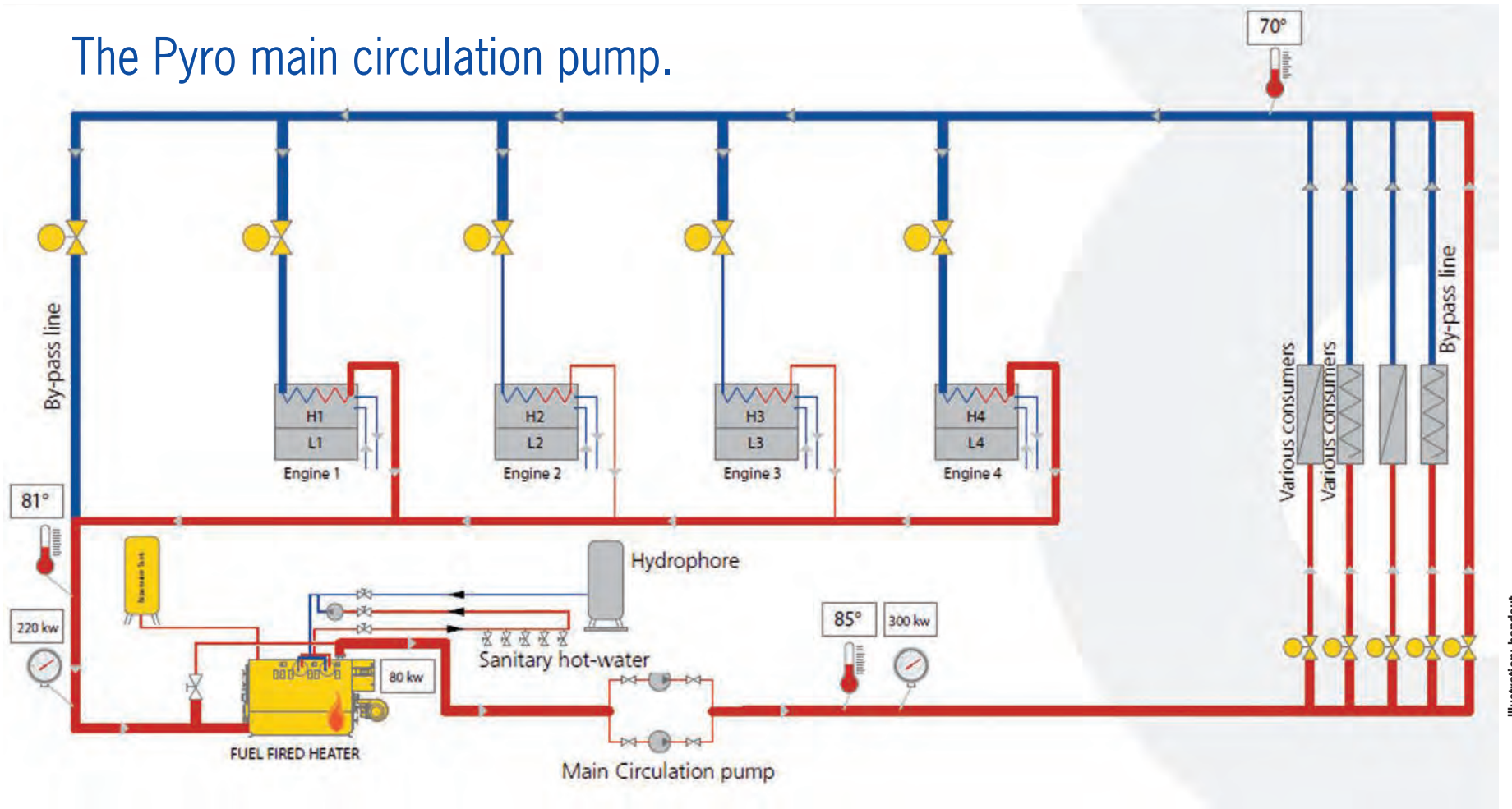


Illustration: handout

fering from 2013.

Another is de-icing, and Ulmatec is understood to have applied for Canadian, European and U.S. anti-icing patents for a system now being installed on an offshore construction vessel being built by Vard Breivik shipyard. Electrical cables, the usual de-icing, are replaced by tubes of waste-heat water and glycol that run on the inside of, say, a gangway railing. The warmed fluid can travel up to 20 meters in one direction, and direction changes bring heat where it's needed, putting an end to nuisance ground-earth faults caused by cable de-icing. To be sure, new Class rules "demand" gang-

way surfaces be kept a minimum of 3 degrees Celsius, an effect thought by some to be "impossible with heating cables". "With this water solution you can transport energy up to a vessel's surfaces for a nice even surface temperature," Urke says.

Norwegian patents are in place for all Ulmatec's offerings, although waste energy cooling and waste-energy power-generation derived from waste-energy management await U.S. patents. In September, a Norwegian university tested for the ideal pipe diameters and flows. The applied research is understood to have cost 20 million kroner.

BWT

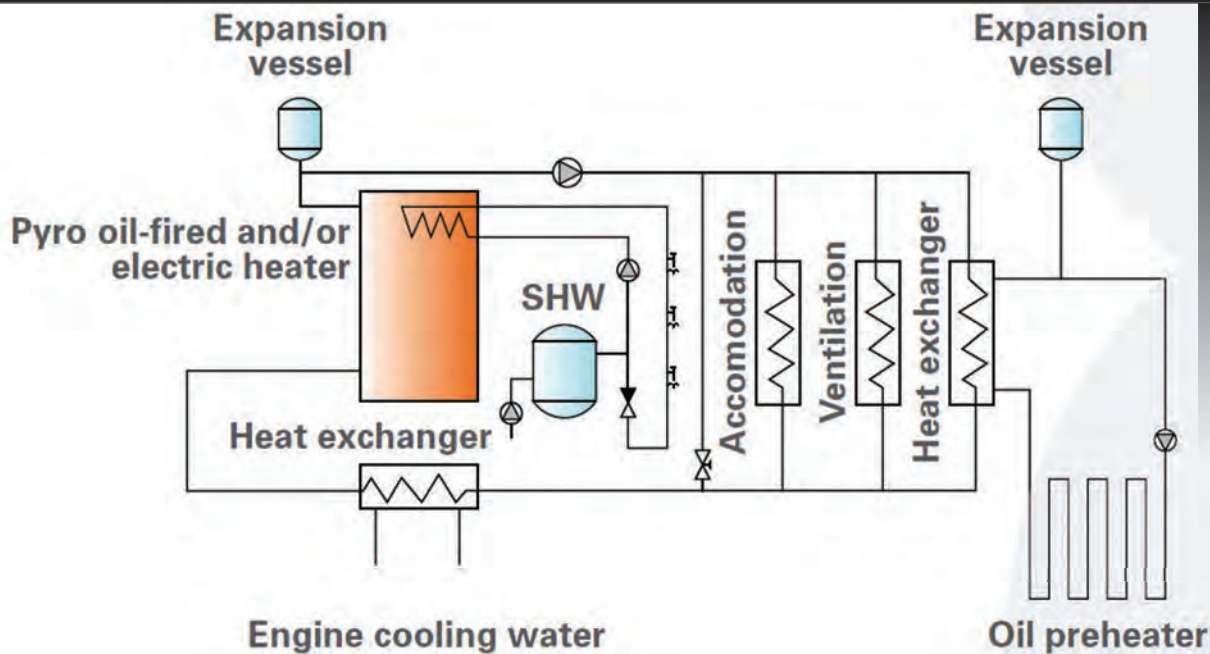
Ulmatec is in ballast water treatment, "like everyone", and so Urke is "watching the (ratification) voting" while testing and keeping count of U.S. Coast Guard technology approvals for 54 inventions said to be in the queue. He doesn't have any international approvals for his BWT system, but, keeping his cards close, he surprises by saying he doesn't expect the U.S.C.G. to approve any of the tech now in the line-up.

"This is the ballast water treatment system," Urke says, pointing to its schematic form by the symbol for a fuel pump. The Pyro water treatment system

is "auto-connected" to the heat recovery system. "It's pasteurization. You heat up the ballast water and cool it down," he says, admitting he had his doubters. "Too much energy, they said. Cannot do it, they said." Unfazed by the criticism, he continues about his BWT. The ballast water is heated, then heated up again by a heat-exchanger and then cooled down.

"When it cools down, it heats up new water (elsewhere), so you need very little energy," he says. A "slow-flow unit" of water heated for "a number of seconds" in a tank "will try to kill all the bacteria". When cold water from the bottom of a ballast tank is warmed up by a coil, its specific gravity increases, Urke explains. The warmed water returns to the tank six degrees warmer and remains at the "surface". It means, according to Urke, that "you have treated all the water for bacteria". The system can treat and discharge or do tank-to-tank.

"We're now studying how to get the right dimensions to keep down installation costs, but the bacteria that survive are zero. Not four or five but zero." The BWT system is designed for "in voyage" applications, and no "heavy filter" leaves some observers wondering how Ulmatec might meet tough new U.S. BWT rules on "marine organisms". Urke says most things die at 55 degrees and up and "in-journey" treatment suggests long periods of heat. Medium-sized vessels with 250 cubic meter tanks are Ulmatec's target BWT market.



SHW=Sanitary hot-water

Illustration: handout

Three Pyro exhaust economizers.

Water power

From ballast water savings, Urke delves into his new “power-generation” system, saying without pause that 1,300 kW of waste energy can be converted into 150 kW of residual electric power using his system. “The efficiency isn’t good, but the (alternative) is to waste it.”

Meanwhile, the waste energy on a 240 m drill ship of six, 7.2 kW engines — like the one Ulmatec customer Maersk is building in the Far East — converts into a lot of extra electric power. Some 72 million kroner a year in fuel and 30 million kroner in saved NOx emissions, Urke insists. The mobile driller needs it. Onboard, they use “95o C water, cooling water and electric energy” and crews need power in the range of 150 kW to 600 kW. A kilowatt is 600 l in fuel use (per year), he says. “That’s huge. It’s amazing, and they say they’ll get five

percent fuel savings a year.”

“This is a (self-censor) engine showing 26 percent energy utilization,” he says, adding, “Here’s the calculation for the fuel.” He shows 6,283 kW going into an engine along with 656 l of fuel. The evidence is “damning”. “Sixty percent of the energy is wasted,” Urke says. A 2.5 kW engine run at about 50 percent load looks to cost about \$2 million per year to run “per engine”.

Urke then turns to the fuel savings of

a “typical offshore vessel” in a tropical area, where it seems a 90 percent fuel savings is attained using Pyro energy management. Make that 26 percent in “northern areas” and 30 percent in the arctic when running a Pyro waste energy management system with heating.

In the old days, the cooling system pumped water at a fixed rate “all the time”. Pyro software made in an Ulmatec factory along with heat-exchanger parts manages water use according to ship needs

“The system onboard is so easy to understand. It’s only heat exchangers. The crew onboard don’t have to deal with lamps and UV and heavy filtration and start and stop of ballasting. Just heat up and cool down, that’s it.”

A normal Pyro heat recovery system for four engines costs about 500,000 kroner, “If you want a heating system and you add high-temperature heat recovery without exhaust gas (heating). The pay-back time is three to five months.”



Photo: handout

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FINLAND BREAKS THE ICE ON LNG



Photo: Arctech Helsinki Shipyard



Due for delivery in Q2 2016, Finland's new icebreaker Polaris is the world's first to feature dual fuel liquified natural gas (LNG) and diesel propulsion, earning the icebreaking vessel designations as the Finland's most powerful and the world's greenest.

By Eric Haun

Arctech delivered icebreaker Murmansk to the Russian Ministry of Transport in December 2015.

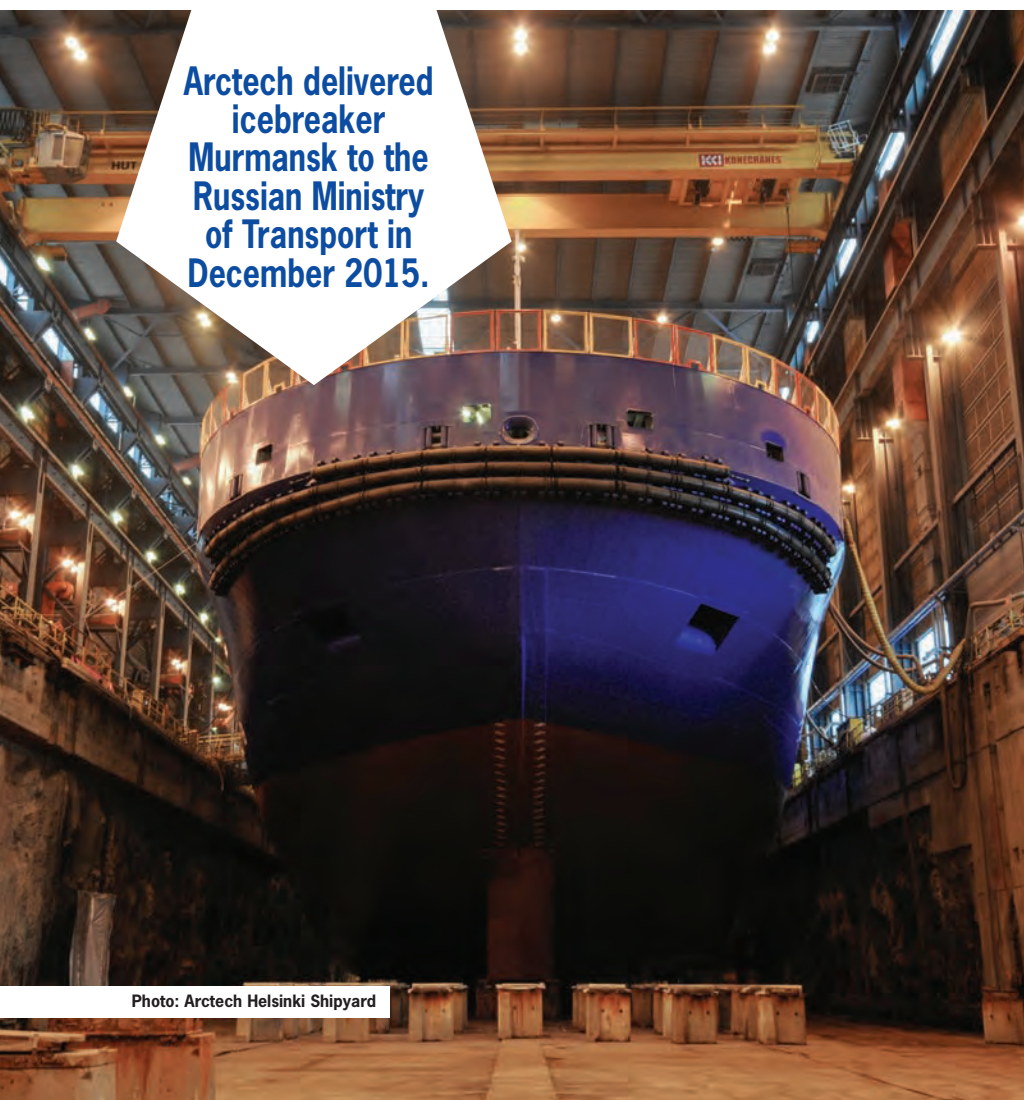


Photo: Arctech Helsinki Shipyard

No stranger to icy conditions, Finland has become a world leader in Arctic maritime technologies, as a nation that must rely on icebreaking vessels to help its commercial ports and harbors remain operational year round.

Seeking a new state-of-the-art icebreaker to bolster these efforts, the Finnish Transport Agency outlined its requirements for a new icebreaker in early 2013, demanding a vessel that could break Baltic Sea ice under all conditions. As a kicker, the new vessel would also need oil spill response and emergency towing capability at open sea. The government procured \$140m for a vessel that had to be at least as powerful as the 16.2 MW Uhro-class icebreakers, and capable of meeting a number of other demanding design criteria, including:

- *assistance capacity at open sea,*
- *average assistance speed of 9-11 knots in all ice conditions in the Baltic Sea,*
- *24-26 meters width of broken ice channel'*
- *good towing features, including a maximum draft of 8 meters to enable operations in all main channels; and sufficient mass and maneuverability for operations in difficult ice conditions.*

In April 2013, the Finnish government awarded a contract to Aker Arctic to design the vessel in cooperation with ILS Oy and help prepare the tender and assist in negotiations with potential builders. Following a tender process, Arctech Helsinki Shipyard in Finland was chosen to build the vessel, though the initial contract was cancelled due to certain guarantee issues. Arctech won the second bid, however, and a final contract was signed in February 2014. First steel was cut in November 2014, and a keel laying ceremony was held in March 2015.

Named Polaris in December 2015, the vessel was floated out from the builder's covered drydock and moved to the outfitting quay in January 2016. Though Polaris was initially scheduled for a January 2016 delivery, sanctions issued have forced some delays with the Russian-owned yard. Delivery is now expected in Q2 2016, after which the Finnish Government will sell Polaris to Arctia Icebreaking Oy, a subsidiary of state-owned Arctia Shipping, which manages all icebreaking operations in Finland.

Currently undergoing final outfitting and commissioning at Arctech Helsinki Shipyard, Polaris is built to last, designed to operate on the Baltic Sea for the next 50 years. A product of Finnish Arctic and maritime technological knowhow, Po-

Polaris leaves drydock



Photo: Arctech Helsinki Shipyard



Polaris rendering courtesy Aker Arctic.

Polaris draws upon some of the industry's top names to secure a spot among the world's most environmentally friendly and technologically advanced vessels.

MEET POLARIS: THE ECO ICEBREAKER

Polaris is based upon the Aker ARC 130 concept, with an overall length of 110m, beam of 24m and an 8m draft, enabling the vessel to operate in all major Finnish shipping lanes. The technologically complex vessel is outfitted with more than 180 km of electric cabling, a brush collector oil recovery system, a satellite imaging system for ice navigation, an emergency towing winch and a helideck.

Arguably, Polaris' most noteworthy asset is its powerplant and propulsion units; the ship is the world's first icebreaker to run on dual fuel (diesel and LNG), a set-up designed to fuel consumption and costs as well as emissions, making it IMO Tier III and Baltic Sea Sulphur Emission Control Area (SECA) compliant.

The Polaris' diesel-electric power plant includes two nine-cylinder Wärtsilä 9L34DF (rated 4,500 kW each) and two 12-cylinder Wärtsilä 12V34DF (rated 6,000 kW each) four-stroke medium speed dual fuel engines, as well as an additional eight-cylinder Wärtsilä 8L20DF auxiliary engine (rated 1,168 kW). All told the combined power output is more than 22 MW.

The vessel's two vertical LNG tanks combine for a total volume of 800 cu. m., enabling 10 days autonomy in typical winter conditions. Another 20 days autonomy is added via a combined 2,500 cu. m. capacity for fuel oil.

Polaris also features a unique propulsion system: three electrically driven ice strengthened ABB Azipod units, two at the stern (6,500 kW each) and one at the bow (6,000 kW), which combine for 19 MW, making Polaris Finland's most powerful icebreaker to date.

And while Polaris' main duty will be icebreaking on the Baltic Sea, which is typically frozen four to seven months a year, the vessel will also be able to serve in oil spill response operations, with a mechanical oil recovery system integrated into its hull, operable in both open water and in ice. Oil recovery tank capacity is 1,300 cu. m.

Timeline

Contract effective date:	2/14/14
Production start:	7/21/14
Keel laid:	3/4/15
Naming ceremony:	12/11/15
Launch:	12/30/15
Expected delivery:	Q2/16

Principal parameters

Length, o.a.	110 m
Length, w.l.	98 m
Breadth	24 m
Draft	8 m
DWT	3,000t
Speed	17 kn
Bollard pull	185 t
Design lifetime:	50 years
Flag:	Finland
Class notation:	Lloyds Register
+100A1 Icebreaker(+), Oil Recovery, Ice Class PC4, *IWS, ECO(NOx3, P, Sox), +LMC, UMS, GF, NAV1, IBS, MPMS, TUG	

Icebreaking capacity

Icebreaking capacity optimized to hardest Baltic conditions
Speed ahead abt. 4 kn, level ice 1.8 m
Speed ahead abt. 8 kn, level ice 0.8 m + 20cm snow
Speed astern abt. 8 kn, level ice 0.8 m + 20 cm snow

Operations in open water

Sea keeping capability for oil-combating at Hs=2 m wave height and 95% time of Baltic wind conditions
Oil spill recovery, also in ice conditions
Emergency towing in 95% time of prevailing conditions at Baltic Sea

Machinery

Fuel	LNG and MDO
LNG fuel tanks (Cyro)	2 x 400 m3
Main diesel gensets	2 x 6,000 kW + 2 x 4,500 kW
Diesel engines	Wärtsilä 12V34DF/9L34DF
Aux diesel genset	1 x 1,168 kW
Rudder propulsors	ABB Azipod VI 2 x 6,500 kW (stern) + 1 x 6,000 kW (bow)

Outfitting

Oil recovery system	2 x brush collector
Tanks for recovered oil	abt. 1,300 m3
Towing winch	1 x double drum, 110 t
Roll reduction tank	abt. 700 m3

Accommodation

Cabins/beds	20/24
Operating crew	16 persons

Emissions

- Hull painting with solvent free epoxy + ice belt area of s/s cladged plates
- Propulsion arrangement selected for optimal load in all ice conditions and modes of icebreaking
- Engine configuration selected for optimal load in all operation modes
- When operating with LNG, the vessel fulfills IMO Tier III emission requirements
- When operating with low sulphur MDO, the vessel fulfills IMO Tier II requirements
- Zero-emission principle for garbage and grey/black/bilge water



Photo courtesy of Georgia Ports Authority

Container Crane Masters

BY HENRIK SEGERCRANTZ

The Port of Savannah, owned and operated by the Georgia Ports Authority, is one of the most successful container ports in the U.S.

Maritime Reporter visited the global head office of Konecranes Plc in Hyvinkää, Finland, to find out about the latest developments in the container handling industry. Konecranes is a major global port lifting equipment supplier, and Dr. Hannu Oja, Director of Port Technology, is a well-known veteran in the business, having worked with Konecranes since 1985.

“In the overall global environment we work in, container shipping volumes continue to grow, container ships are getting bigger, and container handling cranes need to get bigger in step with the increasing size and capacity of the container port terminals, which have to be optimized for the peak loads.” Dr. Oja describes how the arrival of the very large capacity container vessels has put pressure on the logistical chain. The container terminals have had to invest in larger overall size and capacity, and larger container handling equipment, which has resulted in consolidation among terminal operators. “When the peak load used to be, say, 10,000 TEU it is now 20,000 TEU. The new mega-sized container ships exceeding 18,000 TEU in capacity can only use certain

ports due to their size, draft and capacity. Recently, even the International Transport Forum (ITF) has expressed doubt about the wisdom of introducing these mega-sized vessels.” The huge new container ships require a very efficient feeder system (roads and railways) to and from the container port to distribute the containers. “Smaller vessels, say 14,000 TEU in size instead of 20,000 TEU, can access more ports, which can compete for the business, and provide a faster turnaround time and better land logistics. The business scenario has been upended, lately,” Oja summarizes.

“Then, of course, we have the effects of the current global market trends. Container volumes between China and the U.S. have not grown in recent years at the pace of earlier years, which of

course raises the question: will the capacity of all these new big vessels be used?” Among the terminal operators, consolidation has been taking place and new alliances have been formed in order to optimize volume and resources. “This is a constantly changing business landscape.”

Currently the global market is in recession in some areas, but not everywhere. “Substantial growth has occurred in the United States and West Africa, for example, in recent years,” Oja points out. He describes how some major investments have been made in Asia, in Indonesia for example, while the European market has been very challenging for quite a long time, with almost no investment in new capacity except in Rotterdam. The container shipping routes are

evolving, not least through the widening of the Panama Canal, which will change the competitive positioning of the East Coast and West Coast ports of the United States. Also, rail container traffic in the U.S. has increased greatly.

Konecranes supplies lifting equipment and service to a wide range of industries globally under several brand names. The company is among the biggest lifting equipment providers in the world within most of its product segments. Through its remote service centers and the world's most extensive crane service network, Konecranes is the market leader in crane service. The company produces most of the crane types used in container ports, including the big ship-to-shore container cranes. There are different types of container terminal depending on the container handling equipment type. In the U.S. and the Far East, rubber tired gantry cranes, or RTG cranes, are common, capable of stacking up to five containers high. Rail mounted gantry (RMG) cranes move on rails and are typically used in container ports with automated container handling systems. In Europe, straddle carriers are common. These are rubber-tired machines that transport one container at a time and to stack up to four containers high. Reach stackers are heavy-duty lift trucks used to handle containers in inter-modal container terminals - inland terminals that deal with road, rail or river-based container traffic. Konecranes is a major supplier of lift trucks for container handling.

Konecranes is in the top echelon of Western suppliers of ship-to-shore (STS) cranes, the biggest container cranes in the container port. Chinese manufacturer ZPMC is the market leader in this crane type, with a global share of some 65 percent. In the RTG crane market, Konecranes is among the top three leading suppliers. In the automated RMG crane type, which moves on rails, it is the second biggest supplier on the market. The research and development work takes place in Finland where the key components are also produced. The manufacturing of bigger and heavier components, as well as assembly, typically take place near the final destination. Employing some 12,000 people, Konecranes sales totaled EUR 2,126 m EUR in 2015. Some 40 percent of the company's revenue comes from service operations; about 60 percent of revenue comes from equipment sales. The company has some 600 service locations in 50 countries, servicing around 450,000 pieces of lifting equipment, most of which are manufactured by companies other than Konecranes.

There are some 2,000 container ports in the world. Of these, some 500 to 600 ports handle 200,000 TEU to 250,000 TEU annually. Over the years, Konecranes has gained a good foothold in a number of markets. The United States is one of the strongest markets for the

company. "Our way of doing business is based on building long customer relationships, where we want to be among the first the customer calls when there is a need for upgrading and expansion," Oja says. "A good example of this is the Port of Savannah, Georgia, operated by

the Georgia Ports Authority (GPA). The GPA has been our client since the end of the 1980s. Currently, they have 22 of our ship-to-shore container cranes with 8 in the delivery pipeline, and 136 of our RTG cranes with 10 in the delivery pipeline. In 2015, the Port of Savannah



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The GPA has been our client since the end of the 1980s. **Currently, they have 22 of our ship-to-shore container cranes with 8 in the delivery pipeline,** and 136 of our RTG cranes with 10 in the delivery pipeline. In 2015, the Port of Savannah handled around 3.7 m TEU.

Dr. Hannu Oja
 Director of Port Technology
 Konecranes



Photo courtesy of Henrik Segercrantz



Photo courtesy of Konecranes

The TRUCONNECT Remote Service Control Station at Konecranes HQ in Finland and one of three such stations placed around the world.

handled around 3.7 m TEU. Savannah's Garden City container terminal is the biggest single container terminal in the United States - although there are bigger container ports. Savannah is a very efficient port. It has been increasing its volume year after year."

The development of container handling technology has been incremental. With the larger container ships came more efficient container handling systems. "Perhaps the most remarkable development has been seen in increasing automation," Oja notes.

He describes how container ports today, in most cases, have manned container cranes, but it's possible today to fully automate most yard crane operations, with human intervention occurring only at certain phases from a remote operating center in the port's control center.

Quayside operations, loading and unloading the container ships with ship-to-shore cranes, is still mainly done by human crane operators.

That said, remotely controlled ship-to-shore cranes have been taken into use successfully in the last couple years. Development in this area is speeding ahead.

There are bottlenecks, however. The shipping container was developed back in the 1960s, and the ships carrying the containers have not changed much since that time when it comes to their loading and unloading.

It is quite challenging to automate this part of the container handling process. "Here we have not seen that much development yet.

The various parties should interact more to promote more efficient methods enabled by new technologies," Mr. Oja points out.

The development of automated horizontal container transportation from the quayside to the container yard, using automated guided vehicles (AGVs), and incorporating automated stacking and automated road truck loading and unloading, was started in the 1990s by the HHLA Container Terminal Altenwerder (CTA) pilot project in Hamburg. Today, there are a handful of such automated container terminals. In the United States, a container terminal of this type is being developed in Los Angeles.

During its visit to Konecranes Headquarters, Maritime Reporter & Engineering News also got a look at the TRUCONNECT Remote Service Control Station, one of a total of three such stations located on three continents, together providing 24/7 remote monitoring of more than 10,000 cranes and lifting systems worldwide.

The functioning of Konecranes crane installations around the world are monitored, and information is extracted on their condition. A need for preventive maintenance can be identified, for example, when a roller bearing is getting

hot. A software problem can be analyzed and also fixed remotely.

For the time being Konecranes is bidding its time regarding decisions to be made related to the ongoing merger process between Konecranes and U.S.

lifting and material handling solutions company Terex Corporation. The merger plan was announced last year. In January this year, a Chinese company expressed an interest in acquiring Terex by making a share purchase offer.

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Heavy Lifters

Heavy lifters come in all form, shape and size, from deep sea to offshore to inland waterways. This month MR takes a look at some recent innovations designed to make your heavy lifting jobs safer and more efficient.

1,000mt Wellhead Production Topside Transport

SapuraAcergy recently awarded BigLift Shipping the contract for a wellhead production topside module for the Yadana gas field, off Myanmar, a contract which entailed loading the module in Ulsan, Korea, and transporting it to the Yadana field, where SapuraAcergy's S3000 would lift it off and install it onto its offshore foundation. Happy Star loaded the topside module of just under 1,000mt courtesy of its pair of 900mt heavy lift mast cranes at Hyundai Heavy

Industries in Ulsan. A major challenge was the orientation of the topside module on deck which had to be exactly in position for the unloading operation.

The module's eccentric center of gravity and size created challenges in terms of lifting clearances, safe working load (SWL) and outreach. In the planning stages, comprehensive 3D simulations showed that when the module was turned to its final position, the minimum clearance between the cargo and Happy Star's crane would only be 700 mm. A second challenge was to design a grill-

age and sea fastening system capable of taking the anticipated loads in compliance with the client's requirements. A detailed FEM analysis was carried out to prove the integrity of the proposed system and to identify and improve any weak spots. The design of the sea-fastening system focused on easy access to the cutting locations at no more than eye height. This dispensed the need to work at height offshore, increased safety and enhanced the ease of operation at the discharge location. The workshop drawings and Material Take Off list were delivered

to pre-fabricate all components. The discharge operation, including the mooring operations and lifting preparations, had been planned as carefully as the loading sequence. After a short sea voyage Happy Star arrived at the discharge location offshore Myanmar to meet SapuraAcergy's S3000.

Paducah Rigging Pushes Perfectly Positioned Rope

In 1974, the sole business of Paducah Rigging, with just four employees and operating out of a small office not much

BigLift's Happy Star delivers key part of Yadana gas field offshore.



(Photo courtesy BigLift)

larger than a two-car garage, was to manufacture barge wires for a few area towboat companies in the immediate vicinity of Paducah, Kentucky. Today, Kentucky is still HQ, but the full service rigging company now has three additional branches in Louisiana, Mississippi and Illinois.

With expanded geographic coverage comes additional service of a wide range of inland towing needs, with a growing portfolio of equipment, lines and ropes. Along with a full-line of fabricated wire rope slings, chain slings, nylon slings, tie downs, barge and winch wires, crane wires with fittings, logging chokers, and many other related products Paducah Rigging also stocks and sells Samson ropes.

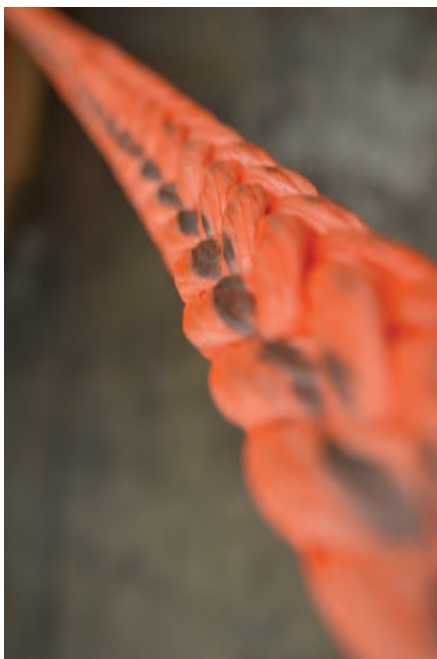
According to Paducah Rigging President Alex Edwards, the U.S. inland rivers began to transition from primarily using wires in the late 1980's to early 1990's. Amsteel-Blue – a Samson synthetic product – then took good hold with decent market penetration in the mid-1990's. In general, on the water,

barge-to-barge moorings today are typically wire. Barge to pushboat connections, on the other hand, have evolved to rope and synthetics.

Samson's AmSteel-Blue, made with Dyneema fiber, is a torque-free 12-strand single braid that yields the maximum in strength-to-weight ratio and, size-for-

size, is the same strength as steel—but it's so light, it floats. According to Edwards, AmSteel-Blue is an excellent wire rope replacement with extremely

Paducah Rigging has had good success introducing Samson's orange and blue lines into the inland waterways market.



Samson Rope

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Agile Lifting System: A Heavy-Lift Sling Fast?

Samson's new AGILE heavy-lift synthetic sling offers unprecedented advantages in offshore environments, including exacting length tolerances, reduced-line weight to lighten loads, and dramatically shorter lead times for production. Slings that used to take weeks to fabricate, can now be achieved in a matter of days. Scalable from 50mt to 4000 mt, AGILE is the next generation of heavy-lifting slings, combining the best advantages of both roving and rope slings into hybrid design that's competitively priced and easy to trust.

4100 Millennium Crawler Crane

The Lampson 4100 Millennium Crawler Crane combines the structural integrity and versatility of the Manitowoc 4100 with the safety and ease of operation of the new generation hydraulic operating system cranes. The modernized power train consists of an eco-friendly Tier 3/4i Cummins Engine, driving Comer drum planetaries which increase single drum line pulls by 70% with two line size choices – 1.125-in. and 1.25-in. diameter. The swing system has been converted to hydraulic operation and the original hydraulic boom hoist drive has been retained. Millennium series cranes are equipped with LSI load monitoring systems to further enhance safe lift operations.

DMW Group

DMW Marine Group, LLC designs, engineers and manufactures special application marine cranes. DMW has a wide selection, with standard models (knuckleboom, telescopic boom and fixed boom) ranging from five to approximately 1000 ton meter. All DMW Marine Group's cranes are designed and built to withstand marine and offshore environments. DMW Marine Group designs and engineers equipment used on drill rigs and semi-submersibles; which include riser maintenance cranes, access baskets and stabbing baskets. All of DMW Marine Group's cranes are built to ABS and API rules and regulations and all models are available with ABS, DNV, Lloyds and BV Certifications.



Statoil rig, Gullfaks field.

(Copyright: Statoil AS, Photo by Oyvind Hagen)

MacGregor and Parkburn launch a Fiber-rope Crane.



(Image: MacGregor)

low stretch, and superior flex fatigue and wear resistance. Because of that, a large percentage of U.S. inland operators depend exclusively on the rope, especially in terms of facing, wing wires and tug winches.

According to Sampson, the unique blue color is there for more than just appearance — it is created by a proprietary Samthane coating that enhances rope wear life and snag resistance. AmSteel-Blue doesn't require lubrication because it doesn't rust or "fishhook." Its flexibility and extreme light weight will allow for an easier, faster and safer mooring sequence. And, Sampson reports that the 12-strand construction of AmSteel-Blue is one of the easiest ropes to splice or re-splice.

The next generation in Sampson's 12-strand working lines made with Dyneema fiber, Saturn-12, has a coating that improves abrasion resistance and increases residual strength as much as 15 to 20 percent when compared with other HMPE lines and their conventional coatings. This torque-free, flexible, and easy-to-handle construction is easy to inspect and splice in the field. Edwards insists, "Amsteel-Blue is the current market leader; hands-down." But, that's about to change because, says Edwards, all of the great features that make Amsteel-Blue a solid rope still apply to the bright orange Saturn 12, which is the exact same rope, but with a better coating

for abrasion control. Saturn 12 will come with about a 5 percent increase in price, but, says Edwards, the change is worth it. Actually, Saturn 12 has been around since 2010 when it was introduced to the markets and by 2013 it had been introduced to inland rivers in the U.S. Saturn 12 is commonly used for river pushboat facing and wing wires and for electric winch wires. Unofficially, U.S. Navy testing is said to be currently yielding a 15 to 20 percent increase in lifespan for the orange Saturn 12 brand.

New Fiber-Rope Crane

The new fiber-rope crane has been developed by combining MacGregor's offshore crane technology with the fiber-rope tensioning technology by Parkburn Precision Handling Systems. The new MacGregor crane features a simple-to-operate fiber-rope lifting system that employs Parkburn's tensioning technology. The Parkburn equipment eliminates the heating and degradation problems associated with on-load fiber ropes stored on winch drums. It can accommodate non-uniformities resulting from splices in the rope.

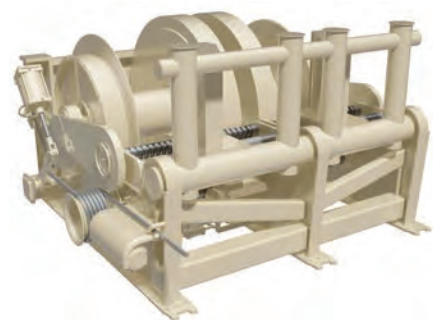
"This is an important advance for handling loads at depth," said Baard Trondahl Alsaker, MacGregor's Vice President, R&D and Technology. "The great advantage of fiber rope in this context is that it weighs virtually nothing in water, so regardless of the length of rope paid out, it does not add anything to the load

experienced by the crane. This is in complete contrast to the situation with wire rope, where the ever increasing weight of wire paid out limits the load permissible in relation to depth."

The new crane will be introduced to the market as a 150T fully heave-compensated knuckle boom crane with capability of reaching 4,000 meters of water depth, but the offering will be extended to the complete range of MacGregor subsea crane fleet. The MacGregor fiber rope technology is also suitable for retrofit on existing subsea cranes. This enables upgrading the capabilities of existing construction vessel fleet without having to build new vessels, an important feature to meet the requirement for reducing the cost level of the industry.

Baydelta Chooses Electric Tow Winch

Rapp Marine has been delivering electric winches to commercial vessels in other industries such as research, oil & gas, and fisheries for years. Rapp Marine has now developed a unique, fully elec-



(Image: Rapp Marine)

tric driven double drum tow winch on a new 110 x 40-ft. tractor tug for Vessel Chartering LLC, a wholly owned division of Baydelta Navigation Ltd. The tugboat is designed by Jensen Maritime, and to be built at JT Marine Shipyard. Driven by a single 100 hp motor, the winch can pull over 75 tons and uses pneumatic cylinders in place of hydraulics, keeping fluid off of the deck. The brakes offer a force of 250 tons on the barrel layer. The main drum can store 2,500 ft. of 2.5-in. steel wire, and the storage drum can store 2,200 ft. of 2.25-in. steel wire. Both drums are equipped with level winds, and can spool 90-ft. of 3-in. chain on top of the steel wire. Another feature is an electric 'come home' drive, which will serve as a back up to the main drive train. The winch's main control station will be situated in the wheel house, with secondary controls located on the winch. The main control station will employ Rapp Marine's Pentagon Tow Control System, that provides more efficient and safer operations for towing vessels. The Pentagon System features a touch screen with tension and wire length readouts, auto-tension capability, and automated haul-in and pay-out settings.

BOP Cranes for Statoil

Statoil awarded Palfinger Dreggen a contract for the complete rebuild and upgrade of six blowout preventer (BOP) cranes for the Gullfaks field in the north-

ern part of the Norwegian North Sea. Each of the BOP cranes to be delivered from Palfinger Dreggen will have the capacity to lift 2 x 20 tons. In addition, the cranes are equipped with an auxiliary hoist with SWL 5 tons for smaller lifts. The delivery includes complete new trolleys with hoisting machineries, new modern control systems for the cranes and radio remote systems to make the operation of the cranes easy and flexible. Engineering, project management and procurement will mainly be performed in Bergen and the production will take place at Palfinger Dreggen's own factory in Poland. The installation and commissioning of the cranes will start end of 2016 and continue until summer 2017.

Techcrane Drives Ahead

Techcrane developed and implored what it calls best "Tech" for telescopic cranes in the marine industry. Its inception can be traced back to the foundation that Techcrane was built upon. Using the same concept as the rack and pinion system commonly used on Jack-Up Rigs, Barges, and Lift Boats for decades, Techcrane's rack and pinion drive system has evolved the marine crane industry to a more environmentally friendly and efficient level. Unlike Jack-Up rigs, the utilization factor in the gearboxes used to the propel the inner boom is minimal. The need for repair of the gearboxes, therefore, has shown to be almost non-existent.

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Solar power is one example of a disruptive energy source that is being adopted by the marine sector. Pictured is the MS Tûranor Planet Solar, the largest solar-powered boat in the world.

Disruptive Sustainability

(Photo: Planet Solar / Philippe Plisson)

What is it? What does it mean to you? A New Leadership Framework Emerges

BY TOM MULLIGAN

'Disrupt or be disrupted' is the new mantra of sustainability. But what does it mean? The IMMEDIASEA Disruptive Sustainability debate held in London earlier this year featured industry leaders giving their ideas of what it means for the maritime sector.

Zero-emissions automobiles; fixed-price electricity from clean energy sources; ultra-efficient domestic temperature control requiring just five percent of the energy required for conventional systems; these are all examples of disruptive sustainability in the modern world.

Similar thinking and approaches are being applied in the shipping industry. Companies are looking at sustainability issues and seeing disruptive threats that are pushing them to make transforma-

tional changes. Hence 'disrupt or be disrupted'. Addressing the problems facing the shipping industry in the 21st century requires entirely new thinking. This was the focus of IMMEDIASEA's most recent debate 'Disruptive Sustainability: the new leadership framework' held in London in February.

Can companies continue to operate in a 'business-as-usual' manner? Not according to Birgit Liodden, Director of Nor-Shipping and chairperson for the debate, who emphasized that our world needs change, ideally to result in no pov-

erty, zero hunger, good health and well-being, quality education, clean water and sanitation, clean energy, and economic growth. Parallel to this is the digital revolution, as well as new competitive threats such as how today's customers may be the competitors of tomorrow, for example Amazon taking steps to move into shipping and Google entering the travel sector. In setting the scene for the debate, her argument was that as a global cyclical business, the shipping industry is optimally equipped to utilize these shifts but that the disruption needs to be

made by the industry itself from within.

“This is clearly demonstrated by ‘an ocean of opportunities’ presented by the four IMMEDIASEA debate speakers,” she stated, urging the audience to “fuel your inspiration! be provoked! get engaged! and join the challenge!”

Create Your Future

“I think you will agree that shipping faces challenges far beyond the need to just be financially sustainable,” said Kirsi Tikka, Executive Vice President, Global Marine, ABS, in her presentation titled ‘You don’t travel to the future, you create it.’ “Themes of innovation and disruption have become commonplace in the media and on conference platforms but the outcome is more often a good headline or snappy soundbite than something that owners, managers, builders or the Class Societies can apply in practice,” she stated.

She said there were a number of reasons for this, the first being that it is an industry that is driven more by short-term market fundamentals than it is by the application of new ideas – at least in ship design, construction and operation: “In a low fuel price/low earnings environment, the appetite for innovation and the development of new concepts can be almost non-existent. When markets are good, the ability to trade an asset regardless of its efficiency makes it an equally low priority,” she said, adding that “the impetus to change has traditionally tended to be regulatory or evolutionary, rather than innovation-driven. The evolutionary changes have been mainly the introduction of specialized ships, such as containerships, different types of gas carriers, improved cargo handling, and economies of scale and, even where time and effort is expended to develop better hull forms, improved-performance coatings, more efficient engines, and improved materials. These have not had the same impact as conceptual changes and the introduction of ever-larger ships.

“We are now looking for more disruptive innovation from automation and big data analytics – but for the most part, we don’t see a roadmap of how we get there, mainly because it involves expertise not found in our traditional industry, and leadership who understands how to apply and benefit from the technology.”

“Collaboration could be an answer, but the stakeholders – the owners, shipyards and manufacturers – are worried

about losing their competitive edge if they share ideas. Perhaps the reality is that shipping has always been too fragmented – in ownership profile, in supplier base, and in service providers, for the take-up of disruptive ideas. There are only two major civilian aircraft manufacturers but here it appears to encourage innovation. We (in shipping) have dozens of shipyards and hundreds of OEMs and service providers but we seem to be suffering from a lack of genuine inspiration.”

Moving on to discuss the long-term needs of the industry, Tikka noted that shipping needed an innovation strategy

and that this was not just a vanity project, it was required to tackle operational issues, regulatory challenges and to find ways of being more competitive, as well as environmentally and financially sustainable.

“The glue to holding these elements together is of course data. Big data as a concept is happening but I think collectively we still need to figure out how to use it. There are plenty of stories of increasing volumes of data collected from the ships without a clear strategy of how to manage and act on the results,” she said.

“So what is our way forward?” she

asked. “If we are truly to tackle the innovation challenges that confront us, the shipping industry needs to open itself up to a much wider pool of ideas and be more open-minded to outside influences. Scientists have proven a fundamental principle of the pursuit of ideas: the future is not something you travel to, it’s something you create,” she concluded.

Digitalization

Rune Braastad, Vice President ABB Marine & Ports, looked at the disruptive sustainability issue from the perspec-

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tives of how digitalization and energy storage technology were shaping current developments, noting that there was an increasing variety of energy sources, carriers and fuel solutions entering the market for maritime transportation, including LNG, batteries, and fuel cells.

Regarding digitalization, he observed how connectivity and digital technology was allowing the control and execution of an increasing number of processes remotely. The availability, quality and affordability of sensors was supporting increasing adoption of sensors that generate digital information that would enable companies to deal with increased political, social and regulatory pressure towards lower emissions and increased efficiency to better protect the environment.

He then described how ABB Integrated Operations was “turning Big Data into small data” through the integration of technical support, alarm monitoring, energy advisory services, and remote diagnostics providing information to engine control rooms and ships’ bridges, as

well as to ‘customer onshore operations centers’ that provided technical support, maintenance planning, and energy and voyage advisory services to clients.

These technological changes, besides improving operational efficiency, would help drive the shift towards zero emission solutions, argued Braastad. In addition to the use of new propulsion methods, energy storage systems are providing backup for running gensets as well as meaning that fewer engines are needed online due to improved fuel efficiency, an added bonus being reduced engine running hours. Other benefits include the production of power at peak efficiency, enhanced dynamic support with instant power in support of the running of gensets, the use of ‘slower’ engines, the adoption of LNG/DualFuel engines and fuel cells, as well as zero emissions in harbor and a quiet engine room. Energy storage solutions can also result in UPS-like functionality for all or portions of the power system, giving new ways of achieving high enhanced ridethrough numbers (ERNs) and higher power sys-

tem availability.

Future Visions

The theme of the presentation given by Willie Wågen, Director Market Innovation at marine solutions provider company Wärtsilä Norway AS was ‘Disruptions attacking the marine industry?’ in which he presented a vision of the future in which energy transformation, the use of autonomy and robotic systems, and competition from non-marine competitors could be seen as the marine industry coming under disruptive attack. Other issues to be considered included green taxes on emissions; changes in people’s opinions and behavior; taxes on CO2 emissions to accomplish COP21 goals; and new political framework conditions or paradigms.

Like Braastad, Wågen cited new energy sources and energy storage as major ‘disrupters’, and the second major disrupter of the marine industry, in Wågen’s view, was increased use of robotics and

artificial intelligence, enabling autonomy in products, systems and vessels. Benefits of these disrupters included connectivity in all layers and the acquisition of Big Data in maintenance, operation and control, enabling new services to be created.

Finally, he quoted the example of Wärtsilä’s EXERGO project, in which available energy is maximised through energy storage and connectivity.

“These disrupters are leading to the adoption of new business models and the ‘sharing economy’, in which transparent information is always available to everybody. Asset-sharing and usage leads to the elimination of the middleman,” Wågen concluded.

Antifoullants

Stein Kjølberg, Global Sales Director, Hull Performance Solutions at Norway-headquartered paints and coatings specialist Jotun, demonstrated how a ship’s hull and propeller performance could be

Meet the Speakers

The speaker/panel lineup for the IMMEDIASEA Disruptive Sustainability debate held in London in February this year (left to right): Kirsi Tikka, ABS; Rune Braastad, ABB; Willie Wågen, Wärtsilä; and Stein Kjølberg, Jotun.



Birgit Marie Liodden, Director of Nor-Shipping and chairperson for the IMMEDIASEA Disruptive Sustainability debate

Birgit Marie Liodden was appointed as Nor-Shipping Director in 2015, and has overall responsibility for all of Nor-Shipping’s activities. Her background includes being the founder and first Secretary-General of YoungShip International, as well as positions at Norwegian maritime industry group Wilh Wilhelmsen and Nigeria-based Sea Trucks. She has also had a consultancy role for the OECD and holds numerous board positions.

Kirsi Tikka, Executive Vice President, Global Marine, ABS

As the Global Marine lead for ABS, Kirsi Tikka’s role is to align ABS strategic planning, client development, and product and service offerings with the

industry’s technical needs and requirements. She holds a Doctorate in Naval Architecture and Off-shore Engineering from the University of California, Berkeley, and a Master’s Degree in Mechanical Engineering and Naval Architecture from the University of Technology in Helsinki, Finland.

Rune Braastad, Vice President Marine Services O&G Segment, ABB

Rune Braastad, has 15 years of management and hands-on experience in the maritime industry. Previous positions held by Braastad at ABB include Vice President, Global Marine & Port Services; Vice President, LNG Projects; Operations Manager; and Teamleader, Commissioning; having joined the company as a Service Engineer. His early career includes service with Statoil and in the Norwegian Army.

Willie Wagen, Director, Market Innovation, Wärtsilä Marine Solutions

Willie Wågen is head of the Market Innovation department of Wärtsilä, where he works on future perspectives and trends in the marine industry. He joined Wärtsilä in 2006, and prior to that was with Aker Solutions. He has a Master of Science Degree in the field of power electronics from Narvik University College.

Stein Kjølberg, Global Sales Director, Hull Performance Solutions, Jotun

Stein Kjølberg has been working for Jotun for more than 26 years, with experience in sales, marketing and general management. He is a naval architect and holds a Master of Science degree from the Norwegian University of Science and Technology (NTNU).

“a ship efficiency killer” due to deterioration in this performance between dry-dockings. This deterioration currently accounts for about 10 percent of world fleet fuel costs and greenhouse gas emissions. “The choice of antifouling coating is a major factor,” he stated, “so what technology is best to choose? There are many confusing claims on performance, and ship operators need to know what to measure, how to measure it, and what to compare it with.”

In a prime example of how to ‘disrupt from within’ Kjølborg showed how, with the company’s Hull Performance Solutions paint technology, Jotun had “made it our business to deliver measurable performance – not just paint. This means measurability, accountability, and delivery.”

Performance monitoring of Jotun’s antifoulants is based on measuring changes in power required to move the ship through water at a given speed, these being due to changes in the condition of the underwater hull and propeller. The focus is on long-term changes with the start-

ing point for the work based on an ISO standard (ISO 19030) that will make it possible to determine dry-docking performance and in-service performance, thereby triggering ad hoc maintenance and determining the effect of such maintenance. The target for publication of the full standard is June of this year with submission to the ISO Central Secretariat in October.

“A commonly agreed-upon method for measuring performance will allow learning from the past to make better decisions for tomorrow”, Kjølborg concluded.

For further information on the companies featured in this article visit the following websites:

www.nor-shipping.com
www.eagle.org
www.abb.com
www.wartsila.com
www.jotun.com



(Photo: ©SusanneHakuba)

Birgit Marie Liodden, Director of Nor-Shipping, chairing the IMMEDIASEA Disruptive Sustainability debate held in London in February.

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Bouchard Christens New VT Halter-built ATB

BY SUSAN BUCHANAN

Photo: Bouchard Transportation Co.

A New York-registered Articulated Tug Barge, christened on Feb. 18 in New Orleans, is slated to carry petroleum products on routes including Baton Rouge to Houston, the tug's captain William Lawton said that morning. M/V Donna J. Bouchard and tank barge B. No. 272 were built at Pascagoula, Miss.-based VT Halter Marine.

Bouchard in Melville, N.Y. and Halter have a relationship that goes back 50 years, Morton Bouchard III, President and CEO of Bouchard Transportation Co., said at the ceremony. As for William Lawton, he has spent the last two decades as a captain and 26 years on the water. The Donna J. Bouchard was launched at VT Halter's Moss Point Marine facility in Escatawpa, Miss. in mid-September and is named after Morton Bouchard's sister. In late November, the barge B. No. 272 was launched at VT Halter in Pascagoula. Built independently of one other and then paired, the Donna and the B. No. 272 – along with the

Kim M. Bouchard & B. No. 270 – are the largest vessels so far in Bouchard's fleet expansion program.

The 150-foot Donna J. Bouchard is a 10,000hp twin screw ATB tug, equipped with an Intercon Coupler System. The American Bureau of Shipping classes it as an +A1 Towing Vessel, Dual Mode ATB, USCG Subchapter M. The ATB unit was designed by naval architects Guarino & Cox, LLC in Covington, La.

The 255,000-barrel tank barge B. No. 272 is 628 feet by 91 feet by 47 feet, and is ABS and U.S. Coast Guard certified for Jones Act service. The barge has a DWT of 35,800 LT.

The Donna J. Bouchard and B. No. 272 represent another milestone in the company's development of a safe, reliable and fuel-efficient fleet, meeting the demands of the world's offshore industry, Morton Bouchard said at the ceremony. For nearly a century, he said, Bouchard has fulfilled the exacting expectations of clients. "Our expansion continues to be driven by our founding

M/V Donna J. Bouchard

Ship Type: ATB Tug
 Builder: VT Halter, Marine
 Owner: Tug Donna J. Bouchard Corp.
 Operator: Bouchard Transportation
 Designer: Guarino & Cox
 Delivery Date: February 2016
 Classification: ABS A1 Towing Service
 AMS ACCU UWILD CPS /Solus Certified
 Length, (o.a.): 150 ft.
 Breadth, (molded): 50 ft.
 Depth, (molded): 29 ft.
 Draft, (designed): 25 ft.
 Crew Capacity: 15
 Main Engines: (2) EMD 20-170 G7C – T3
 Total Installed Power: 10,000
 Generators: . Main (3) John Deere 200 kw
 Emergency (1) John Deere 150 kw
 Engine Controls: EMI Electronic
 Coatings: PPG Paints
 Ballast Control system: Hyde Guardian
 HG 150 Ballast Water Treatment Systems
 Radars: (2) Furuno Model
 Depth Sounders: Furuno FE 800
 Auto Pilot: Simrad
 AIS: Furuno FA 150
 GPS: (2) Furuno
 SatCom: Furuno Felcom 18
 Classification: GMDSS / Solas Certified
 Mooring Equipment: ... (2) Intercontinental
 Deck Capstains – Bow & Stern
 Fire extinguishing systems: Hiller
 Fire detection system: Aurotime
 Rescue Boat Palfinger RSQ450A
 Rescue Boat Davit Coastal Equipment
 Liferrafts: (2) Viking (12) Man capacity
 Service Power: (3) John Deere 6090 AFM
 75 200 kw main generators
 (1) John Deere 6068 AFM 85 150 kw
 emergency generator
 Steering System/Controls: EMI
 Fuel 293,000 Gal.
 Lube Oil 5,300 Gal.

B. No. 272 Equipment List

Ship Type: ATB Tank Barge
 Builder: VT Halter, Marine
 Owner: B. No. 272 Corp.
 Operator: Bouchard
 Transportation Designer: Guarino & Cox
 Delivery Date: February 2016
 Classification: ABS A1 Oil Tank Barge,
 Circle E, UWILD, SH, SHCM, CPS
 USC6 Oil Tank Barge Grade "B" and lower
 cargo authority

Main Particulars

Length, (o.a.): 628.5 ft.
 Breadth, (molded): 91 ft.
 Depth, (molded): 47 ft.
 Draft, (designed): 33.8 ft.
 DWT (at design draft): 35,800 LT
 Generators: . Main (3) John Deere 300 kw
 / Auxiliary – John Deere 90 kw
 Coatings: PPG Paints
 Ballast Control system: (2) Hyde Guardian
 HG 600 Ballast Water Treatment Systems
 Fire extinguishing systems: Hiller
 Fire detection system: Hiller
 Liferrafts: (3) Viking (6) Man
 4 x Deep well cargo pumps driven by John
 Deere Engines
 3 x Deep well ballast pumps driven by
 John Deere Engines
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 Electro/Hydraulic
 Single Drum Mooring Winch 2 x
 Intercontinental Electro/Hydraulic
 Double Drum Mooring Winch 4 x
 Intercontinental Electro/Hydraulic
 Marine Cranes 2 x Rapp HP40
 Cargo Vacuum System 16,000 gal.
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 Crude Oil Washing System Scanjet
 Tank Level Gauging & Alarm Consillium
 Fire Suppression Anslul

fathers and the philosophy of four generations of Bouchards to invest our profits in new, modern equipment to service our customers," he said. Mr. Bouchard thanked VT Halter for its delivery of another well-built tug and barge unit, and wished the crew of the new ATB safe and smooth sailing.

VT Halter Marine plans to deliver another vessel, the M/V Frederick E. Bouchard, this June, Jack Prendergast, President and CEO of VT Halter Marine, said in February. Halter also built the M/V Kim M. Bouchard and the B. No. 270, christened last July in New Orleans. The articulated tug-barge Morton S. Bouchard, built by Halter, was launched in Pascagoula in October.

At the February ceremony, Exxon-Mobil Energy Ltd. Chairman and Managing Director Jim Muschalik said that ExxonMobil and SeaRiver Maritime have had a decades-long relationship with Bouchard that has met or exceeded Exxon's high safety standards. SeaRiver Maritime, owned by ExxonMobile

and based in Houston, is a charterer of Bouchard's equipment.

Joan Lesniewski, wife of Robert Lesniewski of ExxonMobil/SeaRiver Maritime, performed the customary breaking of a champagne bottle over the Donna J. Bouchard's bow.

Family-owned Bouchard Transportation was founded in 1918 by Fred Bouchard, a young tugboat captain at the Port of New York. Today Bouchard is the nation's largest, independent ocean-going petroleum barge company. It operates along the U.S. East, Gulf and West Coasts and Great Lakes. The Bouchard fleet contains 25 barges, each carrying between 25,000 to 252,000 barrels, along with 26 tugs that range from 3,000 to 10,000 horsepower.

VT Halter Marine in Mississippi – a unit of VT Systems in Alexandria, Va. – designs and constructs medium-sized ships. Halter builds and repairs ocean-going vessels used for patrol, oil recovery, oil cargo, ferries, logistics support and surveys.

Rodriguez Towboat for Mid-River

By Alan Haig-Brown

Over the years, Rodriguez triple-screw shallow-draft towboats have won a following in the shallow waters of the Mississippi River estuary. Many of these boats are the distinctive aft-cabin Lugger-type of vessel.

Recently Mid-River Terminals of Osceola, Ark. has taken delivery of a new design towboat from Rodriguez. With a conventional forward-house pusher configuration, the new 70- by 30-foot MV Dianna Lynn utilizes the same propulsion as the Lugger tugs. This is composed of three in-line six-cylinder Cummins QSK19 engines, each delivering 660 HP. Each engine turns a 66-inch stainless steel propeller through ZF gears with 6:1 reduction.

The combination gives the 1,980 HP-

towboat an eight-foot operating draft.

The wheelhouse has a full 360-degree view with large windows and is set atop two accommodation decks and a half deck that also serves for bridge electronics support.

This gives the towboat a 31-foot eye-level, with full tanks, for working high barges. Steering and flanking rudders are controlled by wheelhouse levers with mechanical shafts through the houses and connected to the hydraulic actuator valves in the upper engine room. A set of push knees and deck winches with cheek blocks facilitates barge work. A pair of 55 kW gensets meets the boat's electrical requirements.

Zero discharge tanks, built integral to the hull, provide storage for treated sewage and all drains. A separate tank handles waste oil.

The MV Dianna Lynn is the fourth



(Photo courtesy of Rodriguez Boat Builders)

boat in the Mid-River Terminal fleet, all of which are Cummins powered. Owner Rick Ellis said, "We wanted the three engines for redundancy so that even if we

lose an engine we still have over 1,200 horsepower."

The new boat will be primarily involved in fleeting and harbor work.



(Photo courtesy of Rodriguez Boat Builders)



(Photo courtesy of Rodriguez Boat Builders)

Four Damen Tractor Tugs for Svitzer

Svitzer signed a contract with the Damen Shipyards Group for four ATD 2412 tugs as part of Svitzer's ongoing fleet renewal program. All four tugs are being built at Damen Song Cam Shipyard in Vietnam. Demonstrating the advantages to be gained from building vessels for stock, Damen is handing over the first two vessels just one month after contract signing. Svitzer has the first two tugs signed up for port towage operations at its Dominican Republic joint venture with Remolcadores Dominicanos. Damen will deliver these vessels, to be called Svitzer Maimon and Svitzer Beata, in mid-April 2016. The second two tugs are due for completion in August 2016. All four vessels are of Damen's 24-m Azimuth Tractor Drive (ATD) design. This compact, heavy duty tug yields a bollard pull of over 65 metric tons – the power originating from twin Caterpillar 3516C main engines. A top speed of 12 knots and a powerful aft winch, combined with Damen's experience with tug design, make these vessels suitable for consistent and effective harbor towage activities. Damen has a long relationship with Svitzer. In addition to building a significant part of the Denmark-headquartered company's fleet, the two parties are also involved in developing new innovations together. For example, the first ever Reverse Stern Drive Compressed Natural Gas tug, in cooperation with MTU Friedrichshafen.



Image: Damen

Alabama Shipyard to Repair MSC Tanker

World Marine of Alabama (WMA), a division of World Marine, LLC, competitively bid and won a contract to dry-dock and repair the USNS Lawrence H. Gianella (T-AOT-1125), a Military Sealift Command (MSC) tanker operated by Ocean Shipholdings, Inc.

World Marine, LLC purchased all the assets of Signal International in December 2015, including the Mobile, Alabama-based shipyard. World Marine remains one of the safest shipyards in the country, with its Alabama facility boasting zero accidents for over 460 days, and an OSHA total recordable injury rate (TRIR) of 0.0 for 2015. Ocean Shipholdings is a Houston-based vessel operations company with a history of successful projects with the Mobile shipyard. The contract is expected to commence in late April for 45 calendar days. Under the contract, WMA will be completing many repair items, including steel and pipe renewals, underwater and free-



MV Lawrence H. Gianella

board hull cleaning and painting, ballast tank inspections and painting, main and generator engine overhauls, electrical switchgear cleaning and motor over-

hauls, sea valve rebuilding, and more.

The USNS Lawrence H. Gianella is 615 X 90 ft. and carries over 237,000 barrels of petroleum cargo. This vessel

delivers petroleum products to Department of Defense storage and distribution facilities worldwide, including fuel delivery trips to Antarctica.

Norwegian Fish Food Carrier to Run on LNG

Rolls-Royce has signed a \$6.5 million contract with Tersan Shipyard in Turkey to supply a liquefied natural gas (LNG) propulsion package for a cargo carrier designed by NSK Ship Design for Norwegian ship owner NSK Shipping. The vessel will deliver fish food on behalf of BioMar Group.

The new cargo carrier will be a slightly larger sister ship to NSK Shipping's MS Høydal which was the world's first LNG powered cargo vessel and which was delivered from Tersan Shipyard in 2012. Both ships are designed by NSK Ship Design. The 81.5-m-long vessel will be able to carry 2,700 metric tons of fish food to fish farms along the Norwegian coast. The new cargo carrier is expected to be delivered from the yard in 2017.

The LNG Propulsion system comprises one eight-cylinder Bergen C26:33 natural gas engine rated at 2,160 kW, Promas combined rudder and propeller system, one tunnel thruster in the bow and one in the aft, and a Rolls-Royce automation and dynamic positioning (DP) system.

The vessel is also equipped with the Rolls-Royce hybrid shaft generator (HSG) propulsion system, meaning the



Rolls-Royce

main engine also generates electricity for the ship. The HSG will generate electrical power for the ship even if the engine power output varies, saving fuel. The HSG can also act as a propulsion motor (PTI) providing an alternative power source should LNG becomes unavailable – a prerequisite for class approval.

Rolls-Royce claims its Bergen Gas Engines are the only pure gas engines on

the market using a spark plug ignition. Alternative “dual fuel” engines use a small amount of diesel for ignition. The B and C Series engines emit around 22 percent (including methane slip) less carbon dioxide (CO₂) per unit of power than a diesel engine and nitrogen oxide (NO_x) emissions are reduced by 90 percent. Sulphur oxide (SO_x) emissions are negligible. Bergen gas engines deliver a

significant reduction in fuel and lubrication oil consumption. In addition, the clean, safe engine rooms and advanced technology can reduce maintenance costs as well as providing a more pleasant working environment for the crew.

BioMar has 11 factories producing fish food, in Norway, Chile, Denmark, Scotland, Spain, France, Greece, Turkey and Costa Rica.

Pelindo III to Receive 15 Tugs in Indonesia

Robert Allan Ltd., Naval Architects of Vancouver, Canada was awarded a contract to provide four customized versions of its RAZER series designs of ASD tugboats to the Indonesia Port Corporation, "PT Pelabuhan Indonesia III (PERSE-RO)", commonly known as Pelindo III. While Robert Allan Ltd. had long been very active in the Asian market, these designs were its first directly for a company from Indonesia, a country estimated to employ more than 2,000 tug boats. From its Surabaya headquarters, Pelindo III manages 43 harbors in seven provinces: East Java, Central Java, South Kalimantan, Central Kalimantan, Bali, West Nusa Tenggara and East Nusa Tenggara. To ensure designs especially suited to these ports, the Robert Allan Ltd. design team visited Surabaya to observe local ship-handling operations, and worked closely with the company's Operations Department on these particular requirements.


The latest development of Robert Allan Ltd.'s specialized RAZER series was chosen, and further customized as the RAZER 2623, 2935, 2940 and 2960 (three, six, four and two boats respectively) to allow Pelindo III to provide updated towage services throughout the provinces, and each well-suited to the demands of the individual areas.

The RAZER class tugs are azimuthing stern-drive (ASD) tugs optimized for ship-handling and escort duties within the confined spaces of busy ports. The design features a generous freeboard to ensure a high degree of stability, while keeping the superstructure low and well aft to enhance safe working under the flared hull of ships. The tugs will range

from 26 to 29 meters in length and with Bollard Pulls from 23 to 60 metric tons. Two local shipyards, PT. Daya Radar

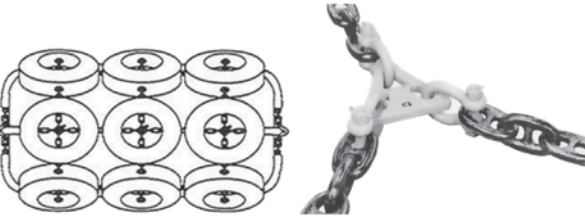
Utama in Jakarta and PT. Dumas Tanjung Perak Shipyards in Surabaya were selected to build the tugs. Construction

work is in progress, and the first new tug will be in service in Pelindo III's territory later this year.



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Photo: Robert Allan



Photo: Robert Allan

Historic PT Boat to Return to Lake Pontchartrain

The National WWII Museum announced plans to return restored patrol-torpedo (PT) boat PT-305 to her home waters of Lake Pontchartrain, where she was originally tested by Higgins Industries more than 70 years ago.

The Museum launched the first phase of the plan this morning: a Kickstarter campaign to raise funds necessary to move PT-305 to the water, test her for passenger use and, for the first time, offer civilians the chance to take a ride on a fully restored combat-veteran PT boat – the fastest U.S. naval ship in World War II.

The Kickstarter campaign, which has a crowdfunding goal of \$100,000, is part of an overall effort to raise more than \$500,000 to return PT-305 to the waterways.

After funding is secured, the Museum plans to place PT-305 on a trailer, remove the entire front wall of her current home, the John E. Kushner Restoration Pavilion, and move the boat out to the Race Street Wharf where she will be placed on a barge on the Mississippi River.

A tug will then pull the vessel to a facility on the Industrial Canal for sea trials.

Following two to three months of testing, plans call for moving PT-305 to a new, permanent home – a custom-built boathouse located at South Shore Harbor near the New Orleans Lakefront Airport.

The transfer of PT-305 to water is the culmination of the Museum's decade-



(Photo: The National WWII Museum)

long effort to restore her, over \$3.3 million worth of in-kind and monetary donations, as well as more than 100,000 hours of work from a dedicated corps of

over 200 volunteers. There, PT-305 will become a unique Museum experience: placing visitors on the very deck where members of the U.S. Navy stood to at-

tack Axis supply ships and troop transports, speeding over the waves just as PT-305's crew did in the Mediterranean during the war.

Kleven to Build Trawler for Spanish Owner

Kleven signed a contract with Spanish ship-owner Pesquera Ancora S.L.U on the building of a 80m long stern trawler. The vessel is of NVC 374 WP design from Rolls-Royce, and is to be delivered in February 2018. This will be the fourth vessel of the same Rolls-Royce design in Myklebust Verft's order book; two vessels are ordered by DFFU in Germany, one by CDP Saint-Malo & Euronor in France, and this latest by Pesquera Ancora in Spain. In addition, the order book holds two live fish carriers for Norwegian owned Sølvrans, a trawler for Gitte Henning in Denmark, and an offshore construction vessel for Volstad, based in Ålesund, Norway. The stern trawler will be ICE 1A* classed, and operational efficiency, low emissions and comfort and safety for the crew have been important criterias in the development of the vessel design.



Image: Rolls-Royce

Fincantieri Launches Seabourn Encore

Seabourn Encore, the first of two ultra-luxury cruise ships that Fincantieri is building for Seabourn Cruise Line, brand of Carnival Corporation, was launched today at Fincantieri's shipyard in Marghera, Venice. The ceremony was attended, among others, by John Delaney, Senior Vice President of Global Marketing and Sales, while Fincantieri was represented by Antonio Quintano, the Marghera yard manager. Due to join the Seabourn fleet in the end of this year, Seabourn Encore is being built according to the standards and technical solutions that make Seabourn one of the most prestigious brands in the ultra-luxury segment and will continue the fleet modernization that began in 2009. The all-suite ship is approximately 41,000 gt, 210 m long and 28 m wide and will be able to reach a cruising speed of 18.6 knots. It will carry up just 600 guests, based on double occupancy. Every suite will feature a private veranda.



(Photo: Fincantieri)

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John P. Murtha Passes Builder's Sea Trials

Huntington Ingalls Industries (HII) announced the successful sea trials of the company's 10th San Antonio-class amphibious transport dock, John P. Murtha (LPD 26).

The ship, built at HII's Ingalls Shipbuilding division, spent four days in the Gulf of Mexico last week with Ingalls' test and trials team operating the ship and performing more than 200 test events.

"Overall the builder's trial was successful, and the ship performed well," said Kari Wilkinson, Ingalls' LPD 26 program manager. "This shipbuilding milestone is another accomplishment for a seasoned LPD production and test team that is ready to continue the learning on future LPD platforms.

This team understands the important mission LPDs provide to our nation, and we look forward to delivering another fine, much-needed asset to our sailors and Marines."

Major evolutions during builder's trials include the anchor-handling demonstration, ballast/deballast demonstration, detect-to-engage exercise, running the ship at full power and steering.

Shipbuilders will now prepare John P. Murtha for acceptance trials in April to demonstrate the same tests and operational success to the U.S. Navy's Board of Inspection and Survey (INSURV). The ship is scheduled to be delivered to the Navy in the second quarter of 2016.

LPD 26 is named in honor of the late John P. Murtha, who represented Pennsylvania's 12th Congressional District



LPD 26 is named in honor of the late John P. Murtha, who represented Pennsylvania's 12th Congressional District from 1974 to 2010. Murtha was also a veteran of the U.S. Marine Corps and Reserves, serving 37 years and receiving the Bronze Star with Combat "V," two Purple Hearts and the Vietnamese Cross of Gallantry for his service in the Vietnam War.

(Photo by Lance Davis/HII)

from 1974 to 2010. In addition to his tenured history in the House of Representatives, Murtha was also a veteran of the U.S. Marine Corps and Reserves. He served for 37 years and received the Bronze Star with Combat "V," two Pur-

ple Hearts and the Vietnamese Cross of Gallantry for his service in the Vietnam War. He retired as a colonel in 1990.

Ingalls has built and delivered nine ships in the San Antonio class. In addition to John P. Murtha, Ingalls has the

11th LPD, Portland (LPD 27), under construction. Portland launched on Feb. 13 and will be christened on May 21. Ingalls received a \$200 million advance procurement contract for the 12th ship in the class, LPD 28, in December 2015.

Great Lakes Shipyard to Build Damen Tugs

First Damen tugs to be built under license in the U.S.

An agreement was signed between Damen Shipyards Group and Great Lakes Shipyard for the latter to build two Stan Tugs 1907 ICE at its facility in Cleveland, marking the first instance in which Damen tugs will be built under license in the United States, according to the Ohio shipbuilder. The ICE Class vessels will be operated by the yard's affiliate company, The Great Lakes Towing Company, and will replace existing tonnage. Under the agreement, Great Lakes Shipyard will receive full construction, design and engineering support from Damen, who will provide assistance based on its experience with construction of some 200 1907 design vessels. The Stan Tug 1907 ICE was chosen on Damen's proven design and fact-finding visits made by the management of The Great Lakes Towing Company to Damen in the Netherlands. Stan Tugs 1907 can be found operating in locations around the world including Russia, Qatar and the Netherlands.



Image: The Great Lakes Group

Bollinger Delivers 17th FRC to the USCG

Bollinger Shipyards has delivered the USCGC Donald Horsley, the 17th Fast Response Cutter (FRC) to the United States Coast Guard (USCG). The Coast Guard took delivery on March 5, 2016 in Key West, Fla., and is scheduled to commission the vessel in Puerto Rico during May, 2016.

The 154-ft. patrol craft USCGC Donald Horsley is the 17th vessel in the Coast Guard's Sentinel-class FRC program. To build the FRC, Bollinger used a proven, in-service parent craft design based on the Damen Stan Patrol Boat 4708. It has a flank speed of 28 knots, state-of-the-art command, control, communications and computer technology, and a stern launch system for the vessel's 26 foot cutter boat. The FRC has been described as an operational "game changer," by senior Coast Guard officials.

Each FRC is named for an enlisted Coast Guard hero who distinguished him or herself in the line of duty. This vessel is named after Coast Guard Hero Donald Horsley. Master Chief Petty Officer Donald H. Horsley was the recipient of the Bronze Star with combat "V"

device for his leadership of Division 13 of Coast Guard Squadron One during the Vietnam War.



(Photo: Bollinger Shipyards)

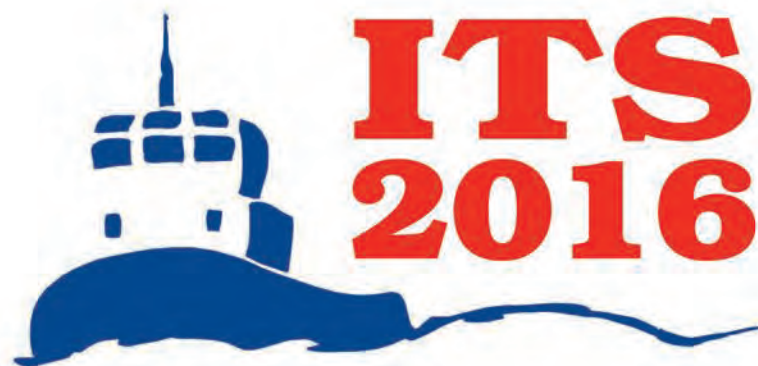
ABB to Service World's Largest Floating Facility

ABB won a five-year contract to deliver equipment and services for Shell's Prelude FLNG, the world's first floating liquefied natural gas (FLNG) facility, the largest floating facility ever built. ABB's equipment will minimize downtime and optimize the efficiency of the facility.

The order includes the delivery of motors, generators, variable speed drives and low-voltage switchgear and guarantees service and lifecycle management of the electrical equipment as well as service and support for motors from third-party vendors.

ABB will build up a spare parts inventory, workshop repairs, training and provide round-the-clock technical support both over the phone and on-site. Spare parts and replacement systems are being procured this year, with training to begin soon after. Prelude is 488 meters long, 74 meters wide, with a loaded displacement of 600,000 tons with the facility's deck longer than 4 football fields laid end to end.

The electrical system will power 14 gas plant modules, allowing the facility to produce 5.3 million tons per annum of liquids.



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BOSTON

Battle in the Bedroom

Industry Study on Work Schedules and Rest Periods reignites decades-old discussion on what constitutes enough sleep and in what 'watch format' will that adequate rest be achieved.

BY JOSEPH KEEFE

It wasn't too long ago that the American Waterways Operators (AWO), the national trade association for the tugboat, towboat and barge industry, hailed a study conducted for the Transportation Research Board of the National Academies of Sciences, Engineering and Medicine which concluded that "[t]here is currently no scientific data to support [...] a change in hours of service" for towing vessel crewmembers. Around the same time, International Organization of Masters, Mates & Pilots (MM&P) Vice President George Quick also weighed in and said there is "a serious credibility issue" with the paper, calling it "essentially an advocacy position paper for the American Waterways Operators."

It should also come as no surprise that both camps – MM&P and AWO – reside on opposite sides of the argument with Quick's largely blue water membership

sailing on vessels employing a "4 on / 8 off" system of watches, while AWO's membership almost overwhelmingly employ the traditional workboat "6 on / 6 off" schedule. It also goes without saying that any changes in the brown water system of manning and watch systems could potentially cost industry millions if it had to retool into the blue water practice of rotating watches stood usually by three officers, as opposed to two. Conversely, any move to change blue water manning models to more closely conform to the brown water standard might mean the reduction of manning levels even below today's relatively lean schemes for ocean going, deep draft tonnage. And, no self-respecting seagoing union man wants to see that happen, right?

Although not at the heart of this particular matter, the discussion also dredg-

es up hard feelings from brown water stakeholders who increasingly complain that blue water practices and regulations, STCW 'creep' and other policies are being pushed down onto smaller, brown water workboats with little consideration as to whether they fit, or not. And, with the impending subchapter M towboat rules lurking just around the corner, it's safe to say that many stakeholders are likely following the matter closely.

In the Real World

I honestly don't have an opinion about which system of watches – or others that may be employed elsewhere – is better than the other. And, as an upfront disclaimer, I'm no expert on sleep science or efficiency metrics. All of that said, I can say that when I did go to sea – all of six years – I always did so on vessels employing the "4 on / 8 off" system of

watches. Suffice it to say, on a coastwise chemical tanker, that schedule was frequently interrupted by any number of events. And, I have my own thoughts on adequate rest periods and how best to achieve that goal. I'm not sure you could do it under any watch system.

Looking back, it seems like I spent most of my watchkeeping time on the 12-to-4 watch. That's a good thing, because I liked those hours, for some strange reason. And for a guy (today) who goes to bed before 10 PM on a regular basis, it wouldn't seem that the 12-to-4 slot would have suited me, but, it did.

Sailing Second Mate on an aging chemical carrier in the mid-1980's, I liked the solitude of the midwatch. You were less likely to see the Captain up at those hours, much less anyone else, and it limited the amount of time that the grouchy old man could reprimand me

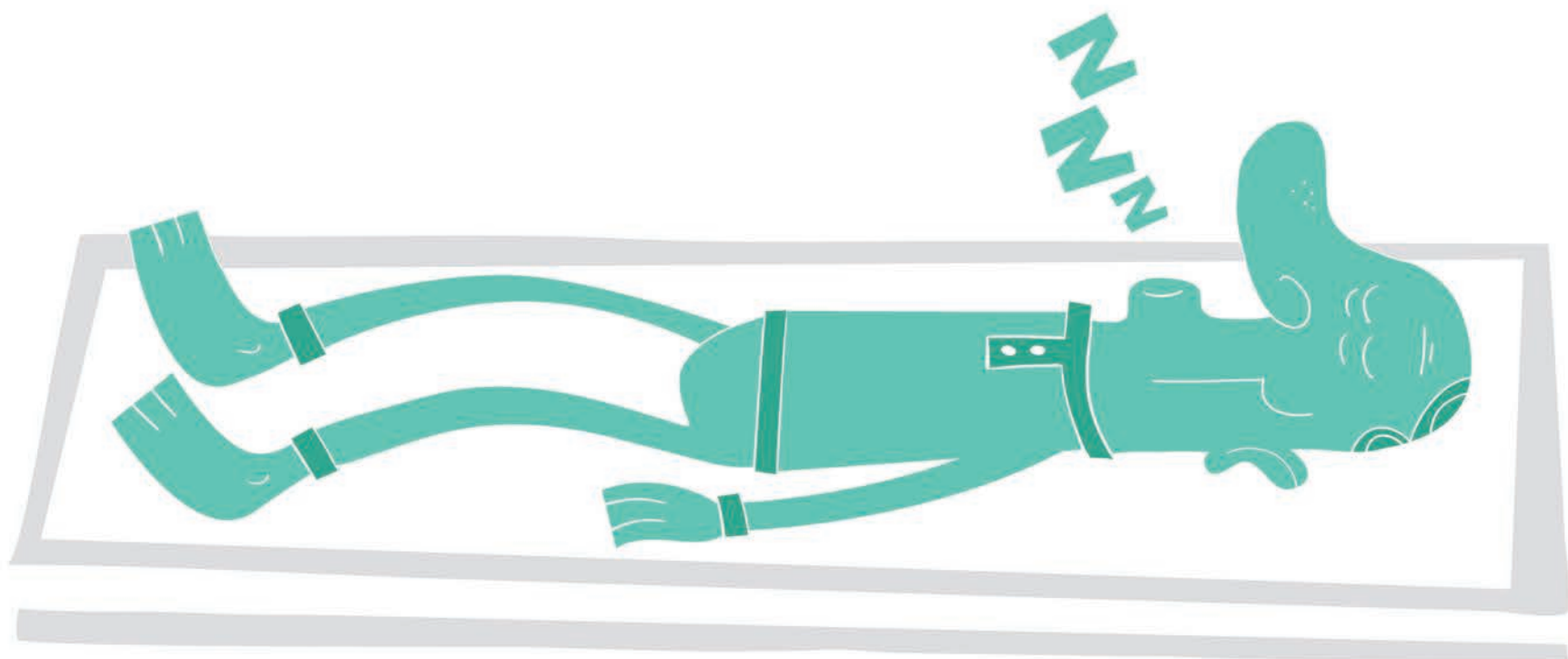


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“The TRB study is the latest contribution to a growing body of scientific research in multiple transportation modes that demonstrates that splitting sleep into two periods can be a safe and effective way to manage fatigue in 24/7 operating environments like the tugboat, towboat and barge industry.”

Jennifer Carpenter, AWO Executive Vice President & COO

for some perceived, insignificant oversight on my part. On the other hand, the peace and quiet of the midwatch was also balanced by the hustle and bustle of the noon to four watch, when virtually everything you did was on display for all to see. For that matter, I am glad that I sailed in a time when the automatic bridge data recorders in use today weren't even a gleam in the eye of the most ardent 1980's techie.

Once relieved of the watch at sea, I typically retired to my stateroom where I was suppose my employer wanted me to turn in immediately and catch up on my sleep.

But, I rarely did that. I can't speak for other mariners, but I was usually far too wired after four hours of watch to go to sleep at 4 AM. In that pre-OPA90 world, I would first deadbolt the door and then, occasionally crack open a warm, 12-ounce, low-cal adult beverage, plopped down in the broken recliner in my luxurious 1940's-era stateroom, and read whatever novel I was grinding my way through at that particular moment.

With that scandalous beverage finished, I set about meticulously hiding the can from the bedroom steward (lest he 'rat' me out to the Old Man) and then I would turn in. How much sleep I got was usually determined by how much work had to be done on deck in the morning. If overtime was available, we were supposed to be on deck at 0800 with the deck gang. That didn't leave a whole lot of time to sleep. The afternoon watch that followed that kind of routine could be a bit monotonous, and if you had to relieve the Chief Mate for supper in the evening, you might not get to bed yourself until well after 1800 hours.

In a perfect world, that "4 on / 8 off" rotation probably works just fine. On the other hand, sailing on a coastwise routing that might involve eight different ports and as many as ten different docks on a particular 15 day round trip, there was rarely more than two days in a row that could be considered routine. Arrivals and departures, docking and undocking, shifting berth, anchoring, two time changes and then tank cleaning and gas-freeing operations of 35 cargo tanks on the return ballast leg provided enough interruptions to the 'normal' schedule

that arguing for one watch schedule over another probably seems kind of silly in retrospect.

The Oil Pollution Act of 1990 (OPA 90) mandates that, "On a tanker, a licensed individual or seaman may not be permitted to work more than 15 hours in any 24 hour period, or more than 36 hours in any 72-hour period, except in an emergency or a drill. In this subsection, 'work' includes any administrative duties associated with the vessel whether performed on board the vessel or on-shore." I never sat down to quantify how many hours that I was typically working in those days, or how many hours that could qualify as rest, but I know that we made a lot of money in overtime. I also doubt that we would have been in compliance with today's 'OPA 90' rest mandates.

My only real exposure to a 6 and 6 watch schedule would come when we were on the ballast / tank cleaning leg on the way back to our typical loading berth. I did not like it, but then, my experience was rooted in the "4 on / 8 off" model, so that's understandable. On these instances, with the Chief Mate working on deck 8 to 10 hours daily, the third mate and I would split his watch on the bridge. From my point of view, the 12 to 6 watch was excruciatingly long. And, I promise you, no one was getting their 7 to 8 hours of sleep on those days.

Six hours is a very long time to remain alert on the bridge of a ship. In open waters, it was also enormously boring. I can imagine that piloting a pushboat with ten barges on the inland waterways has to be equally, if not more taxing. Threading the needle on a narrow inland waterway demands constant attention and I would imagine that once relieved at the end of a six hour river watch, that it takes some time to wind down. That said; it is also fair to note that inland / brown water mariners typically have much shorter work rotations than do their blue water, deep draft counterparts. Maybe today's typical pushboat mate, once relieved of the watch, sits down to read for an hour or so. More likely, he or she will pick up their smart phone, hope for a decent signal and do a little web surfing.

Jennifer Carpenter, AWO Executive Vice President & Chief Operating Of-

ficer Jennifer Carpenter also says, "The TRB study is the latest contribution to a growing body of scientific research in multiple transportation modes that demonstrates that splitting sleep into two periods can be a safe and effective way to manage fatigue in 24/7 operating environments like the tugboat, towboat and barge industry." And, she continues in the same prepared statement, "AWO and its members have been working with the Coast Guard to prevent and manage fatigue risks in our industry for nearly two decades. We look forward to working with the Coast Guard and our other government partners to incorporate the TRB study recommendations in to our ongoing efforts to ensure that towing vessel crewmembers consistently obtain the quantity and quality of sleep they need to do their jobs safely and to optimize crew members' sleep and endurance within existing industry watch schedules." That's a mouthful, but it also sounds reasonable to me.

From the other side of the bridge wing, however, MM&P's Quick quickly disagrees. In an online posting taken from MM&P's web site, Quick was quoted as saying, "The timing, the methodology and the conclusions appear to be an attempt to justify the current six-on/six-off watch system in the towing industry. The paper is not based on an independent scientific study but on interviews as to the opinions of the stakeholders—company officials or employees—who have an interest in or are under pressure to shape the outcome."

Seeing the forest for the trees ...

I'm actually less concerned with which watch system is in use than I am with what happens when mariners everywhere go off watch. The seafaring profession is, at its root, an incredibly lonely way to make a living. I can say that. I've been there. I would suggest that the vast majority of mariners actually interact with very few people, for very short periods of time and in a typically superficial manner once signed onto a vessel. And, it is furthermore unreasonable to expect that mariners will immediately hit the rack at every 'off-duty' moment in order to be alert when they do go back on duty. It just isn't going to happen. People have

to eat, bathe, take up some form of pastime and in general do something other than work or sleep during work rotations that can reach or exceed six months.

For blue water mariners, off duty activities frequently mean access to the Internet, E-mail and other related e-entertainment delivery systems. Anyone who has a social media account, for example, can tell you that it can be an enormous consumer of time.

This kind of behavior can become a serious habit, one which invites solitude and discourages interaction with others. Hence, while connectivity is what most mariners crave in today's on board environment, like anything else, too much of a good thing can be unhealthy. I think we're only just starting to understand this concept.

Think about it: in 1985, most ship operators worried primarily about alcoholism and maybe drug abuse amongst their crewmembers.

It was a real concern. Fast forward to 2016 where we find that reduced manning leaves seafarers even more isolated on board these giant post-Panamax vessels, some spending hours at a time behind closed doors surfing the internet or something else. Arguing about which watch system is better than the other isn't going to solve the problem.

In the 'Summary' section of the report, TRB reported that, "Human error related to operator fatigue is a major concern in all freight operations." Well, that much we know. And, it goes on to say, "The general consensus is that 7 to 8 hours of sleep per 24-hour day is required to maintain acceptable levels of alertness, minimize fatigue, and permit optimum performance." But, I don't want to bore you. After all, the document goes on for a whopping 180 pages. I encourage everyone to visit and to read every word: with caveats.

http://onlinepubs.trb.org/onlinepubs/nctrp/nctrp_rpt_036.pdf

If you find yourself off watch and on board a merchant vessel or inland towboat as you claw your way through this blog, then I must insist that you immediately shut off your tablet, laptop or smart phone. It's time to go to bed. That's an order.

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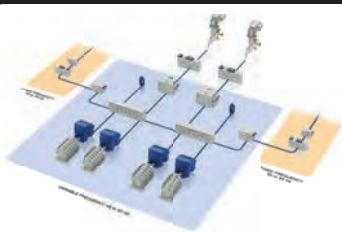


ABB Dynamic AC Concept

New electric power system is ideal for cruise ships and can reduce annual fuel consumption by 6%

ABB is launching a new Dynamic AC (DAC) concept that promises to optimize engine speed, leading to significant fuel savings the company says. It joins a number of established ABB products, such as Azipod propulsion and the Onboard DC Grid, all which are designed to maximize energy efficiency for vessel owners. Even though fuel costs are low today, history suggests it will certainly rise again. “No matter what bunker costs are now, ship owners look to the long term and always want ways to maximize fuel efficiency,” says Juha Koskela, Managing Director of ABB’s Marine and Ports business. DAC adjusts the rotational speed of the diesel generating sets, allowing the system frequency to vary within the specified range. Currently, many ships still run with their generators at a set speed, regardless of the power requirement, creating a surplus of wasted energy. The medium voltage power system in the ship is specially engineered for variable frequency, including component design and system integration. Distribution for the auxiliary and hotel loads is provided by frequency converters or directly from the variable frequency system.

It will sit alongside the Onboard DC Grid in ABB’s portfolio of power distribution products that can significantly increase ship fuel efficiency. Whereas the Onboard DC Grid can improve the performance of vessels with a lower power requirement, DAC is aimed at larger ships with power of 20MW or more.

Hapag-Lloyd Ups Special Cargo Focus

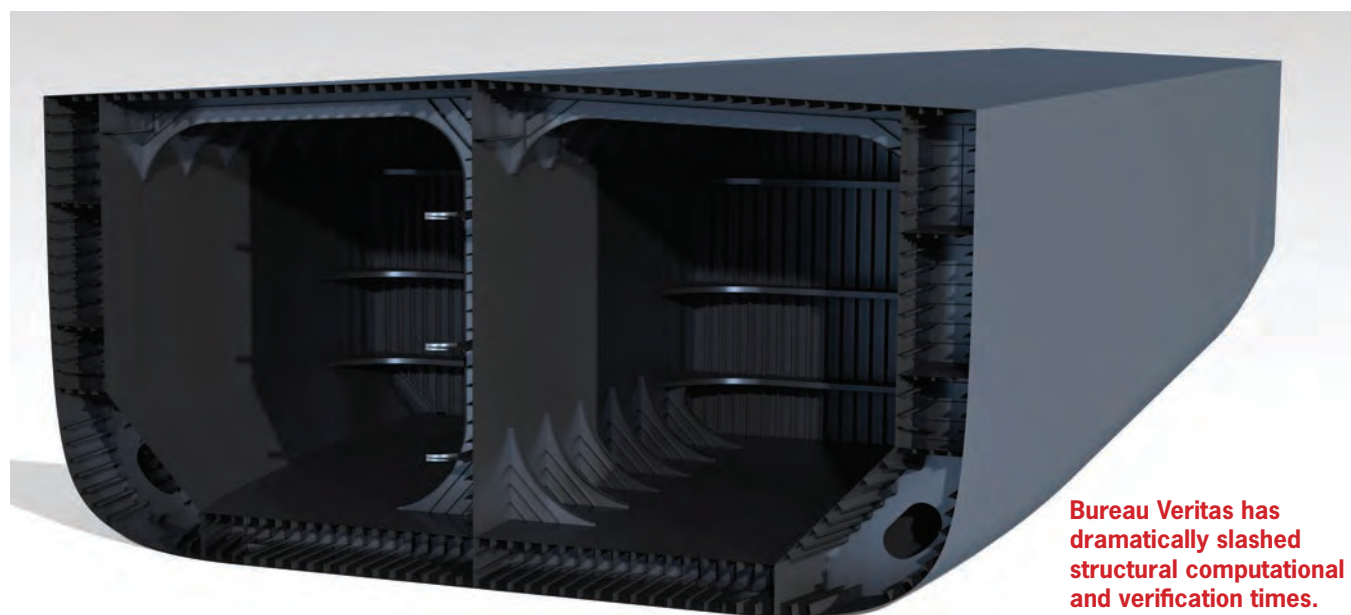
Container shipper Hapag-Lloyd said it has intensified its focus special cargo for container vessels. In order to be able to transport more cargo which does not fit into standard containers due to over-size or overweight, Hapag-Lloyd has strengthened its team of specialists. In addition to its Special Cargo Division at its headquarters in Hamburg, Special Cargo Teams have been established for the major markets in Asia and South and North America. “Special cargo is a growing market throughout the world,” said Hapag-Lloyd Chief Commercial Officer (CCO) Thorsten Haeser.

A ship prop with a diameter of 9.2m is loaded on a Hapag-Lloyd ship.



(Photo: Hapag-Lloyd)

BV Cuts Design Review Times with Digital 3D Model



Bureau Veritas has dramatically slashed structural computational and verification times.

The dramatic reduction in the time needed to check the structure, seakeeping and stability of new vessels and floating offshore units is being delivered through the use of a powerful 3D model which links directly to BV’s entire VeriSTAR suite of calculation tools. The power and ease of use of our new modeling software enables us to build a detailed 3D model of the proposed vessel very quickly, much more quickly than has ever been achieved before,” said Philippe Donche-Gay, EVP, Marine & Offshore Division. “That model interfaces directly with all our tools, meaning no data has to be entered twice, saving time and improving ac-

curacy. Ship designers, shipyards, ship owners and offshore operators are going to benefit from major time and cost savings as we move our entire design and plan approval onto this new digital platform.” BV’s new system is based on a strategic partnership with Dassault Systèmes under which Bureau Veritas will use Dassault’s 3DEXPERIENCE platform to dramatically speed the creation of detailed 3D models of ships and floating offshore units.

The model allows end-to-end calculation without data re-entry through all the analysis and design phases, then will facilitate construction by simplifying the order of steel cutting. It will then go on

to form a digital twin of the vessel or unit and be maintained in an as-is state for the life of the unit. This will facilitate maintenance and repair or conversion decisions. A pilot project with the Chinese design institute SDARI has been completed. Two new Aframax and Suezmax tanker projects from this designer were modeled by using the new 3D platform. The models were then automatically transferred into BV’s structural calculation software VeriSTAR Hull, in which the latest CSR Rules for oil tankers are fully integrated. The process enabled the designer to check compliance with the CSR Rules in a very quick, powerful and easy way.

JANUARY

Ad Close: Dec. 21

Ship Repair & Conversion Edition

Market: Passenger Vessel Operation Optimization
 Technical: Marine Salvage & Recovery
 Product: Maritime Propulsion: Gears, Thrusters, Waterjets & Propellers
 Country Reports: Spain & Portugal

PVA Maritrends

Jan. 22-26 Washington DC

Cruise Shipping Miami March 14-17, Miami, FL

Asia Pacific Maritime March 16-18, Singapore

ASNE DAY March 2-3, Arlington, VA

NACE Corrosion March 6-10, Vancouver

PSOCE 2016 Florida March 17-19, Tampa, FL

FEBRUARY

Ad Close: Jan. 21

Cruise Ship Technology Edition

Market: U.S. Navy Technology
 Technical: BIG DATA: Satellite, Data, Tracking & Communications
 Product: Marine Coatings & Corrosion Control
 Country Report: Italy

CMA Shipping

Mar 21-23 Stamford, CT

Workboat Maintenance

April 12-14, New Orleans, LA

Sea Japan April 13-15, Tokyo

MARCH

Ad Close: Feb. 22

Green Marine Technology

Market: Training & Education: Maritime Simulation Centers & Technology
 Technical: Workboat Fleet Maintenance & Repair
 Product: Green Marine Fuels & Lubricants and Emission Technologies
 Country Report: Japan

OTC May 2-5, Houston, TX

Inland Marine Expo May 10-12, St. Louis

Portsecure 2016 May 18-20, Toronto

APRIL

Ad Close: Mar. 21

The Offshore Annual

Market: Port & Ship: Loading and Unloading Technology & Equipment
 Technical: Satellite Communication
 Product: Deck Machinery, Winches and Ropes
 Region Reports: Scandinavia: Denmark, Finland, Norway & Sweden

Posidonia June 6-10, Athens

Sea-Air-Space May 16-18, National Harbor, MD

SeaWork June 14-16 Southampton, UK

CIMAC CONGRESS June 6-10, Helsinki

MAY

Ad Close: Apr. 21

The Marine Propulsion Edition

Market: RIB & Patrol Boat Report
 Technical: Workboat Design & Construction
 Product: Marine Electronics: Navigation Radar & ECDIS
 Country Reports: Greece & Turkey
 Special Report: U.S. Coast Guard Annual

Marine Money Week

June 21-23,
 New York, NY

JUNE

Ad Close: May. 20

Annual World Yearbook

Market: Maritime Simulation & Training Centers
 Technical: Dredging Vessel Technology
 Product: Pumps, Valves, Pipes & Insulation
 Country Reports: U.K. & Ireland

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 ELECTRONIC EDITION**
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JULY

Ad Close: Jun. 21

Marine Communications Edition

Market: Tugboat, Towboat & Barge
 Technical: Oil Spill Response & Recovery
 Product: Marine Electronics Equipment & Supplier Guide
 Country Report: Singapore

SMM HAMBURG

September 6-9,
 Hamburg, Germany

AUGUST

Ad Close: Jul. 21

The Shipyard Edition

Market: Offshore Deepwater: Structures and Systems
 Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan
 Product: Ballast Water Technologies
 Country Report: The German Maritime Cluster

Shipping Insight

October, Stamford, CT

SEPTEMBER

Ad Close: Aug. 22

Maritime & Ship Security

Market: Caring for the Mariner: Onboard Amenities
 Technical: Maritime Propulsion: The Hybrid Drive Solution
 Product: Clean Water Technologies
 Region Report: U.S. West Coast Maritime

SNAME

November 2-4, Bellevue, WA

Arctic Technology Conference

October 24-26, St. John's

OCTOBER

Ad Close: Sep. 21

Marine Design Annual

Market: Ship Classification Societies
 Technical: Marine Firefighting, Safety & Salvage
 Product: CAD/CAM
 Country Report: The Netherlands

**NOV. SPECIAL CONTENT
 ELECTRONIC EDITION**
www.whitepapers.marinelink.com

Workboat Show

Nov. 30-Dec. 2, New Orleans, LA

NOVEMBER

Ad Close: Oct. 21

Workboat Edition

Market: The 'LNG-as-Fuel' Revolution
 Technical: Deck Machinery, Winches & Ropes
 Product: Marine Coatings
 Special Report: Gulf of Mexico Builder and Supplier Guidebook

Surface Navy Association 2017

Crystal City, VA

DECEMBER

Ad Close: Nov. 23

Great Ships of 2016

Market Report: The Autonomous Ship: Command & Control
 Technical: Shipyard Automation: Welding & Cutting Equipment
 Product: Marine Engine Guide
 Country Reports: China & Korea

Permanent Magnet Shaft Generator for LNG Carrier

The Switch, a specialist of megawatt-class permanent magnet (PM) machines for advanced marine drive trains, will deliver its PM shaft generator for an LNG carrier with a 45,000 cu. m. cargo capacity, an order which is part of a complete energy efficiency system being delivered by WE Tech Solutions (WE Tech) of Finland to Saga LNG Shipping Pte. Ltd. The vessel will be built by China Merchants Heavy Industry Co., Ltd.

“The optimized PM shaft generator system using WE Drive allows unprecedented levels of energy efficiency in the marine industry,” said

Mika Koli, Business Development Manager of The Switch. WE Drive is WE Tech’s variable frequency drive for shaft generator applications.

Using the active front-end low harmonic drive technology of WE Drive, The Switch’s PM shaft generator can operate over the full main engine speed range while generating electricity for the vessel’s electrical network with high efficiency. This feature is particularly advantageous in electrical part loads, which is the normal electrical load condition in any ship.

Along with The Switch PM shaft generator and WE Drive, WE Tech

will also deliver its efficient power distribution solution that provides the vessel’s electrical network with up to 1,200 kW of electrical power in Power Take Out (PTO) mode. The delivery also features the Power Take In (PTI) mode for Take Me Home, whereby the WE Drive is used as an auxiliary propulsion drive when the main engine is not in operation. Furthermore, the solution utilizes the common DC-link in the WE Drive to enable energy-efficient DC power distribution for the bow thruster.

The high-speed PMM 500 marine shaft generator will be connected to



Image: The Switch

the PTO shaft of the reduction gear in the propulsion line. The Switch offers PMM 500 shaft generators in various power ranges from 0.5 to 4 MW at speeds of up to 2,000 rpm to best adapt to various requirements.



Image: Jotun

Jotun Jotachar 1709 Coating

Jotun launched Jotachar 1709, mesh-free epoxy passive fire protection coating to the hydrocarbon processing and energy industries, to protect steelwork from the effects of hydrocarbon pool fires

Jotachar 1709 has been developed using the technology platform behind Jotun’s Jotachar JF750, which the manufacturer says continues to be embraced by the offshore and onshore industries as an alternative to traditional mesh containing solutions for hydrocarbon pool and jet fire scenarios. Jotachar JF750 is a solution for operators and installers who wish to remove risks associated with incorrect mesh installation, while benefitting from reduced installation time, according to Jotun.

Jotachar 1709 has been designed to protect steel against hydrocarbon pool fire scenarios for up to four hours, as defined within the ANSI/UL1709 Standard. Operators also benefit from long term corrosion protection, reduced life-cycle costs and the elimination of any risk associated with mesh installation errors. By contrast, Jotachar 1709 can be applied in a continuous application process.

www.jotun.com

New Tank Skimming Equipment

SKF has launched a new mechanical device for the fast and easy separation of oil and water in tanks in marine and offshore applications. The SKF Turbulo Sludge Buoy has been developed to eliminate the need for laborious and time consuming manual drainage processes as it floats inside on-board tanks for constant, hassle-free and effective separation. In operation, the oil in the tank flows into the Turbulo Sludge Buoy’s lower compartment at a maximum rate of 6m³ per hour. It is then either pumped out or flows out under gravity depending upon whether the drain is below or above the surface of the water. This separation at the source enhances environmental performance according to ISO 14001.

The resulting water left in the tank is much cleaner and easier to process in the bilge water separator, boosting its efficiency and reducing costs. Meanwhile, the free water content of the separated oil is quite low, typically less than five percent, SKF said. Consequently, it requires no further treatment and can be disposed of either in an on-board incineration plant or ashore.

The system can be used at higher temperatures of up to 90°C and it is available in two sizes – the Turbulo Sludge Buoy and the Turbulo Sludge Buoy Mini – which can be specified depending on the available space in the tank.

www.skf.com



Image: SKF



Image: Furuno

Furuno: New Remote Controller

Furuno’s NavNet TZtouch and TZtouch2 Multi Function Displays have become utilized on a variety of helms and bridges. To enhance the various installations, Furuno announced it has developed the MCU004, a versatile remote control unit that can be used with TZtouch and TZtouch2 units.

The MCU004 Remote Control features a large rotary knob and joystick, which can be utilized as the RotoKey on NavNet TZtouch and for zooming in/out on both TZtouch and TZtouch2. In addition, the joystick allows users to pan around the chart and move the cursor on the screen.

The remote also has dedicated buttons that operate different functions, such as Edge Swiping, Home, Stand By/Auto for Autopilot control, MOB and Center on vessel.

For those captains that have multiple TZtouch or TZtouch2 displays on their helm or bridge, a single MCU004 can control all of the displays. With a simple press of the Active Display Button, users can switch from one display to another.

The MCU004 Remote Control is a suitable for any helm or bridge, Furuno said. Whether using the TZtouch Black Box and wanting to mount the MCU004 in the arm of the captain’s chair, or having a center console and wanting to have a remote on the transom while you are fishing, the MCU004 is a possible solution.

www.furunousa.com

Biodegradable Lithium Complex Greases



RSC Bio Solutions expanded its EnviroLogic 800 series of biodegradable greases. The EnviroLogic 800 series are VGP compliant, biodegradable Lithium Complex greases designed to operate in severe outdoor environments and withstand corrosion. RSC Bio Solutions is introducing EnviroLogic 800 and EnviroLogic 801 greases to further compliment the already established EnviroLogic 802, allowing the company to offer solutions for additional applications when specifications call for NLGI grades #0 and #1.

The EnviroLogic 800 series were specifically designed for multipurpose high performance industrial applications where incidental environmental exposure is a cause for concern. They operate in equip-

ment or systems over a wide temperature range in both marine and land applications. Examples of marine applications include deck cranes, davits, fin stabilizers, shaft bearings, controllable pitch propellers, stern thrusters, barges, roll on/roll off (RO/RO) hatches, cargo hold doors and other moving parts on ships. On land, the EnviroLogic 800 series could be used in any application where grease could end up in the environment, such as garage doors, tracks, hinges, trailers and construction equipment.

The EnviroLogic 800 series demonstrate excellent low temperature pumpability, extreme pressure, antiwear protection and oil separation stability during storage. They are biodegradable and will not cause harm to aquatic life or animals.

EnviroLogic sustainable lubricants are suitable, proven and approved for a wide range of applications, and meet a wide range of ISO grades and industry performance specifications. These solutions maintain technical feasibility evident in the many original equipment manufacturer (OEM) approvals, including: Aegir, Blohm & Voss, Eaton/Vickers, Linde, Rolls Royce, Rexroth, Komatsu and Wärt-silä.



New CMR Modular Approach

CMR's Goldfinch provides a new modular approach for Ballast Water Treatment Systems (BWTS) and marine control panels. A new modular approach for Ballast Water Treatment Systems (BWTS) and marine control panels has been developed by CMR Group, specialists in controls, instrumentation and wiring systems for marine and high-horsepower applications.

Goldfinch is an advanced engineering process that is based around standard and modular panels for BWTS, enabling OEMs to expand and improve their offering through reduced lead times and cost savings. Using Goldfinch can reduce time-to-market lead times by 75% when compared to traditional systems, delivering potential savings of upwards of thousands of dollars per project.

Goldfinch enables BWTS OEMs to select from a range of modular and standard control panel parts and technologies compliant with Marine Classification societies, which can be tailored to individual requirements. This simplifies the whole process from initial technical specification to final delivery of completed units. These include steel constructed Local Operating Panel-based (LOP) solutions which provide protection from dust and water ingress (to a minimum of IP54) and incorporate industry standard PLC-based control systems, HMI user interfaces and are suitable for a Supply Voltage range 380 – 690V, 3-Phase, 50/60Hz.

www.cmr-group.com

New Oil Debris Sensor Launched



Image: Gill Sensors & Controls Ltd.

Gill Sensors & Controls Limited announced immediate availability of its new Oil Debris Sensor that provides continuous real-time monitoring of particle contamination in hydraulic and engine oil

lubrication systems. The new sensor triggers either an immediate shutdown in cases of large particle build-up, or an early warning indication for needed maintenance in both cases preventing unexpected downtime.

www.gillsc.com

OMEGA Debuts Guided Wave Radar Level Transmitter



Image: Omega

The LVRD10 Series of general purpose guided wave radar level transmitters provide continuous level measurement with a 4 to 20 mA signal output. Offered in three probe (rod, coaxial or cable) configurations up to 3 m (9.8') for the rod and coaxial and 5.5 m (18.0')

for the cable design. The sensor is configured using the easy, yet powerful software. The contact liquid level sensor is intended for low corrosive chemical, waste, oil or water storage applications in above grade metal or reinforced concrete tanks or below grade tanks of any material.

www.omega.com



Image: Vesconite

Vesconite: Fast Turnaround on Rudder Bearings

Workboats, ships and megayachts rely on large and extra-large rudder bearings. Having a vessel in dry dock for days or weeks while waiting for an oversized bearing is costly and frustrating, said Vesconite, whose machined Vesconite and Vesconite Superclad replacements—up to 10-ft. in diameter with practically any wall thickness—are available for immediate shipment from a global network of dedicated dealers, and with fast turnaround times for custom sizes. Vesconite is an advanced, internally lubricated polymer that excels where high load strength, dimensional stability, and zero swelling or softening is required. It performs in dirty and silty water, and has long wear life—more than 10 times that of bronze—so maintenance costs are reduced. And unlike metal bearings, it doesn't need oil or grease lubrication, so it's environmentally friendly and fully compliant with EPA Uniform National Discharge Standards.

Vesconite bears type approval certifications from ABS, Bureau Veritas, China Classification Society, China Corporation Register of Shipping, Det Norske Veritas, Germanische Lloyds, Korean Register of Shipping Lloyds Register and Russian Maritime Register of Shipping. It is accredited to ISO 9001.

www.vesconite.com

LSU Site of Sixth National SeaPerch Challenge – Underwater Robotic Championships

2016 is the sixth year of the National SeaPerch Challenge, an underwater robotics competition.

On Saturday, May 21, the Sixth National SeaPerch Challenge will be held on the campus of Louisiana State University (LSU) in Baton Rouge. More than 200 teams of middle and high school students from across the country, an impressive increase of almost 50 percent over last year, will have earned the right to compete against their peers on the national stage by winning at the regional level. Compare this phenomenal growth with the first National Seaperch Challenge, held six years ago in Philadelphia, where just 187 students in 38 teams participated.

Next month more than 1,500 students, teachers, coaches/chaperones, family, friends, volunteers, judges, invited guests, speakers, and committee members will gather for a weekend of learning, sharing and competition. On the line will be the title of National SeaPerch Champion, additional trophies for all

three competition events and an expanded number of special awards.

Hosted by LSU's College of Human Sciences & Education, registered participants and spectators will be treated to the "college experience," enjoying the entire weekend's activities, including the Friday Night Social, Saturday's in-pool competition events and the new electronic poster competition. The Awards Ceremony, along with residence hall accommodations and meals through Sunday morning, will be featured for all participants on the university's picturesque campus.

What is SeaPerch?

SeaPerch is the innovative K-12 underwater robotics program, sponsored by the Office of Naval Research (ONR) and managed by the Association of Unmanned Vehicle Systems International Foundation (AUVSIF). It offers teachers and group leaders the opportunity to

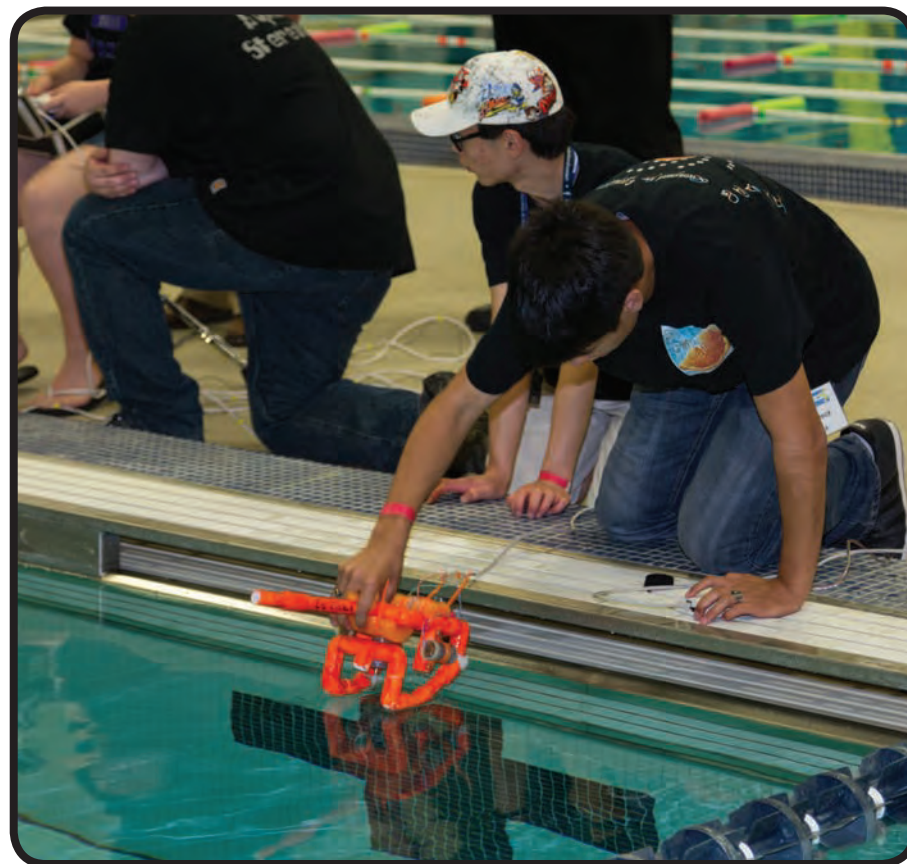
inspire their students to build their own Remotely Operated Vehicles (ROV's) following an academic curriculum consistent with national learning standards supporting Science, Technology, Engineering and Mathematics (STEM) subjects with a marine engineering-based theme. The program promotes hands-on learning of engineering and scientific concepts, problem solving, teamwork and critical thinking, and introduces students to potential and rewarding career opportunities in naval architecture, marine, ocean and naval engineering. "With guidance afforded by AUVSIF and with ONR's commitment to SeaPerch, we have grown exponentially, reaching over 300,000 students to date," said Susan Nelson, Executive Director of SeaPerch.

Over the years, more than 19,000 teachers and mentors have committed to supporting student learning through this stimulating and fun hands-on activity and to promoting student discovery and

excitement about STEM subjects leading to a potential future career path. The program reaches a diverse population, so participants in the National Challenge frequently include students from inner cities to remote rural areas of the country to Native American reservations in Minnesota to the islands of Hawaii, all of whom have now been introduced to STEM through SeaPerch.

This year, the organizers welcome teams from Australia, the Cayman Islands and Puerto Rico.

Beginning on Friday afternoon, May 20, arriving teams will first check into their assigned rooms in the LSU residence halls and get settled, then head over to registration in the LSU Carl Maddox Field House where they will check in and submit their ROVs for a compliance review. For those vehicles requiring adjustments and/or repairs, a triage station with spare parts and tools will be available. Following dinner at



the Resident Dining Hall, teams will participate in the Friday Night Social where students from all over the country and beyond can meet, mingle and compare their design enhancements and innovations as well as their challenges along the way.

All participants will receive National SeaPerch Challenge T-shirts and giveaway bags with items contributed by the SeaPerch program and its corporate sponsors.

Competition day, Saturday, May 21, will take place at the LSU Natatorium. Teams may consist of a minimum of one student and one adult leader, and there is no restriction on the maximum number of students that can participate although teams averaged six members last year. Susan Nelson will preside over the opening ceremony in the LSU Field House featuring a number of notable speakers and last minute technical instructions for the teams, accompanied by photographers, videographers and local media. Again this year, there will be live streaming of the day's activities for the benefit of classmates, friends and parents back home.

The in-pool technical competition consists of two events. The first will require students to steer their ROV through the Obstacle Course consisting of five, 18-inch diameter submerged hoops oriented in different planes. Every year, the second in-pool event changes, requiring the students to design their vehicles

specifically to meet the designated mission. The second event for 2016, aptly named, "The Challenge," will test the students' ability to release three different sized balls from four dispensers on the pool bottom and transport them in a controlled manner either to a submerged container or to a floating pen on the surface as appropriate. Detailed specifications for both underwater events have been posted on the SeaPerch website, www.seaperch.org, for teams to construct their own events for practice prior to the national competition.

Again this year the third event will provide a chance for the competitors to share their learning, innovations and science understanding through poster displays and presentations. Introduced this year for the first time will be electronic poster judging in advance of the National SeaPerch Challenge.

The top 30 teams will be offered an opportunity to present in-person to a panel of judges on competition day. Scores both for the posters and for the presentations will be added to each team's total points.

Approximately 150 judges and volunteers are also anticipated to attend during the day on Saturday in order to adequately oversee and judge the in-pool competitions, to judge the top posters that will have been selected for in-person presentations during the day and to ensure a rewarding and memorable day for all participants, attendees and guests.

On Saturday evening the Awards Ceremony will take place in the LSU Field House. Here, first-through-third place trophies in each event for middle school, high school and open classes, special awards and the naming of the 2016 National SeaPerch Champions will be made by Susan Nelson, ably assisted by the invited guests who will also be photographed with each winning team. Invited speakers, representing corporate sponsors, local and state congressional representatives, ONR, U.S. Navy, U.S. Coast Guard and other military branch personnel, will be able to take part in the day's activities.

They have been encouraged to arrive early and observe the competitions, judge various events and speak first hand with the students before addressing them that evening about the importance of STEM to their future careers. All student team members will receive participation medals, and be photographed by team for the benefit of their families and schools. Additionally, Certificates of Participation will be available both for student participants and for teachers and advisors to download following the National Challenge. At the conclusion of the award presentations all registrants will enjoy an outdoor Awards Party and Barbeque.

Sunday, May 22, will be a free day for the teams to explore, on their own, the rich cultural history and outdoor activities in the greater Baton Rouge/New

Orleans environs including museums, parks and historic sites.

The College of Human Sciences & Education (CHSE) is a nationally accredited division of Louisiana State University. Formed in 2012, CHSE brings together programs and capitalizes on individual strengths to create a dynamic college that addresses the socially significant issues we face as a state, nation and world. The college is comprised of the School of Education, the School of Human Resource Education and Workforce Development, the School of Kinesiology, the School of Library and Information Science, the School of Social Work and the University Laboratory School. These combined schools offer eight undergraduate degree programs and 18 graduate programs, enrolling more than 1,900 undergraduate and nearly 1,000 graduate students.

The college is committed to achieving the highest standards in teaching research and service, and is continually working to improve its programs. Judges and volunteers are always welcome. Should you be interested in participating as a volunteer or judge on Saturday, May 21, please go to the SeaPerch website, www.seaperch.org, to sign up. Sponsorship opportunities are still available for individual, local and corporate funding, and can be viewed on the SeaPerch website. You may contact Susan Nelson at susan@seaperch.org about how to become a sponsor for this event.





ABS

Wiernicki



ClassNK

Koichi Fujiwara



Seaspan

Chylinsk



Seaspan

Chick



Seaspan

Wortman



Transas

Ward

ABS' Wiernicki Calls for New Talent Approach

ABS Chairman, President and CEO Christopher J. Wiernicki says risk-based, data-centric, cyber-influenced decision-making defines a new absolute value of talent. Speaking at the opening session of the CMA Shipping 2016 Conference, Wiernicki shared his views in setting the stage for a discussion on "Local Talent, Global Impact."

"The absolute value of talent we need to develop must anticipate, leverage, and exploit rapidly emerging technologies, make the right techno-economic risk decisions... and recognize the need for change on a global scale," he said. This means the workforce of tomorrow will be able to identify and embrace disruptive technologies. The driving force behind this change is that evolving technology and regulations are moving the industry to risk-based, data-centric, cyber-influenced decision-making. "New technologies are being developed and applied at faster speeds than we've ever seen to meet regulatory and operational demands," Wiernicki said.

ClassNK appoints new Chairman and President and Executives

Current Executive Vice President Koichi Fujiwara has been appointed as Chairman and President as well as a Representative Director of ClassNK, effective March 7, 2016. Current Executive Vice Presidents Yasushi Nakamura and Tetsuya Kinoshita will continue in their present roles on the team, joined by Junichiro Iida as Managing Director. Noboru Ueda has stepped down as Representative Director, Chairman and President. Current Executive Vice President Tetsushi Agata has been appointed as an Executive Auditor as part of the Society's aim to strengthen its auditing system.

Koichi Fujiwara holds a Master of Naval Architecture from the University of Tokyo, and served in Japan's Ministry of Transportation (now Ministry of Land, Infrastructure, Transport and Tourism). He joined ClassNK in 2007

Seaspan Appoints Three Leaders

Seaspan named three new Vice Presidents to its Senior Leadership Team, announcing the appointments of Linda Wortman as Vice President, Finance & Accounting; Catherine Chick as Vice President, Business Services & Technology; and Shawn Chylinski as Vice President, Health, Safety, Environment & Quality.

Transas Appoints Ward

As a part of its global restructure, Transas announced that Andrew Ward has joined the team as the Vice President of Sales, Asia Pacific, succeeding Johan Gustavsson, who moves into the newly created role of a Vice President Global Customer Support. Ward has a BA (Hons) In Business Administration and Marketing and began his career with Litton Marine Systems (now Northrop Grumman Sperry Marine).

New CEO for Odfjell Terminals

The Board of Odfjell Terminals BV announced that Frank Erkelens will join Odfjell Terminals as CEO for its global activities. Erkelens has more than 20 years of experience in the terminal industry and comes from a position as President EMEA in Vopak.

Ide Joins Viega

Viega LLC announces Elwood Ide as its newest technical manager for shipbuilding and offshore for the West Coast. In this position, Ide provides analysis, forecasts and guidance for developing the marine and offshore business in the California, Oregon, Washington, Alaska, Hawaii and British Columbia region. He also introduces and trains engineers and craftsmen to use and install new solutions that meet rigorous marine and offshore challenges.

Matherly Joins Delta "T" Systems

Delta "T" Systems named industry veteran Tony Matherly as its production manager. Matherly has worked within the marine industry for 25 years.



Crowley

(L to R): Richard Scales, Daniel Press, Andrew Scalice and Conner McDaniel

Crowley Scholarships to Four SUNY Maritime Cadets

Crowley Maritime Corporation's 2016 Thomas B. Crowley Sr. Memorial Scholarships have helped to further educational opportunities for four students of State University of New York (SUNY) Maritime College. The recipients, who will each sail with Crowley this summer, were chosen based on their demonstrated leadership skills, financial need and plans to pursue a career in the towing or petroleum shipping industries after graduation. The awardees are Daniel Press from Middletown, Del., Richard Scales from Huntsville, Ala., Conner McDaniel from Islip Terrace, N.Y., and Andrew Scalice from Howard Beach, N.Y.

"SUNY is a great resource for professional, qualified mariners," said Crowley's Jenny Terpenning, recruiter, marine personnel. "Crowley regularly hires from its marine transportation and marine engineering programs. We have hired more than 30 graduates from SUNY Maritime College since 2012."

Since 1984, Crowley has provided more than \$3 million dollars in scholarship funding for more than 1,000 students.

Bruton Joins Intermarine

Intermarine, LLC, a transporter of project, breakbulk and heavylift cargo, has named Mac Bruton as Director of Business Development, Americas. He will be based in New Orleans. Bruton has more than 20 years in the international shipping and infrastructure development industries, with a focus on Latin America. He began his career in 1989 as an operations manager for Marine Chartering Co., Inc.

HII Names Smith VP, Strategy and Development

Huntington Ingalls Industries (HII) announced that Michael S. Smith has been named the company's corporate vice president, strategy and development, succeeding Christopher D. Kastner, who

is replacing Barbara A. Niland as corporate vice president and CFO upon her retirement. Smith reports directly to HII President and CEO Mike Petters. Smith is a graduate of Stanford University, where he earned a bachelor's degree in industrial engineering and a master's in engineering management.

Kirby Buys Seacor's Inland Tank Barge Fleet

Kirby Corporation agreed to purchase the inland tank barge fleet of SEACOR Holdings Inc. from subsidiaries of Sea-



Kirby Corp.



Ide



Matherly



Bruton



Smith

cor for approximately \$88 million in cash. The asset purchase will consist of 27 inland 30,000 barrel tank barges and 13 inland towboats, plus one 30,000 barrel tank barge and one towboat currently under construction. Also, as part of the agreement, Kirby will transfer to Seacor the ownership of one Florida-based ship docking tugboat.

BOURBON Invests in Gas Sector



While BOURBON is a leader in the offshore marine sector, the current tough offshore environment has led it to diversify. With that, the company announced the acquisition of the activities of a global leader in ethane transportation, with a market share greater than 50%.

It comprises the following companies who are currently owned by their majority shareholder, JACCAR Holdings:

- 100% of Greenship Gas, a Singaporean owned “shipping trust,” comprising directly or indirectly of: a fleet of 17 vessels (of which 13 vessels are currently in service) dedicated to the transport of Ethane gas, Ethylene and LNG and having an average age of 3.5 years;
- 100% of EVERGAS, operator and contractor of gas transportation services;
- 100% of Greenship Gas Manager Pte. Ltd, manager of the Greenship Gas “shipping trust”; and
- 80% of JHW Engineering & Contracting Limited.

The purchase price for these companies is \$320 million with a net debt as of December 31, 2015 of \$389, the financing of the vessels being transferred as part of the transaction.

Nemko, Retlif in New Agreement

In a collaborative move that provides collective services as a complete, globally accepted testing solution, Nemko and Retlif Testing Laboratories, have part-

nered. Retlif offers EMC/EMI, Lightning and Environmental testing services as well as engineering and compliance program management at locations in Ronkonkoma, New York, Plainview, New York, New Hampshire, Pennsylvania, North Carolina and Washington D.C.

Nemko offers testing, inspection and certification services with more than 20 locations in 12 countries. In North America Nemko has facilities in San Diego California and West Valley City, Utah, as well as Nemko Canada (Ottawa), and Nemko Montreal. Nemko Canada is accredited to ISO 17025 and offers EMC, Safety and Wired Telecom testing.

ABB Wins \$140 Mln Order for HVDC Station

ABB received an order worth around \$140 million from transmission system operators Energinet.dk in Denmark and 50Hertz Transmission in Germany to design, supply and install a high voltage direct current (HVDC) converter station in Bentwisch, Northern Germany. The HVDC Light “back-to-back” converter station, the first of its kind in Europe, will allow the connection of the asynchronous AC power grids of Eastern Denmark and Germany.

The deal will see ABB provide the complete including transformers, converter valves, cooling systems, control and protection and other related equipment at the converter station. HVDC Light provides sophisticated features to the network such as the “black-start” power restoration capability and exceptional power control, to regulate the system with changes in the wind speed.

Providing the HVDC system makes



ABB

ABB a technology contributor to the “Kriegers Flak combined grid solution” project, which establishes the world’s first offshore interconnection by using the national grid connections to the future Danish Kriegers Flak and operating German Baltic 1 and 2 offshore wind farms.

FleetWeather Changes Name to



Accuritas Global Solutions

FleetWeather Ocean Services, providers of business intelligence and analytics for the commercial shipping industry, opened its doors under a new name and new brand: Accuritas Global Solutions ...A business intelligence and analytics company. Executive Vice President Jess Hurwitz announced the name change reflecting continued focus and growth in providing industry-unique business intelligence, analytics and consulting services, and expansion from working within the commercial shipping industry to other modes of global transportation. The new name is effective immediately.

www accuritas.com
email: info@accuritas.com

ClassNK gains USCG Authorization under ACP

The United States Coast Guard (USCG) has authorized classification society ClassNK to participate in its Alternate Compliance Program (ACP) in addition to granting the authorization to carry out statutory surveys for US-flagged ships in 2011. The ACP was developed as an alternative method for US-flagged vessels to fulfill the regulatory requirements for construction and operation. Under the program, ClassNK can now carry out a wide range of surveys and inspections on US-flagged vessels on behalf of the USCG.



(Photo: Lionsgate)

Deepwater Horizon, Hollywood Style

Wahlberg Headlines Film on Deepwater Horizon Tragedy

Nearly six years after the BP oil spill in the Gulf of Mexico, Hollywood takes its shot at recounting the tragedy with a film due this fall aiming to tell the story on the fatal blowout and its aftermath.

The oil spill, an epic environmental disaster, is depicted in the film Deepwater Horizon, named after the Transocean-operated semisubmersible Mobile Offshore Drilling Unit which suffered a catastrophic blowout and explosion on April 20, 2010, killing 11 workers and injuring 16 others, and leading to an 87-day-long oil spill in the Macondo Field roughly 40 miles off Louisiana. Deepwater Horizon, directed by Peter Berg, stars Mark Wahlberg, Kurt Russell, John Malkovich, Gina Rodriguez, Dylan O’Brien and Kate Hudson and is due for release on September 30, 2016.

Watch a trailer for Deepwater Horizon at:

www.deepwaterhorizon.movie



(Photo: Lionsgate)

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FLSA Status: Exempt

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Reports to: Vice President of Engineering

Please apply at: <https://seattle-harleymarine.icims.com/jobs/1272/director%2c-vessel-construction/job>

POSITION SUMMARY

Provide oversight and guidance for all HMS vessel construction and major overhaul/refit projects. Coordinate and review the development of all drawings and specifications for vessel construction/major overhaul. Solicit and review bids for engineering design and vessel construction. Make recommendations for contractor selection. Manage all on going vessel construction projects; work closely with shipyard to maintain budget and schedule performance. Review and approve all change orders. Collaborate with HMS Legal for review and approval of all contracts related to vessel construction. Manage and supervise Contract Administrator, Manager of Tug Construction, and Manager of Barge Construction.

ESSENTIAL FUNCTIONS

- Provide oversight and guidance for all HMS vessel construction and major overhaul/refit projects.
- Coordinate and review the development of all drawings and specifications for vessel construction/major overhaul.
- Solicit and review bids for engineering design and vessel construction. Make recommendations for contractor selection.
- Manage all on going vessel construction projects; work closely with shipyard to maintain budget and schedule performance. Review and approve all change orders.
- Collaborate with HMS Legal for review and approval of all contracts related to vessel construction.
- Coordinate with Operations and Safety for outfitting and delivery of vessels.
- Manage the warranty program.
- Perform related duties as assigned.

MINIMUM QUALIFICATIONS

- Experience managing vessel construction projects.
- 15 years of increasingly responsible vessel construction experience in the maritime industry.
- Bachelor's Degree in Naval Architecture/Marine Engineering or other Maritime engineering field.
- Ability to obtain TWIC card.
- Knowledge of oil transportation and marine industry preferred.
- Knowledge of tugs and barge systems and equip-

ment preferred.

- Ability to work with others using courtesy, tact, and good judgment.
- Maintain the confidentiality of all sensitive communications.
- Ability to understand and execute complex oral and written instructions.
- Ability to work independently with minimal or no guidance.
- Must be physically fit enough to board barges and tugs at sea and in port.
- Must be able to read, speak, write, type, and understand English in person and over the telephone.
- Valid State drivers' license.
- Use of Computer (MS Office Suite), Copier and Fax Machine.

WORKING ENVIRONMENT and CONDITIONS

- Capable of making decisions and giving directions to facilitate prompt service delivery.
- Typically work in office environment with frequent travel/work in shipyard environment.

EXPECTED HOURS OF WORK

- Normal office hours are 8:00 a.m. to 5:00 p.m. Monday through Friday.

Division Manager, Industrial/Maritime Bay Ship and Yacht

Salary: \$ 110,000 , Full Time , General / Operations Manager

Category: Corporate / Senior Management

Skills: Candidates with a bachelor's degree in Mechanical Engineering, Structural Engineering, or Business Administration, or equivalent experience, are preferred. Solid management and leadership as well as responsibility for a profit/loss center would be a plus. Industry experience in structural or mechanical engineering, construction, manufacturing, oil & gas, utilities, defense, transportation, or marine services would be helpful. Prior military leadership and logistics training would be a plus. Experience with trades related to industrial and ship repair industries, i.e., foundries, fabricating, machine shops, welding and/or industrial painting are preferred. Excellent written and verbal communication skills as well as good computer skills with MS Word and Excel are needed.

Description:

Bay Machine and Fabrication is a full service industrial company located on the waterfront of San Francisco Bay with service shops that support sandblasting and painting operations, pipefitting, precision machining, metal fabrication and repair. Our fully equipped shops are staffed with qualified, technically trained craftsmen and an in-house engineering department. We are also able to provide full services on customer sites. In addition to servicing the needs of Bay Ship and Yacht, we serve customers across a wide spectrum of industries, including construction, manufacturing, transportation, high tech and refineries. We are

growing this important profit and service center and are looking for a proven, motivated leader to join our team and run this important division under the direction of the owner.


This is an excellent opportunity to manage and develop people, processes and our external customer base. The Division Manager is responsible for the successful management of Bay Marine and Fabrication's marine and industrial shops' operations, including engineering, customer service, personnel, shop and administrative procedures, quality control, equipment, facilities, risk management and profitability. The core competencies required for success in this position include the mental capacity to innovate, develop and drive high performance; the communication strength to build relationships, proactively resolve problems and articulate concepts, plans and directives orally and in writing; the capacity to lead, motivate, coach and develop subordinates and collaborate effectively with others throughout the organization; strong organizational skills, including the ability to thoroughly and effectively define, prioritize, direct and assign all functional elements including staff, procedures, facilities and equipment.

Division Management responsibilities include but are not limited to the following:

- Customer Service, including managing administrative procedures to ensure that customers always receive a quick response to inquiries or work orders, ensuring that delivery of products and services always achieves the mission statement and providing for continual development of the Division customer base and work volume.
- Operations Management, including developing and effectively managing production and quality control procedures to minimize cost and optimize quality, effectively providing and/or managing shop engineering services and developing and maintaining facilities and equipment in appropriate condition and optimum serviceability.
- Financial Management, including routinely monitoring Division revenue, cost & profitability, making adjustments to ensure that year-end division financials meet profitability objectives and developing and submitting annual division overhead budgets. Additionally, responsibilities include managing overhead costs to achieve annual budget estimates and managing Division contracts to minimize company financial risk.
- Personnel Management, effectively managing shops' staff, including recruitment, training and development. Ensuring that annual reviews are accomplished effectively and on time, managing grievances, discipline and personnel issues effectively and ensuring strict compliance of all shops' personnel with company and regulatory body safety and environmental rules.



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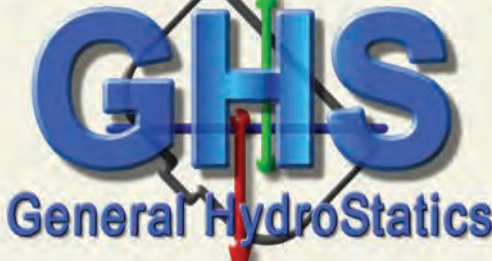
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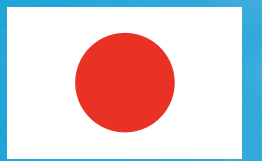
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