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Marine News

Volume 27 • Number 11

NOVEMBER 2016

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ON THE COVER

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Departments & Analysis

MarineNews (ISSN# 1087-3864) is published monthly (twelve issues) by Maritime Activity Reports Inc. 118 E 25th St. New York, NY 10010-1062. Periodicals Postage Paid at New York, NY and additional mailing offices. POSTMASTER: Send all UAA to CFS. NON-POSTAL AND MILITARY FACILITIES send address corrections to Marine News 850 Montauk Hwy, #867 Bayport, NY 11705.

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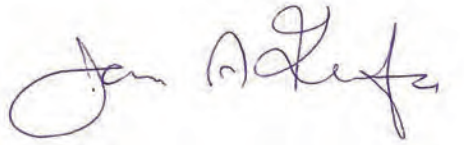
I'm not one to make a lot of predictions, especially when it comes to divining when the price of oil will reach and sustain a palatable plateau for offshore operators and their clients. That being said; there is plenty happening on the water, in the heartland and everywhere else in between. Moreover, this industry inertia gives me plenty of reason to be optimistic for the collective, North American waterfront. Stay with me for just a minute, and I'll show you why.

It is easy to fixate on Gulf of Mexico oil-related woes, but there is also ample reason for tempered optimism. The impact of a much anticipated 'subchapter M' towboat rule is likely far less than expected for uninspected vessel operators, but even with delayed implementation timelines and otherwise watered down content (we waited 12 years for this?), workboat repair yards will see at least a nominal uptick in business as a result. Separately, the advent of offshore wind on this side of the big pond didn't arrive a minute too soon. If and when it does take off, Jones Act rules will require either a newbuild program and/or a thoughtful repurposing of the ample offshore service tonnage now laying idle in the U.S. Gulf.

Separately, the Gulf Coast boatbuilding industry (in particular) got a much-needed boost this past quarter with the U.S. Coast Guard's long-awaited Offshore Patrol Cutter (OPC) award to Eastern Shipbuilding, while two other Louisiana-based yards hit the jackpot with New York City ferry contract(s). And, as I sat down to write this note this morning, the news of three dredge newbuilding contracts hit my desk.

Elsewhere, the impact of the IMO's ratification of the international ballast water convention and signs that the Coast Guard is inching towards approval of one or more OEM BWT designs is difficult to gauge. After all, the domestic brown water industry will likely have limited exposure to this retrofit tsunami, when it comes, but anything being built or operating in the offshore 300' range will have to be considered prime targets.

I promised you no predictions. But, you ask: *what is the state of the broader workboat market?* To be fair, the world of workboats encompasses far more than just the offshore sector. In this edition, we bring you two contrasting views of current conditions. Longtime ***MarineNews*** contributor Susan Buchanan weighs in on the state of the industry from the perspective of offshore Gulf of Mexico stakeholders. It isn't always pretty, but it does incorporate the full range of analysis and opinions from those who ought to know. In contrast, Kathy A. Smith paints a far different picture of what's happening now for the broader markets. As global shipyard operator Damen formally enters the U.S. markets with a physical presence in Houston, it is hard to find the downside of as many as 27 new design contracts for domestic boat yards. There's plenty of balance out there, if you only look for it. We did, and so too can you.



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Passenger Vessel Safety: Under the Coast Guard Spotlight

Information recently extracted from the U.S. Coast Guard's Marine Information for Safety and Law Enforcement (MISLE) database chronicles the safety performance of U.S. Inspected Passenger Vessels. The Coast Guard's numbers are telling, and hence we ask: *"How is the domestic Passenger Vessel industry doing in terms of safety?"* You can likely judge for yourself. Or, maybe not …

According to the U.S. Coast Guard, the domestic passenger vessel population represents a significant part of the U.S. fleet as a whole, 6,458 vessels (~ 16%) in total within the broader commercial fleet of about 39,500 hulls. These passenger vessels all fall into one of three categories; Subchapter H (100 or more gross tons), Subchapter K (small passenger vessels carrying more than 10 passengers or with overnight accommodations for more than 49 passengers, and Subchapter T (under 100 gross tons). More than 90 percent of these are considered subchapter T hulls. The Coast Guard data contains information concerning deaths and injuries for the Calendar Years 2011-2015. Only information from closed cases is provided.

The data is one thing: figuring out what it means is quite another. That's because various sources of data count passenger vessels and ferries in different manners. For example, the Coast Guard counts 6,458 (Subchapter T, H & K) vessels, while the Passenger Vessel Association (PVA) – an organization that bills itself as the voice of the passenger vessel industry – has a membership that hovers around 1,300 hulls. Yet another source, the U.S. Government's Bureau of Transportation Statistics (BTS) counted 853 passenger vessels in its 2014 census, and a 2014 domestic ferry survey had the domestic ferry population – mostly Subchapter H & K hulls – at 499 vessels.

The numbers show that the passenger vessel industry has gotten better over time. In general, deaths and injuries have dropped, and – as a function of the incredible number of passengers who travel on passenger vessels every year – the number of injuries and deaths are remarkably low.

The PVA estimates that its members carry more than 200,000,000 passengers annually, while the BTS puts the domestic ferry industry's totals 115,000,000 passengers. And while even one death or injury is one too many, just 168 fatalities over the past five years, spanning more than one billion passengers, is a statistic that bears watching. How many of these injuries and deaths are actually related to the vessels themselves? It's a smaller number than you might think. For example, over a five year period, as many as 128 deaths (76%) of the 168 reported were a function of existing medical conditions, diseases or diving incidents. Or, in other words: nothing to do with the vessel itself.

Subchapter T vessels (91% of hulls) had 88% of deaths (and 55% of reported injuries) over a five year period associated with that type of vessel. But without the passenger throughput totals from each class of vessel, it is impossible to make educated statements about which type of vessel is safer or, for that matter, better regulated. The real answer is that the data isn't linear because we don't have all the numbers. Passenger vessel operators guard their proprietary passenger throughput numbers closely. PVA doesn't pretend to speak for all H, K, and T vessels, but claims to represent 95% of the H&K fleets.

When parsing the safety numbers, the U.S. Coast Guard works closely with industry in all sectors. For example, they cooperate with AWO when that organization puts together its annual report on towboat safety. And the Coast Guard would like to do the same with the passenger vessel industry. But, while towboat and barge safety numbers tend to be rather straightforward, the same cannot be said for passenger vessel data, especially when it spans so many different types of vessels, subchapter classifications, and a host of other obstacles (proprietary data, among them).

Deaths onboard Passenger Vessels (Subchapter T, K, H) by Accident Type

Accident Type	2011	2012	2013	2014	2015	TOTAL
Assault, Homicide, Suicide, or Self-Inflicted Injury					1	1
Contact Injury- Collision with Fixed Object			1	1		2
Contact Injury- Fall into water		1	1			2
Contact Injury- Fall onto surface	1	2	3	1		7
Contact Injury- Struck by Moving Object	1					1
Diseases- General			6	3	4	13
Existing Medical Condition Event	25	16	19	8	12	80
Noncontact Injury- Asphyxiation		4	3	1	1	9
Noncontact Injury- Diving	13	12	3	5	2	35
Noncontact Injury- Other		1	2			3
Other Injury Type		1			2	3
Overexertion Injury- Existing medical condition	1	3	3	1	1	9
Unknown Injury Type	1		1		1	3
TOTAL	**42**	**40**	**42**	**20**	**24**	**168**

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Injuries onboard Passenger Vessels (Subchapter T, K, H) by Accident Type

Accident Type	2011	2012	2013	2014	2015	TOTAL
Assault, Homicide, Suicide, or Self-Inflicted Injury	2		2			4
Contact Injury- Collision with Fixed Object	20	30	42	35	10	137
Contact Injury- Crushed between objects	11	13	9	7	11	51
Contact Injury- Fall into water	6	7	3	1	3	20
Contact Injury- Fall onto surface	91	88	103	79	74	435
Contact Injury- Line handling/caught in lines	5	3	1	5	3	17
Contact Injury- Other	20	16	30	12	8	86
Contact Injury- Struck by Moving Object	17	10	9	7	3	46
Diseases- General		2	2			4
Existing Medical Condition Event	6	9	6	6	1	28
Noncontact Injury- Asphyxiation		1	4	5	4	14
Noncontact Injury- Burn	1	2	1			4
Noncontact Injury- Diving	20	8	10	12	14	64
Noncontact Injury- Electric Shock	1				1	2
Noncontact Injury- Exposure	2	3	1	1	1	8
Noncontact Injury- Other	8	11	4	5	3	31
Other Injury Type	6	2	9	4		21
Overexertion Injury- Existing medical condition	1	4	5	2	1	13
Overexertion Injury- Strain or sprain	6	7	10	6	4	33
Unknown Injury Type	5	3	89	4	1	102
TOTAL	228	219	340	191	142	1120

Dead, Missing or Injured Persons Data: Accident Type & Party Role

Accident Type - Party Role	2011	2012	2013	2014	2015	TOTAL
Dead	**42**	**40**	**42**	**20**	**24**	**168**
Contractor Employee			1			1
Crewmember	4	2	2	2	1	11
External Victim	2	2				4
Master			1			1
Passenger	36	36	38	18	23	151
Exposure No Injury					**1**	**1**
Passenger					1	1
Injured	**228**	**219**	**340**	**191**	**142**	**1120**
Contractor Employee	2		1	1	1	5
Crewmember	62	55	56	39	21	233
Employee	2	2	1	4	2	11
External Victim		2			3	5
Master	3	10	10	8	2	33
Operator					1	1
Owner					2	2
Passenger	157	137	271	137	108	810
Person in Charge	1					1
Pilot				1	1	2
Visitor	1	13	1	1	1	17

Dead, Missing or Injured by Inspection Subchapter

Casualty Type - Inspection Subchapter	2011	2012	2013	2014	2015	Total
Dead	**42**	**40**	**42**	**20**	**24**	**168**
Subchapter H	1	4	2	1	1	9
Subchapter K	3	1	5		1	10
Subchapter T	38	35	35	19	22	149
Exposure No Injury					**1**	**1**
Subchapter T					1	1
Injured	**228**	**219**	**340**	**191**	**142**	**1120**
Subchapter H	50	55	64	50	45	264
Subchapter K	41	39	120	24	12	236
Subchapter T	137	125	156	117	85	620
Total	**270**	**259**	**382**	**211**	**167**	**1289**

Readers can access information about individual casualties on the CGMIX website at:
https://cgmix.uscg.mil/IIR/IIRSearch.aspx

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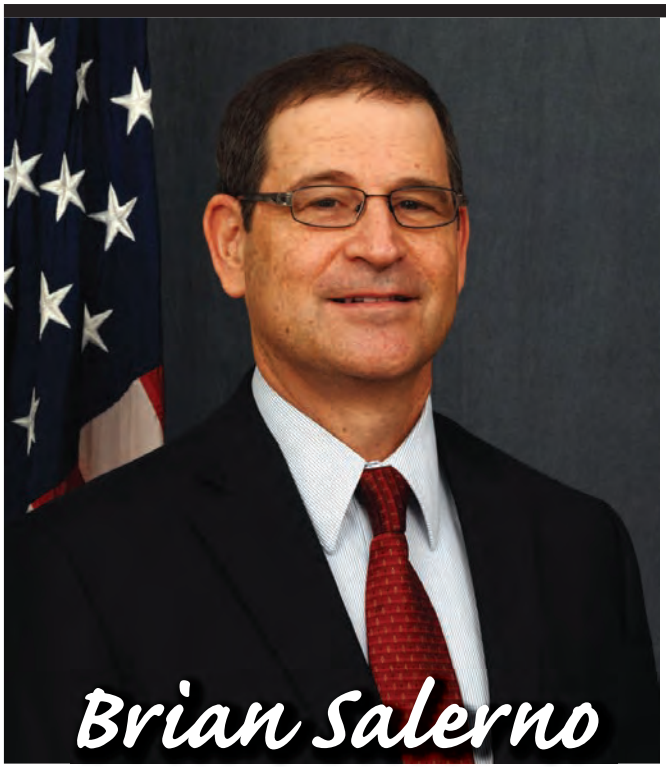
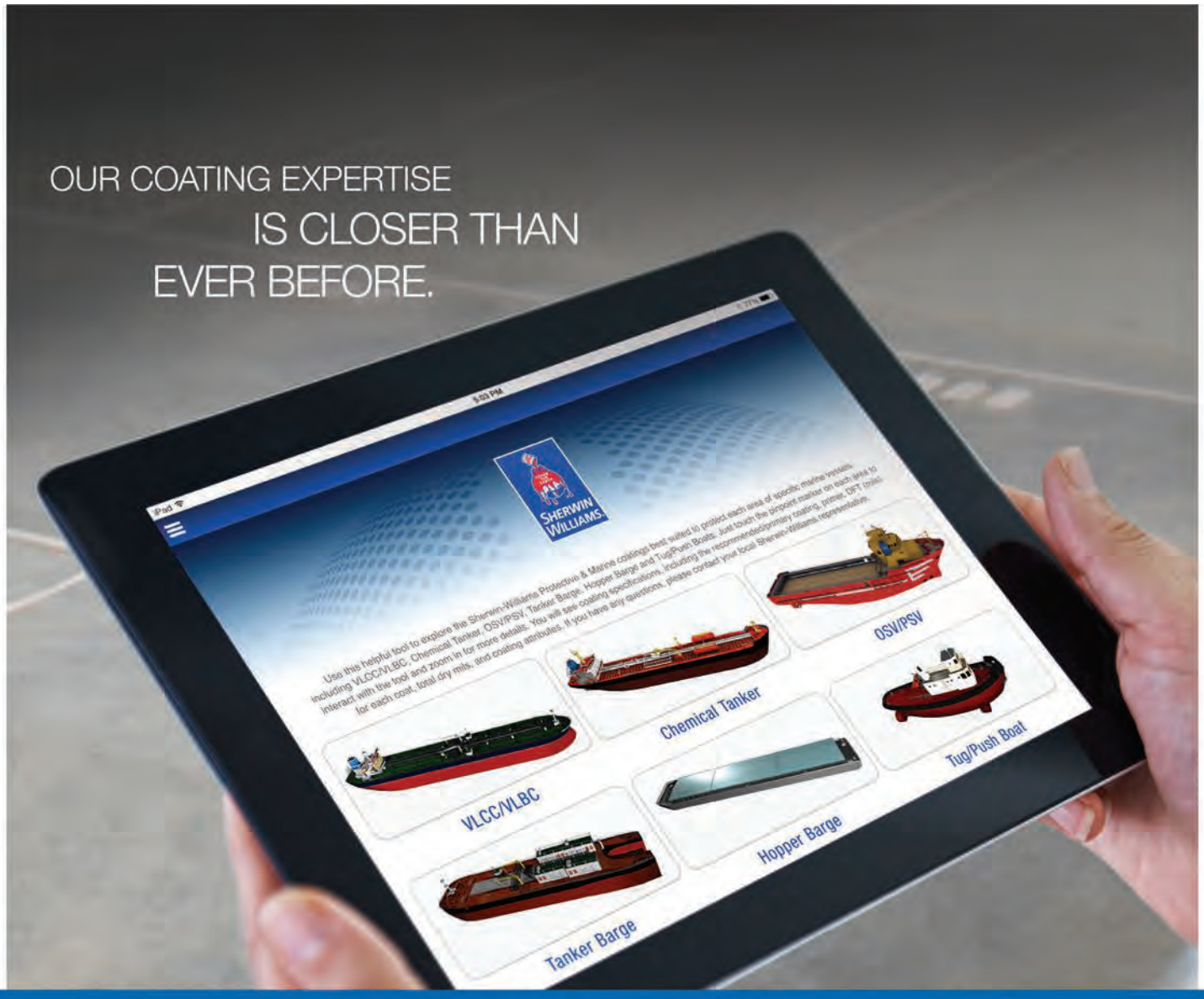


Director,
Bureau of Safety and Environmental Enforcement (BSEE)

Brian Salerno was sworn in as the Director of the Bureau of Safety and Environmental Enforcement (BSEE) on August 26, 2013. He is responsible for promoting safety, protecting the environment and conserving resources through the vigorous regulatory oversight and enforcement of offshore operations on the U.S. Outer Continental Shelf. Prior to his appointment as Bureau Director, Salerno served as the U.S. Coast Guard's Deputy Commandant for Operations where he was responsible for establishing and providing operational strategy, policy, guidance and resources as needed to meet national priorities for U.S. Coast Guard missions, programs and services. Previous Washington, D.C.-based assignments included serving as the Assistant Commandant for Marine Safety, Security and Stewardship, Assistant Commandant for Policy and Planning, and Director of Inspections and Compliance. Salerno was commissioned as an ensign in the U.S. Coast Guard in December 1976 after attending Officer Candidate School. Over the course of his 36-year active duty career, Salerno attained the rank of Vice Admiral, serving predominantly within the U.S. Coast Guard's marine safety program. He is also a 2000 graduate of the U.S. Army War College, with a Masters in Strategic Studies. In addition, he holds a Master's Degree in Management from the Johns Hopkins University. He is licensed as a master of small passenger vessels. At a time when things could certainly be going better for the industry he regulates, Salerno weighs in on offshore operations from the unique perspective afforded him from the c-suite at BSEE.

BSEE was established in 2011 following the Deepwater Horizon oil spill. Tell us about the changes in the regulatory climate since then. What makes BSEE a better solution?

In the wake of the 2010 Deepwater Horizon tragedy, there was a sentiment that regulatory functions related to safety, environmental protection, and resource conservation should reside in a bureau solely dedicated to those duties. BSEE's creation on October 1, 2011 resulted in a process of continuous regulatory standardization and enhancement. A number of practical changes have occurred since 2011 including the expansion of Safety and Environmental Management Systems (SEMS), finalization of the Well Control Rule, the Arctic Rule, the Production Systems Safety Rule, and the Decommissioning Costs Rule. BSEE also created a near-miss reporting system (SafeOCS) for safety-related data collection and analysis, and launched joint inspections with the U.S. Coast Guard. All of these changes coincide with doubling the number of inspectors and increasing the staff of engineers. Taken together, these changes are part of a comprehensive effort that forms the foundation of a safer offshore energy industry. We caution, however, that government can only do so much, and the companies themselves, with BSEE's encouragement, must take the steps needed to create a robust and integrated offshore safety culture, one that expands beyond single companies and is truly "industry-wide."



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Safety is a key mission for BSEE, and BSEE pushed the requirement of each company having a Safety and Environmental Management System in order to forward that goal. Tell us why you believe SEMS improves safety.

SEMS is an ongoing story that is yielding continuous improvement. However, it is still in the maturation phase for many companies. The requirement to implement a SEMS became effective in 2011 and was further refined in 2013. The SEMS regulation is aimed at changing the dynamic between operators and regulators from one of compliance checking to one of performance measurement. The difference is that a performance requirement puts ownership of the means to achieve the expected level of safety performance on the operator. This changes how the operator approaches its regulatory responsibilities, because having flexibility to select the means of operation requires that you think about what you are going to do today, and rethink it tomorrow, instead of just relying on compliance checklists. As the industry and BSEE have gained more experience with this approach, we are seeing quicker identification of issues that need to be addressed, as well as deeper commitments to act on those issues.

Research is another BSEE mission. Where does this research extend and give us an example of an offshore success in that regard.

BSEE actively conducts research and evaluates current and emerging technologies for operations ranging from the drilling of oil and gas exploration wells to the removal of platforms and related infrastructure. The research efforts are part of our ongoing effort to reduce risks across all offshore operations. BSEE's Technology Assessment Program (TAP), which operates through contracts with universities, private firms, and government laboratories, evaluates safety-related technologies. TAP has administered nearly 900 research and development projects since its inception. BSEE has aggressively maintained a comprehensive, long-term research program dedicated to improving industry's ability to respond to oil spills. The major focus of research in this area is improvement of the methods and technologies used for oil spill detection, containment, treatment, recovery and cleanup. We engage in cooperative efforts that bringing together funding and expertise from research partners in government agencies, industry and the international community to advance the ability of industry to quickly respond should a spill occur. We conduct unannounced inspections to make sure that every offshore operator is ready to immediately deploy resources in the event of a spill.

BSEE talks about the "development of safer technologies," but how are you facilitating that development?

The offshore energy industry is extremely innovative. New technologies are continually developed, and many of these technologies have the potential to make the offshore working environment safer. One of BSEE's mandates is to make sure that the offshore industry is using the "Best Available and Safest Technology." BSEE's BAST program is the regulatory program that identifies and assesses proven technologies on the Outer Continental Shelf. The BAST program receives technical assistance from BSEE's Engineering Technology Assessment Center. ETAC provides BSEE's headquarters, region and district offices with consulting expertise, value-added solutions, and the comprehensive review of newly developed and emerging technologies. The work performed by the staff at the Engineering Technology Assessment Center does not impact the permitting approval process for industry but it does help everyone involved identify the strengths and weaknesses of new technology.

Oil Spill Preparedness and an Environmental Focus go hand in hand. How is BSEE helping to improve the technologies associated with spill response – here in the Gulf and in the Arctic, as well?

BSEE aggressively maintains a comprehensive, long-term research program dedicated to improving oil spill response options. BSEE's Ohmsett facility, the largest oil spill response test facility in North America, includes a 667-foot test tank that contains 2.6 million gallons of saltwater maintained at open ocean salinity. A computer controlled wave generator at one end of the tank creates waves up to 3 feet high, while an adjustable wave-damping 'beach' system at the opposite end of the tank helps control the shape of the waves. Researchers can tow equipment through the water at speeds up to 6 knots, simulating a vessel towing oil spill response equipment such as booms and skimmers. With the potential for increased oil production in, and transport through, Arctic regions, BSEE decided to fund the development of a new skimmer – one that could more efficiently recover oil in icy waters. Named the IceHorse, this skimmer is designed to travel under ice, surface when it reaches broken ice, and collect oil from places where water and ice form a patchwork. It was engineered to add systems that allow it to maneuver both at the water surface and underwater.

Beyond the regulatory aspect of BSEE's mission, they are also tasked with 'Risk Assessments.' How does that work and who do you partner with make that sort of thing happen?

BSEE is currently exploring the idea of risk-based in-

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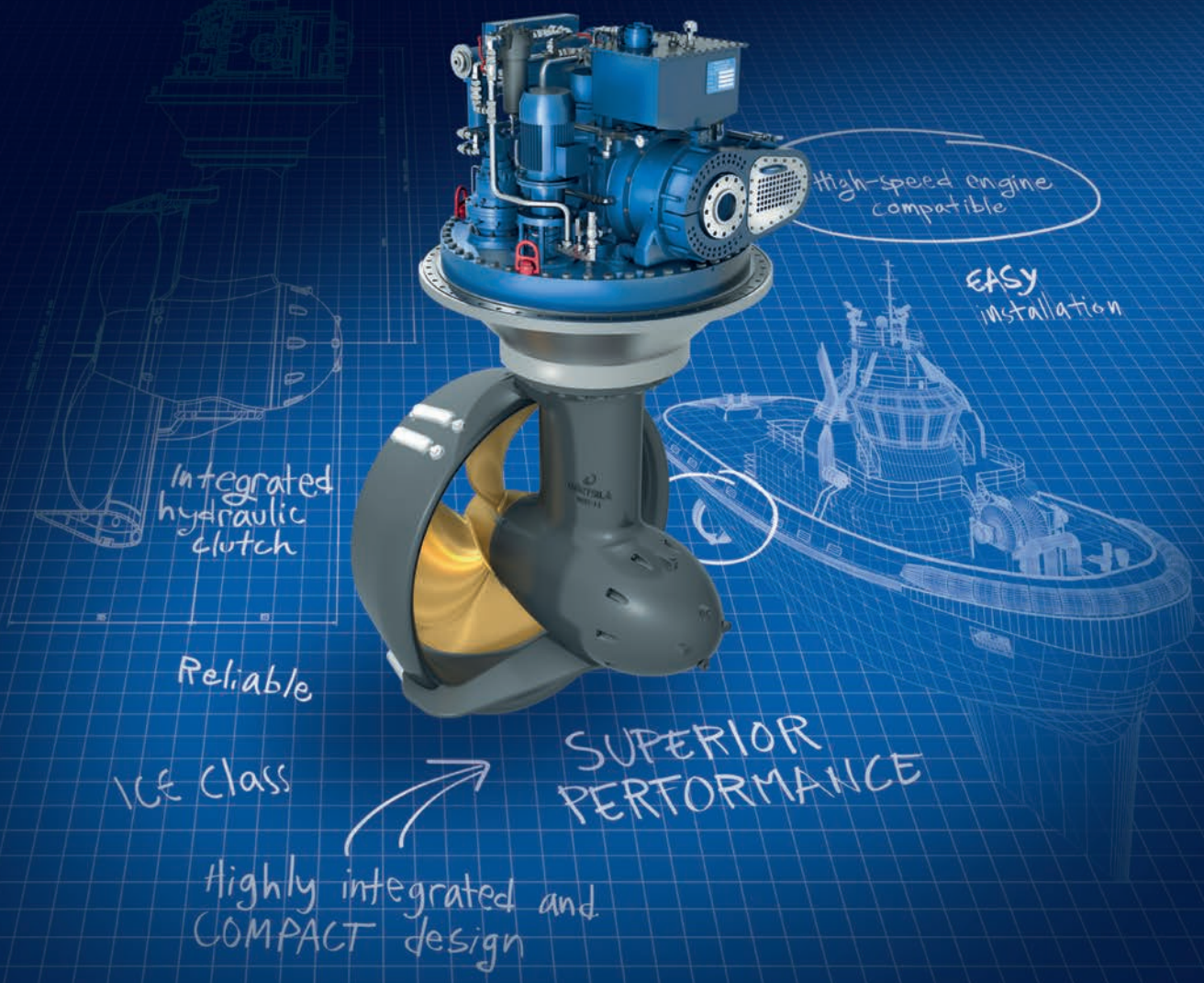

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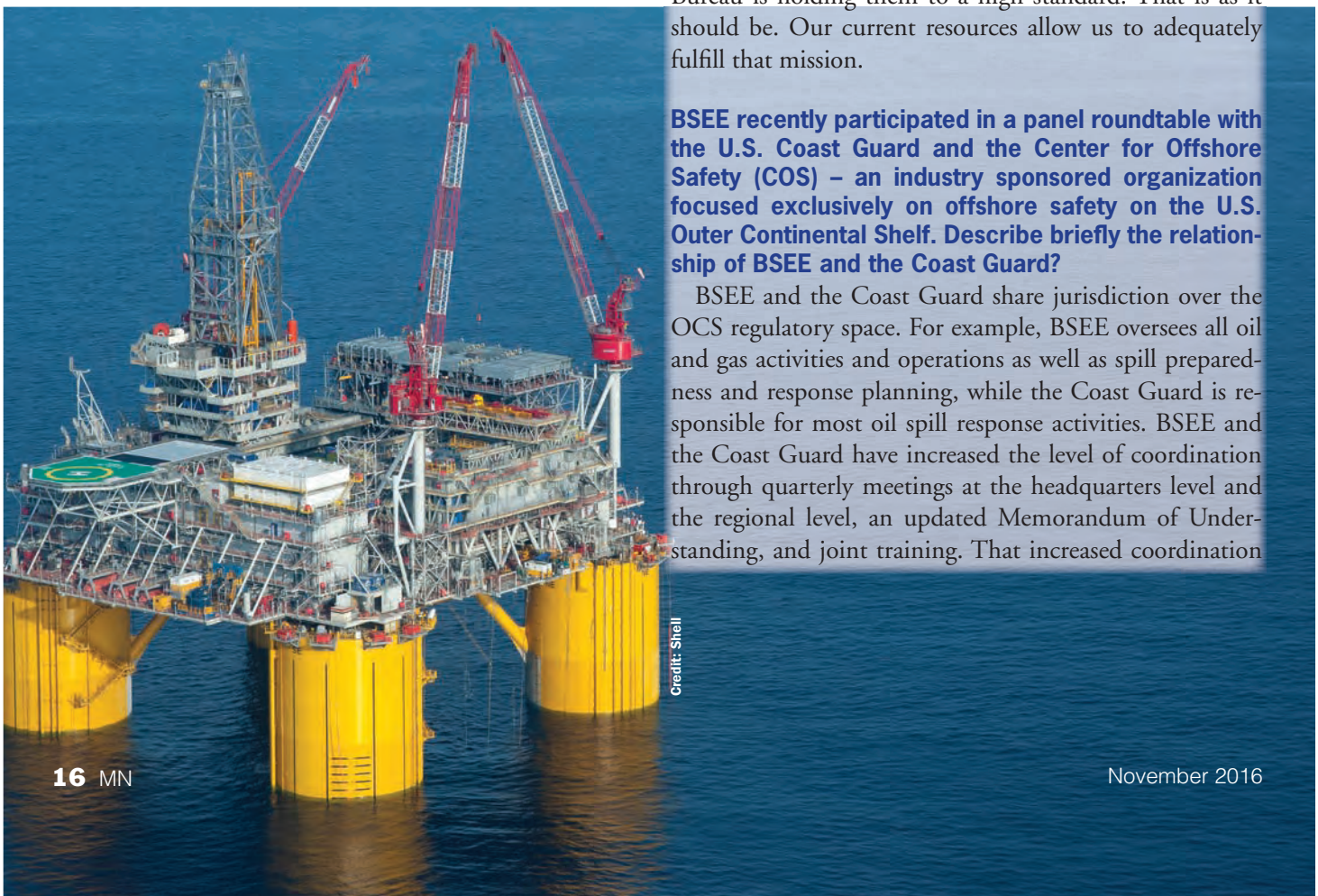
spections. We have a pilot project currently underway to test the feasibility of conducting risk-based inspections on a broader scale. There are good reasons to believe that risk-based inspections will help improve safety on the OCS. Our analyses indicate that 80% of safety-related incidents occur on about 20% of facilities. Applying the principles of risk assessment and management, it seems clear that BSEE should focus its resources where the problems are located. In order to improve its risk assessment capacity, BSEE has partnered with NASA to study their management approaches to risk. Both BSEE and NASA oversee work in harsh and uncompromising environments, and both rely on cutting edge technology to go deeper and further than previously thought possible. The BSEE-NASA partnership brings together technical experts from both agencies to focus on the specific risks associated with offshore operations so that we can continue to find ways to improve safety for offshore workers and protect the environment. NASA will share its experiences related to probabilistic risk assessment with BSEE. Embracing a probabilistic risk assessment approach will allow BSEE to quantitatively model risk. NASA is presently using this approach for the International Space Station and Orion deep space capsule programs. BSEE believes that it can more effectively assign risk once its staff can calibrate the NASA approach so that it can be applied to the Outer Continental Shelf energy industry.

How do you attract and maintain the talent and expertise that BSEE needs?

While BSEE as a regulatory agency cannot compete with industry in terms of salary rates, we do offer opportunities for qualified professionals to have exposure to a broad range of industry programs and issues. BSEE has been working with Congress and the Office of Personnel Management to seek approval of special higher salary rates for petroleum engineers, geologists, geophysicists, structural engineers and inspectors working in specific regions. To date we have been able to offer such incentives for some positions. The opportunity for public service and the ability to make a difference in an important energy industry are also two very positive incentives for pursuing a career with BSEE. BSEE's staff members have many opportunities to contribute to regulatory work across the industry and gain valuable experience as employees in government service.

BSEE's budget is over $200 million with about 800 full-time employees. Are both numbers enough in today's energy and offshore climates?

We are an efficient agency that tries to leverage its impact whenever possible. We have ramped up the number of personnel to meet our mission, including inspectors from below 60 to over 120 in just over five years. At BSEE, we have created a sense among the offshore industry that the Bureau is holding them to a high standard. That is as it should be. Our current resources allow us to adequately fulfill that mission.



Credit: Shell

BSEE recently participated in a panel roundtable with the U.S. Coast Guard and the Center for Offshore Safety (COS) – an industry sponsored organization focused exclusively on offshore safety on the U.S. Outer Continental Shelf. Describe briefly the relationship of BSEE and the Coast Guard?

BSEE and the Coast Guard share jurisdiction over the OCS regulatory space. For example, BSEE oversees all oil and gas activities and operations as well as spill preparedness and response planning, while the Coast Guard is responsible for most oil spill response activities. BSEE and the Coast Guard have increased the level of coordination through quarterly meetings at the headquarters level and the regional level, an updated Memorandum of Understanding, and joint training. That increased coordination

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has also led to joint inspections and investigations, and environmental preparations. The combination of BSEE's laser-like focus and the Coast Guard's tremendous human and material assets results in a coordinated regulatory environment that maximizes the probability of safe outcomes on a daily basis.

Both BSEE and the Coast Guard hope to help foster a more robust 'culture of safety' in offshore operations. But, how do you do that and more importantly, how do you measure and/or benchmark those improvements?

BSEE and the Coast Guard have been very public in their statements about the need for a more robust and integrated offshore energy industry safety culture. Neither of us believes a truly embraced safety culture can be achieved through regulation, but it can be encouraged by regulators. I recently discussed this issue at a National Academy of Science Workshop focused on its report on strengthening the safety culture of the offshore oil and gas industry. It is not enough for individual companies to have a robust safety culture; the entire industry needs a safety culture. All offshore contractors need a safety culture. We need prominent leaders because we need an industry-wide safety culture that is owned by the industry. This is really industry's reform; it will only exist if the industry owns it.

Three years ago, BSEE and industry were only just going through the first audit cycle and the drive to ensure that everyone had a valid SEMS plan. It can be argued that SEMS might be only a paper shuffling exercise. What can you say about SEMS today, now that you are three years after the big push?

By its nature, SEMS is a performance-based approach. We can all see that the prescriptive approach is easy to quantify, because you are inspecting for compliance against a checklist. However, it is well known in the regulatory community that a hybrid approach – one that employs both prescriptive and performance-based regulation – leads to safer outcomes. The offshore energy industry will always be inspected prescriptively, but the dimension of adding SEMS presents a performance-based opportunity. SEMS has definitely prompted many companies to better articulate their safety goals. It has provided a roadmap that, if followed, can greatly reduce risk. The SEMS audit process provides a critical examination of each company's SEMS, and over time we have seen the audit process improve through the accreditation processes. BSEE has also given auditors clearer expectations for what constitutes an acceptable audit plan and audit report. Taken together, more companies are providing audit reports with deeper insights into their management system challenges. We have seen the SEMS of many companies move in the direction of SEMS maturation. But a SEMS is a process of continuous improvement. When a company prepares its SEMS thoughtfully, only promising what it can deliver, and then actually delivers on the SEMS, we have reached a point of significant improvement. Of course, every SEMS should be viewed as something that needs to be revisited and opportunities for improvement, as well as application of lessons learned, should be part of that continuous improvement process.

In 2013, BSEE cited 12 offshore operators for their failure to demonstrate compliance with the Safety and Environmental Management Systems (SEMS) requirements of the Workplace Safety Rule, 30 CFR Subpart S. How far are you willing to go to enforce SEMS?

As a performance based program, BSEE is looking for continuous improvement. All operators now have a SEMS program in place. BSEE will continue to work with the operators and the corrective action plans that are based on the audits.

In times of thin (or no) profit margins, safety can sometimes be one of the first things that takes a backseat when cutting costs. How do you ensure that cutting costs doesn't also mean cutting safety corners?

The commitment that industry leaders have to safety is put to the test during these times. When BSEE observed the price downturn, we were worried that we would see a spike in incidents, that the number of injuries would go up, and that the number of oil spills might go up. But the truth is that – so far – we're not seeing obvious signs of the feared outcome, and we think it might be reasonable to attribute that to the emergence of leadership that is resident within the industry. There is a sense that there is a growing tendency to put a commitment to safety front and center, to embed it into all your normal work processes. We are cautiously optimistic when we look at the future of SEMS and its value to the industry. We think it has had a beneficial effect through this downturn. We caution, however, that we have not fully analyzed statistics for the fiscal year just ended, September 30, 2016. Also, safety may be a lagging indicator of a tight fiscal environment, due to the possibility of delayed maintenance.

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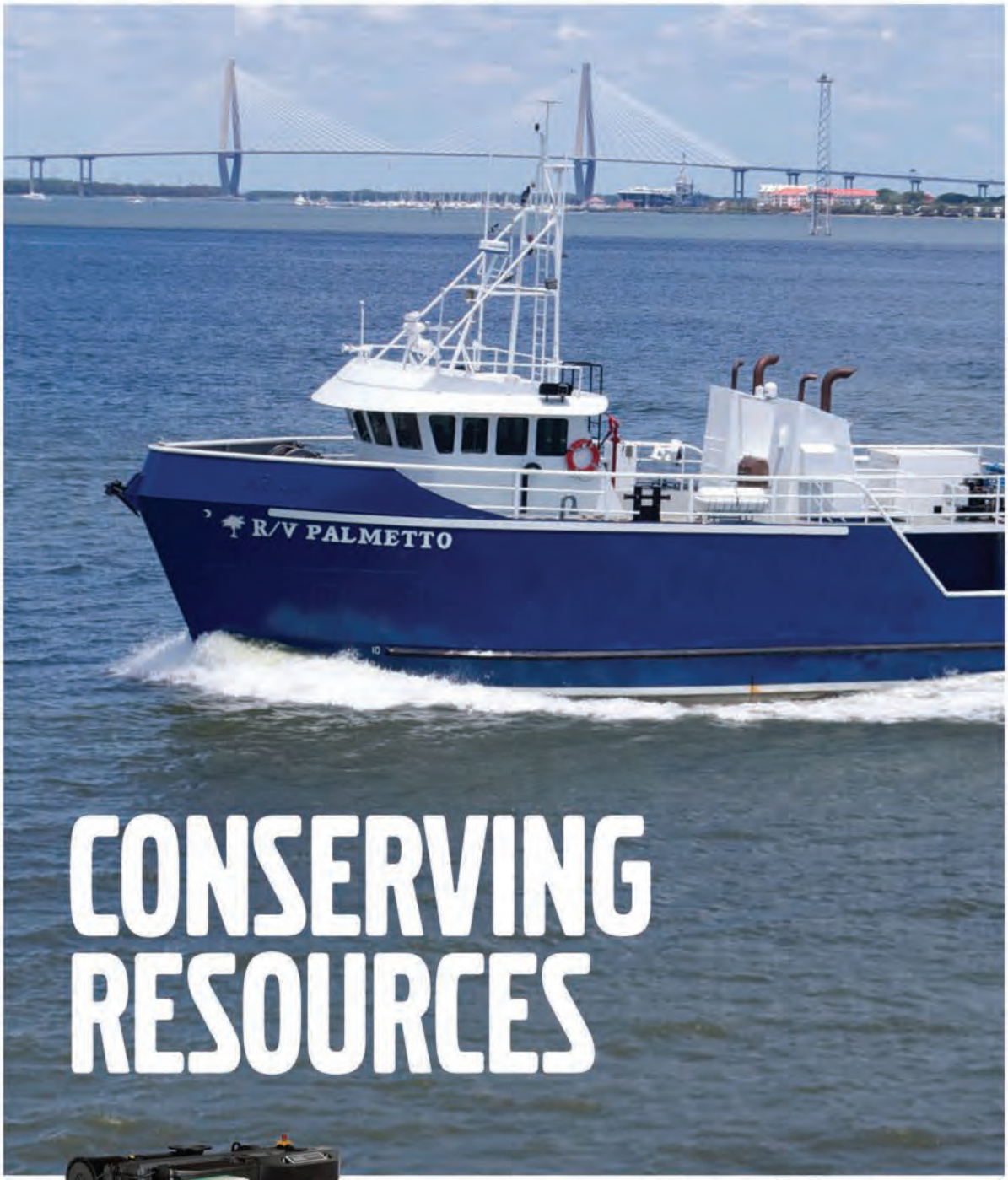

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WRDA: Dredging up Progress

Digging out the Small Ports and Harbors that serve as the on-ramps to the maritime super highway is important work.

By Sean Duffy, Executive Director of the Big River Coalition and Stephen Gambrell, Executive Vice President at the MVFCA


Duffy


Gambrell

We support the WRDA language that makes our water commerce system work productively. The Presidentially-appointed Mississippi River Commission in its public meetings alongside the members of Big River Coalition and the MVFCA has heard from interests, discussed and supported this approach for more than five years.

Our navigation infrastructure must be fully maintained or the efficiencies offered by the inland navigation system, comprised of over 12,500 miles of inland waterways, are lost and costs are increased. The 12,500 miles of the inland system is not simply the largest in the world – it is bigger than the rest of the worlds' waterways … combined.

For all the great people that work along these waters … thank you for investing in the greatest economy builder in the world … our ports and harbors and deep-draft channel along with the flood control and navigation system that makes the center of the USA the "Great Alluvial Empire." The protection of people – Flood Control – and productivity – the movement of goods – along and within the God-given Mississippi River and its tributaries is critical to our ability to deliver the nations' exports.

Small Ports and Harbors are essential to our nation's demands and the fundamental needs of many around the globe. Without these on-ramps to the super highway, our larger ports and the greater transportation system are not collectively efficient. This makes the Unites States less competitive. Without a much more efficient and effective method to dredge the 19 small ports and harbors along the largest inland navigable system in the world, we simply cannot deliver the needed products at a price people can afford.

Due to over six months of high water stages on the Mississippi River in late 2015 and early 2016, the Mississippi River Ship Channel was not maintained at its federally authorized channel dimensions. The funding from the President's Budget for Fiscal Year 2016 was almost half of what was needed to restore the Ship Channel through dredging. The President's Budget was $85.866 million and the Corps received almost $160 million. Federal funding to maintain the deep-draft and shallow-draft navigation channels must flow in more effective "streams of water investment" to allow commerce to flow unimpeded.

Our navigation channels are being cut off by inadequate funding. For example, on the deep-draft side, the required funding to be generated by the Harbor Maintenance Tax has generated a fund surplus of over $9 billion. Although legislation has been approved that would increase the annual allocations, the "taxation without channelization" must end, so that commerce can flow.

Remember 15 years ago, September 11, 2001: Interest was high – courage was building – anger was growing – action was imminent. When we want to accomplish something in the United States … we do, every time. It is time for us to act. It's time to build our future. It's time to make smart investments in the water infrastructure system, and this is one of those smart investments.

The link shown below provides signed resolutions supporting and describing vital needs of our 'center coast.' The resolutions representing 10 states, the voices of more 300 groups, representing 17 million acres of the most productive land in the world overlaid on the world's largest system of inland navigable rivers is a consistent voice of clear support. The direct impact of this watershed footprint directly concerns more than 9 million people, impacts half the U.S. population, 41% of North America's drainage, 60% of U.S. grain exports and our competitive economy.

We are grateful for the many leaders that champion our high value water infrastructure and we depend on each one of you to help guide our nation to a productive future. To better understand a method for efficiently and effectively dredging small ports and harbors, please reference the Senate version of WRDA 2016, Section 2012.

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Catching the Electric Vision

All bets would have been lost if one was to predict that I would never find one of the most advanced and modern workboats in the heart of the Norwegian Fjordlands.

By Joe Hudspeth

Paxton

Sure enough, if you make the trek to Flam through nearly 50 tunnels in between the prominent towns of Bergen and Oslo, you will behold such a craft. The 40 meter Vision of the Fjords was recently constructed by Brødrene Aa shipyard in Norway and delivered to The Fjords AD earlier this year in June. The vessel is simply striking, with accessible ramps switch-backing up the sides of the superstructure, mimicking the mountain paths cut into the steep banks surrounding the fjords. The vessel provides ferry service between Flam and Gudvangen, but the journey truly offers one of the most remarkable tours through the Nærøyfjord, which is listed as a UNESCO World Heritage site.

Electric Slide

CEO of The Fjords, Rolf A. Sandvik, has taken an aggressive approach in implementing new technology. Such a position has earned the company the prized honor of having its new vessel named Ship of the Year at the recent 2016 SMM commercial maritime expo in Hamburg, Germany. Sandvik is enthusiastic about embracing new technology, even with full anticipation and expectation that any cutting edge innovations implemented on the boat could become obsolete so quickly after being put into service. Sandvik, like many others recognize that the initial efforts made by their companies will spur on bystanders to join in and push the limitations of development to even greater bounds.

The Vision of the Fjords contains a unique hybrid system that employs the independent use of a full battery powered system in addition to a diesel powered controllable pitch propeller propulsion system. During part of voyage, the vessel will utilize twin MAN 1000 horsepower engines to cruise at a speed of 19 knots. The propulsion shaft is connected to a 150 kW Oswald electric motor-generator. When the vessel is transiting the eco-sensitive UNESCO heritage site, the captain can seamlessly shut down the diesel engines and run on pure electric battery power fed by two battery arrays run by ABB's DC grid system.

For The Fjords, the return on investment is tangible with benefits coming both from capitalizing on low cost shore side hydroelectric power in lieu of more costly diesel and from the environmental gain achieved by operating completely carbon-neutral during half of the voyage. This vessel makes the case that 'being green' can generate 'green' as operating costs are lower and customers are positively drawn to the mission and technology of the new vessel and desire to experience it firsthand. Furthermore, the primary port of operation for the Vision of the Fjords has offered premium boarding locations and landing times for vessels that are equipped with clean emission technology, which gives The Fjords a platform to edge out the competition.

Batteries Included

Retrofitting or implementing battery powered propulsion technology on a new construction vessel is not as simple as it may appear—the technology comes with some limitations and caveats. Battery power can be utilized in a

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variety of ways in marine applications, including peak shaving for both hotel load and propulsion power requirements. Batteries can also be installed as a hybrid arrangement as part of a diesel-electric propulsion system or they can be fit as a standalone power source to cleanly and quietly drive all propulsion and onboard power requirements. Applications similar to the Vision of the Fjords that can fully operate on battery power tend to be limited in speed to around 8 to 10 knots and have a range of approximately 1 hour of run time on full electric (battery) power on average.

Beyond the electrical components, the auxiliary support and safety systems must also be examined.

Considering the limitations on battery run time, having proper shore side infrastructure for recharging is paramount. With ample shore side power available, charging times can be quick, reaching full recovery in as little as 10 to 20 minutes. Even with quick charging times, busy workboats will be bound by the down time of charging and this time must be minimized for any ROI to be recognized. In order to speed up the process, companies such as ABB are automating the charging procedure through the use of robotics and pantograph arms that will automatically latch hold and immediately begin the charging process as soon as the vessel is near enough at the dock.

Being able to accelerate the charging connection time by as little as 30 seconds can make a significant impact for a busy work boat that is charging frequently throughout the day. Ferry operator Norled, has successfully implemented a pantograph charging arm for their 80 meter car ferry, Ampere, which is 100 percent battery powered. ABB will soon be providing the first ever industrial robot to quickly handle all charge plug connections for HH ferries operating between Sweden and Denmark.

Batteries or Bust

For many operators, a complete reliance upon battery powered propulsion just is not feasible, especially if routes are too long. Real estate and weight are also very real considerations. The Vision of the Fjords specifically chose to construct their vessel from carbon fiber sandwich technology, which offered a one-third savings in weight over aluminum and helped offset the heavy payload of the batteries. For some applications, in order to get adequate power, it may be necessary to fill nearly every void with batteries. Fortunately, the technology is constantly improving along with package size and power density ratios.

The batteries themselves are only a part of the many components required to make the system work. Rectifiers, DC to DC converters, battery management systems, the array control system, and back-up auxiliary power supply (APS) are all needed. Additionally, the circuit breaker switch gear that completes the power connection flow should not be overlooked and this component can sometimes mirror the size of an entire battery array. Lastly, most will want a layer of redundancy to provide back-up as a failsafe to get home to port.

If batteries do indeed make sense for your application, there probably is a growing concern about fire and thermal runaway—especially with all the latest issues developing around mobile device batteries. Should thermal runaway take off from cell to cell in a battery array, the result can be catastrophic, generating enough heat to easily liquefy any metal boat they may be contained in. There are, however, many advances in air cooled and water cooled lithium battery technologies that provide the newest batteries with comprehensive battery management systems and safety features. These allow shutdown of the cells before trouble can begin. Classification society DNV-GL has also written guidelines for installing battery propulsion technology, including requirements for firefighting systems that do offer some measure of assurance for the operator.

Feel the Buzz

Visiting the *Vision of the Fjords* is a clear testimony to the advances and reality of feasible electric propulsion powered by batteries. As Rolf Sandvik advocates, the technology will only get better and become viable for more and more applications. The cost premium for batteries is considerable and the life span varies, ranging from 2 to 10 years depending on the size and charging cycles. For The Fjords, the technology works and the capital investment is recouped on the backend savings in operating costs. With the vision of electric propulsion showing such favorable potential the vision may soon become a reality for many, offering a new and feasible propulsion alternative for modern work boats around the world.

Joe Hudspeth *is Vice President of Business Development at All American Marine, Inc., a manufacturer of high speed passenger ferries, excursion vessels, and work boats, in Bellingham, WA. Hudspeth has been involved with maritime sales, marketing and product development since 2000. He currently serves as a regional co-chairman for the Passenger Vessel Association and participates on several committees concerned with marine industry issues. Reach him at jhudspeth@allamericanmarine.com*

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VIGOR

Workboat vs. Jet Ski:
A mystery collision and its consequences.

By Randy O'Neill


O'Neill

As summer slowly fades to memory and commercial vessels have less frequent encounters with recreational vessels of all sizes, shapes and descriptions on America's inland waterways, it might be a good time to review a strange, but not completely unusual incident that occurred in Louisiana on a navigable channel in the lower Mississippi River late last May.

A workboat was pushing a small barge through a narrow tributary on a job to deliver it to its destination approximately twelve miles away from where the transit originated. The late spring sun had already set, but clear skies and a bright half moon made for easy going and, because the barge was in a light condition, the tug/barge combination was a little ahead of schedule. With ideal weather conditions and partially moonlit skies, visibility from the vessel's upper wheelhouse was good with minimal visual obstructions from the barge.

A Strange Encounter

Approximately halfway to his destination, the vessel's captain noticed several rapidly moving lights ahead of him. While mostly on his portside, he saw a few more similarly lit objects moving parallel to the shore on his starboard side just slightly ahead of the barge he was pushing. Beyond the moving lights, he observed a few small fishing shacks and small docks hugging the channel's bank.

Not immediately recognizing what he was looking at, as his small tow drew closer to the lights, he heard the unmistakable whine of several jet skis and quickly deduced that the moving lights were powerful flashlights being held by the operators of the otherwise unlit personal water crafts (PWCs).

He counted at least a dozen jet skis zigzagging up, down and across the channel with some apparently attempting to jump the small wake his mini-flotilla was creating. That action concerned him because, in their attempt to jump the largest waves created by his passing, they were getting dangerously close to his stern.

As a precaution and in an attempt to get them to back off, he sounded a short blast to alert them that he was aware of their presence and did not approve of their dangerous thrill-seeking activity. Throughout the brief encounter, he maintained a safe, steady speed and his position in the center of the channel. After covering about a quarter mile of distance up the channel, both the noise and dancing lights disappeared.

An Unexpected Development

When he finally arrived at his destination to deliver the barge less than an hour later, he was surprised to see a U.S. Coast Guard investigator waiting for him at the dock to board his vessel. Further to his surprise, the no-nonsense officer informed him that the local Coast Guard office had received a call about 30 minutes earlier to report that a jet ski had collided with the barge he was pushing and was now damaged and disabled, about four miles down channel. Much to his relief, he was told that the PWC's young operator was not injured and had been plucked from the channel by a jet ski operated by one of his friends from the night-riding group. The USCG investigator explained to the workboat's captain that he was there to interview him and his crew about the alleged collision.

Recognizing the sudden potential threat to his license and livelihood, the shaken captain immediately took the time to report his situation to his license insurer which quickly connected him to a local attorney from its national network. That experienced maritime law specialist promptly called the frustrated captain on his cellular telephone to prepare him for the impending initial onsite Coast Guard interview. While acknowledging his brief encounter with the thrill-seeking jet ski group, about 45 minutes earlier, he flatly denied any knowledge of the alleged collision. He further provided the investigator with a written statement supporting his contention. After briefly speaking with several members of the workboat's crew, the USCG investigator left the scene without taking any further action, but informed the captain that he would shortly be contacted to come in to a local Coast Guard facility for a more formal interview regarding the alleged incident. He responded that he would come to the interview with his attorney.

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The Story Unravels

At first light the next morning, a damaged jet ski was recovered from the area of the incident bearing significant damage to its right side from what appeared to be a sideswipe collision or allision with another vessel or fixed object. Further investigation led to the discovery of significant damage to the vertical posts at the end of one of the small docks in front of one of the fishing shacks lining the shore in the vicinity where the previous night's encounter had taken place. Ownership of the damaged PWC was tracked to a local teenager who readily acknowledged being out on the channel riding his jet ski the night before with a group of his friends.

Eventually, he admitted 'buzzing' the tug/barge combination the night before, but that his uninsured PWC had sustained the damage and became disabled after striking the end of an unlit dock which extended out into the channel about 15 feet. That PWC/dock allision occurred 5 to 10 minutes after the larger vessels had cleared the area. He finally admitted that he asked one of his friends to call his dock allision in to the Coast Guard as a collision with the mini-flotilla in a fraudulent scheme to get some insurance money to repair his jet ski. These new facts prompted the Coast Guard to get the local law enforcement authorities involved who initiated their own investigation of the two teens who concocted the ill-conceived scheme.

Lessons Learned

While relieved to be exonerated of any involvement in the incident by the teenagers coming clean on what really happened, the still furious captain decided to work with the local authorities to enable them to prosecute the boys for their folly which put his U.S. Coast Guard-issued license temporarily in the crosshairs.

While this incident ultimately ended satisfactorily for this falsely accused professional inland mariner who had his own license insurance policy and immediate access to counsel and representation, it's sadly more the exception than the rule in many David (recreational boater/PWC operator) versus Goliath (professional mariner) encounters in which the latter is held to a much higher standard of care to the point where many often believe they are perceived to be 'guilty until proven innocent.'

It's an unfortunate reality, but one that every prudent Coast Guard license holder must consider when deciding how best to protect his or her license, livelihood and professional reputations.

Editor's Note

In a former life as a marine surveyor in the 1980's and 1990's, this Editor saw the proliferation of PWC's in crowded waters, operated by recreational users, often with very little boating experience, and this gave rise to a robust (and presumably busy and lucrative) Admiralty law specialty that exists to this day. PWC accidents, unfortunately, are not uncommon.

Randy O'Neill *is Senior Vice President with Lancer Insurance Company and has been Manager of its MOPS Marine License Insurance division since 1984. Over the past 29 years, Mr. O'Neill has spoken and written on many occasions on the importance of USCG license protection. He is a regular contributor to MarineNews magazine.*
He can reached at: ***roneill@lancerinsurance.com***

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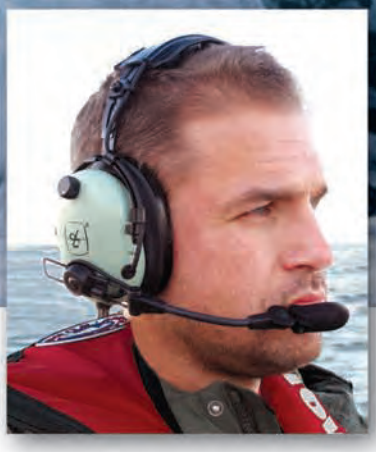

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Clear Contractual Language
What You Are Agreeing To?

By Larry DeMarcay


DeMarcay

The tightening of the marine markets over the last two years have pushed some companies to do everything that they can to avoid obligations that they feel are burdensome or take advantage of obligations that provide them with a competitive advantage. The starting point for all of these analyses begins by analyzing the language of your contracts, what many refer to as "the legalese."

Unfortunately, many of these agreements were crafted during happier times, by employees who were motivated by simply closing the deal and without any real regard for the legal technicalities of the agreement. However, as the market has changed, these contractual details can have a long term lasting impact upon your company. As such, it is important to look at each agreement with a critical eye to make sure that there are no serious gaps in the terms of the agreement, that the terms are consistent with each other, that you are aware of the details of the obligation and that the agreement makes sense in today's economy.

Buyer's Remorse

Many of the agreements that we see – usually after a legal claim arises – are created from old contracts and are the product of many years of revisions. These contracts usually start with an original document that was drafted by an attorney and numerous sections have been added or deleted over time. As many modifications are copied and pasted from other agreements, the obligations are not always clear when placed in the context of a different agreement. These discrepancies also lead to confusion and can often have unintended consequences.

The first thing to look for in a contract is to check that the terms of the agreement are clear. Courts hold that the language of a contract will prevail if the terms are clear, explicit and do not lead to any absurd consequences. As such, it is important to use language that clearly explains the obligations agreed to between the parties. It is best to use plain language and simple sentences. If you read an agreement and are unable to understand what the language is describing, it is always best to revise it to clearly state what you are agreeing to. Allowing language to remain in a contract that you do not understand always includes the risk of shaping the parties' obligations in a manner that you did not intend.

Although using plain and simple language sounds easy, many contracts still look like they started from drafts that had been prepared centuries ago. We quite often see agreements that include language like "now therefore", "now ye presents" or "in witness whereof the parties hereto." If your standard agreement includes this type of anachronistic language, it makes sense to revise it to include a clearer recitation of what you are trying to say. Although these odd phrases may not sink your agreement, they are signs that your agreement is probably infected with language that needs to be cleaned up.

Another area of confusion occurs when a contract fails to use the same term throughout the agreement. This is often the result of copying and pasting provisions from multiple documents over a period of time. These inconsistencies can often be used to avoid obligations by arguing that the language is not clear.

Indemnity obligations provide a great example to look at because they are obligations that everyone is willing to agree to but no one wants to honor them. An indemnity obligation may include, in one section, "the company and its affiliated companies" within the scope of the obligation, where, in another section, the indemnity obligation may use the term "company group" to define who is included. The "company group" may be defined in the contract to include a different set of parties, or worse, not at all. This type of inconsistency can create a serious problem when a third party attempts to obtain indemnity under the agreement. If the language used in the contract is not consistent, courts are left to decide which companies are included within the scope of the contract, a situation that could be avoided by the use of consistent language.

Location, Location, Location

It is also important to look at your contract's choice of law obligation. Nonsensical choice of law provision are often the result of being copied from prior agreements and usually do not have a sinister purpose. However, the court

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will apply the selected state law to evaluate the terms of the agreement. There is always the chance of an unintended consequence based upon the application of a state's law that you are not familiar with.

On the other hand, some parties to an agreement will attempt to insert a choice of law provision for the sole purpose of taking advantage of the state law called for in the agreement. If you have an agreement that calls for the application of a state law that has no reasonable basis, such as an agreement between companies doing business and Louisiana and Texas calling for Alabama law to apply, it is a good idea to investigate the ramifications of such a choice of law.

These choice of law issues often arise in defense and indemnity obligations as some states prohibit indemnity for oil field related contracts. Each state treats indemnity disputes, and their related insurance obligations, differently. Thus, the selection of state law will often determine how the obligation is enforced. Thus, it is very important to look at the choice of law provision to make sure that any such selection is providing your company with enforceable obligations.

Many contracts also include arbitration provisions to evaluate disputes arising under the agreement. Although arbitration can be a faster way to resolve a dispute, it is not always cheaper as it requires the parties to shoulder the costs associated with litigating the matter, including paying the arbitrators. You are also bound by the arbitrator's decision and do not have any venue available to appeal a decision that you believe is incorrect. Again, arbitration is not a bad option, but it is important that you are aware that you are agreeing to an alternate form of dispute resolution.

Forum selection clauses should also be analyzed to determine if the agreement is selecting a forum that is fair to both parties and complies with jurisdictional laws. For example, many contracts name the federal district court in a certain state as the court of jurisdiction to resolve disputes. However, if the claim does not include a basis for federal jurisdiction, a contractual statement requesting jurisdiction does not give the court the power to hear such a claim. It is also critical that the forum selected be analyzed to make sure that it provides a fair venue for adjudicating disputes. You may have issues receiving a fair trial if you are litigating in the backyard of a regionally powerful party.

Unfortunately, in bad times such as these, the details of your agreements can significantly affect your company's bottom line. A little time and effort put into reviewing your current contracts to make sure that they clearly bind your company to the obligations you intended can save you and your company significant time and resources by avoiding contractual disputes. Furthermore, when a dispute arises, the issues can be worked out quickly if the contract provides a clear recitation of the parties' rights and obligations.

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What to Know When Welding Primer-Coated Steel

Solving one problem can create another. Safety always comes first.

By Kevin Trick, Applications specialist at CWI, Hobart

Amid competitive bidding, contract deadlines and the general drive to gain the best productivity and quality, welding operations in the shipbuilding industry face their own set of challenges. That's especially true when it comes to welding primer-coated steel, a material prevalent for its ability to withstand atmospheric corrosion from sources such as saltwater.

Most primer coatings are zinc-based and used on steel that is between 70 to 120 ksi in strength (and sometimes higher). As a cost- and time-saving measure, shipbuilding operations employ this material to expedite the welding process — it eliminates the need for painting large portions of steel after the welds are completed. And while the coating serves a distinct protective function, it also makes it prone to issues like spatter and porosity during welding.

From selecting the right type and diameter of filler metal to employing proper techniques, it is possible to minimize the potential for these problems during welding — and to reduce downtime and cost for their associated rework.

Ahead of any such business matters, however, comes safety. The paint used for this material contains compounds that may release hazardous materials into the air when heated, including chromium, lead and tin, in addition to the zinc. As a result, the heat from the arc may cause paints to give off unsafe amounts of gases like carbon monoxide and carbon dioxide. They also give off zinc oxides, which are formed when zinc vaporizes from the weld pool. These gases are especially risky in confined work areas or those with poor air movement. Welding operators should always take proper safety precautions according the SDS (Safety Data Sheets) and Occupational Safety and Health Administration (OSHA) guidelines.

Credit: Hobart

Recommended Techniques

Porosity is one of the biggest pitfalls when welding primer-coated steels due to the primer's zinc content and its inability to burn out of the weld pool when the welding operator establishes an arc. Using travel speeds that are too fast can increase the opportunity for porosity and it can also result in poor tie-in at the weld of the toes. So what can be done?

One option is to remove the primer coating, but that is rarely a viable approach from a productivity standpoint; it causes additional downtime not only for the removal, but also for painting again after the weld is completed. Still, some companies may prefer this method.

Another option is to tandem weld on a dual-sided joint, employing two operators welding on opposite sides at the same time or using an automated process with two welding heads or two individual robots. In both cases, welding both sides can help to push the zinc impurities from the weld. In the case of a semi-automatic operation, it is common for end users to weld 3 or 4 inches ahead of the other welding operator to prevent zinc oxide gases from becoming entrapped in the puddle and solidifying as porosity.

Adjusting travel speed and voltage is another means to minimize issues when welding primer-coated steel. Because the primer often makes the weld pool sluggish, traveling too fast when welding can result in poor tie-in at the toes of the weld. Welding operators typically need to change their voltage and wire feed speed to accommodate for the coating. A lower voltage — about 5 to 7 percent less than when welding non-coated carbon steel — forms a tighter and/or more biting arc that is capable of burning the zinc out of the weld pool more readily. A slower wire feed speed is often necessary to compensate for the slower travel speed that accompanies this lower voltage. It is also important to note that the slower an operator goes, the more convex the weld bead may be, which may or may not be a factor in a given application.

Finally, the gun angle a welding operator uses in a manual operation can also help when welding primer-coated steel. Depending on the travel speed, using a slight angle, between 0 to 15 degrees, can help dig into the weld joint and create a tighter arc to weld through the primer.

Selecting a Filler Metal

When selecting a filler metal for welding primer-coated steel, it is important, first and foremost, to choose one specifically formulated to be tolerant of welding through

primer or other such coatings. Contact a trusted filler metal manufacturer for the best recommendation. That said; flux-cored wire is often an ideal option for welding primer-coated steel. The flux inside of these wires often contains scavengers that are good at collecting impurities like zinc that compile in the form of slag after each pass. This slag must be chipped or otherwise removed, however, in between each pass and after welding.

Traditional flux-cored wires with an American Welding Society (AWS) T-1, T-9 or T-12 designator — for example, E71T-1C H4, E71T-9C H4 and E71T-12C H4 — can be used for a primer-coated welding application due to their excellent chemical and mechanical properties. The T-1 and T-9 wires have rutile slag, a feature known for being easier to operate. T-9 and T-12 wires have similar impact properties, such as a minimum of 20 foot-pounds at -20 degrees Fahrenheit, while a T-1 wire offers a minimum of 20 foot-pounds at 0 degrees Fahrenheit. T-9 and T-12 wires are typically best when welding primer-coated paint for ships that will encounter extremely cold or even arctic temperatures.

Wires with a "J" classification, such as E70T-1C/-9CJ H8 are also very well suited for welding primer-coated steel on ships encountering arctic temperatures, as these provide excellent low-temperature impact strength — a minimum of 20 foot pounds at -40 Fahrenheit.

Flux-cored wires with a T-5 designator are another option but can be a bit more difficult to operate due to their basic slag system. The benefit of using these wires, however, is that they provide excellent mechanical properties. Some of these wires available in the marketplace are also unique in that they can be operated on electrode negative or electrode positive, an added versatility depending on the application.

Electropositive welding (DCEP) provides better penetration while electronegative welding (DCEN) increases deposition rates. During DCEN, the process provides approximately 2/3 of the heat to the filler metal and 1/3 to the base material, which also helps control heat input and distortion.

T-5 wires offer impact values at a minimum of 20 foot-pounds at -20 degrees, similar to T-9 and T-12 products. T-5 wires also have a high capacity for absorbing oxygen so there is less risk of this atmospheric contamination.

Metal-cored wire can also collect impurities like zinc from primer-coated steel but is not quite as well suited for this application as flux-cored wire. One drawback to using metal-cored wire in this application is the manner in which it operates. This wire commonly uses a

spray transfer mode, which requires using higher voltage. While that is a benefit in most welding applications — it produces less spatter and welds faster — when welding primer-coated paint, it is a disadvantage because it won't help remove the zinc from the weld pool as well. Also, metal-cored wire is limited to flat and horizontal welding, due to the fluidity of its weld pool, unless paired with a power source that is capable of pulse welding; it can then be used out of position.

Minimizing Overexposure

Most importantly, primer-coated steel can expose welding operators to fumes and gases during the welding process. Steel coatings and paints often contain materials that can cause harmful overexposure when breathed. As a result, the joining of some coated steel requires special types of ventilation and, in some cases, for welding operators to wear a respirator for optimal safety. Safety tips to consider – taken directly from the Safety and Health Fact Sheet No. 34, April 2014, American Welding Society – when welding primer-coated steel include:

- *Always refer to the SDS for the type of material being welded.*
- *Be certain that there is adequate ventilation to control the weld fume and keep*
- *any contaminants below the Permissible Exposure Limit (PEL) set forth by*
- *OSHA and the TLV guidelines provided by the American Conference of Governmental Industrial Hygienists (ACGIH).*
- *Monitor air quality in areas where welding of primer-coated steel occurs. A certified industrial hygienist can perform this task.*
- *Consider the use of additional personal protective equipment such as a purified air powered respirator (PAPR).*
- *Train welding operators to keep their head out of the weld plume when welding.*

As Operators Look for the Bottom, *Gulf Gloom Persists*

Gulf of Mexico vessel operators want to see sustained, higher oil prices.

By Susan Buchanan

After a rough two years, supply boat owners and operators in the Gulf of Mexico hope crude oil prices will improve in 2017. That would encourage activity among the offshore drillers that they service and would put unemployed boats back in the water. Vessel owners aren't necessarily banking on a good year ahead, however.

"Utilization of OSVs and PSVs in the Gulf is below 50 percent now, down from about 70 percent a year ago and 90 percent two years ago," Peter Laborde, Jr., founder of Laborde Marine, estimated in early October. "Of course, we don't know where crude oil prices will go from here." He fears the region's demand for supply vessels many not get any better for another two years or so. With a fleet of 22 crew boats and supply boats, New Orleans-based Laborde Marine has an operations office in Morgan City, La. The firm's international unit provides offshore supply vessels and line handlers in Brazil's Rio de Janeiro area.

In early October, buoyed however briefly by hopes that an OPEC production cap would provide price supports, West Texas Intermediate crude reached $51.50 a barrel on the New York Mercantile Exchange, up from $41.25 in mid-August. As ***MarineNews*** went to press, stability in the oil markets was anything but certain, however.

GoM Output Rises, but Rig Numbers, Spending Dips

Capital spending by big oil producers is lower in the Gulf of Mexico this year, as it is worldwide, Loren Scott, Louisiana State University emeritus economics professor, said in October. "The count in the Gulf fell to 14 offshore rigs earlier this year from 56 in 2014," he said. "Drill ships are tied up or not working. Hornbeck, Chouest and Tidewater each have lots of offshore supply vessels that are without work."

Gulf oil production is up this year, however, and will continue to rise in 2017 because of deepwater projects that began eight to ten years ago, Scott said. The U.S. Energy Information Administration sees Gulf oil output averaging 1.63 million barrels per day this year and 1.79 million bpd in 2017. Output should reach a record 1.91 million bpd in late 2017, exceeding a peak in 2009, the year before the BP spill. In addition to the start-up of fields that were developed when crude was around $100 a barrel, Gulf oil output has grown as technologies are adopted for developing satellite wells in or near producing fields.

In February, the EIA said: "GOM production is less sensitive to short-term price movements than onshore production in the lower 48 states is. Decreasing profit margins and reduced expectations for a quick oil-price recovery, however, have prompted many GOM operators to pull back on future deepwater exploration spending, to scrap and stack older rigs, and to restructure or delay drilling rig contracts." That said; Reuters was reporting in mid-September that the market adding rigs in 11 of the previous 12 weeks, according to market barometer Baker Hughes.

A decline in working rigs in the Gulf has taken a toll on employment, Scott said. The Lafayette, La. area should lose 9,000 jobs this year and possibly 5,000 next year, while Houma, La. could be down 5,400 jobs this year and 4,000 in 2017. Louisiana as a whole should lose over 17,000 jobs this year. Shipyards along the Gulf have shed workers. Edison Chouest Offshore in Cut Off, LA has laid off more than a thousand people from its yards, and has 100 boats tied up now. Chouest didn't respond to requests for comment in October.

Separately, Houston-based, oilfield-

service companies Schlumberger and Halliburton have made huge layoffs in the last two years. "All kinds of jobs have been lost along the Gulf, and that's had a multiplier effect on the retail, wholesale and other sectors of the region's economy," Scott said.

Vessels Stacked Along the Coast

Offshore vessel builders and operators, including Edison Chouest Offshore, Bollinger Shipyards, Hornbeck Offshore Services, SEACOR Marine and Gulfmark Offshore, have had to retrench.

In early October, an officer at Hornbeck in Covington, La. said the company couldn't comment on conditions in the Gulf because its Nov. 2 quarterly earnings were approaching. Hornbeck serves deepwater exploration and production with marine transportation and subsea installations. At midyear, the company owned 62 new-generation OSVs – including two new-builds that were delivered early in the year – and 6 MPSVs.

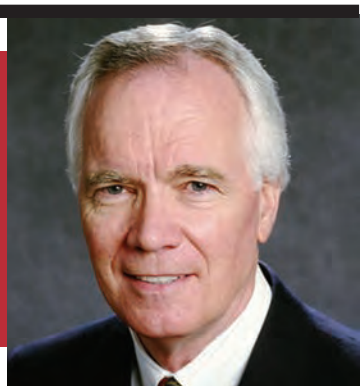
Because of the soft offshore market, Hornbeck was forced to make company-wide cuts in its shore-based and vessel staffs, along with pay reductions, the company said in its August earnings report. Hornbeck from October 2014 to mid-2016 stacked 48 new-generation OSVs, including eight 300-class OSVs. In this year's first half, Hornbeck had an average of 37.8 vessels stacked, versus 13.5 in the same 2015 period. And on June 30, Hornbeck had 44 OSVs that weren't in use.

Separately, and in its August 10 earnings report, New Orleans-based Tidewater said that because of the reduced demand for OSVs and an increased supply of them, the company had seen a significant decline in vessel utilization, average day rates received and vessel revenue. On June 30, Tidewater had 181 active, owned or chartered OSVs and 87 stacked boats. That compared with 245 active, owned or chartered vessels and 28 stacked boats just one year prior.

Florida-based SEACOR Holdings Inc., the parent of SEACOR Marine in Houma, La., had 25 of its 33 owned and leased vessels cold-stacked in the Gulf at mid-year, according to the company's Aug. 1 quarterly earnings. Of the 25 vessels stacked, 13 were liftboats. SEACOR Marine's vessels serve offshore oil-and-gas exploration and production.

"All kinds of jobs have been lost along the Gulf, and that's had a multiplier effect on the retail, wholesale and other sectors of the region's economy."

– Dr. Loren Scott,
Louisiana State University emeritus economics professor



Lag Between Rising Oil Prices and OSV Demand

"The OSV market appears to be finding a bottom and is staying flat for now," Blake Miquez, president and CEO of SeaTran Marine, LLC in New Iberia, La., said in early October. With a fleet of 21 vessels, SeaTran is one of the top providers of crew and fast supply boats in the Gulf.

"We haven't seen oil prices recover enough for supply boat activity to increase at this time," Miguez said. "The upcoming presidential election adds to overall uncertainty. A lag, or delay in time, exists between improvement in oil prices and demand for offshore services and vessels, and that's mainly because of a need by companies to plan and budget."

Miguez, who is also the Louisiana House representative for District 49 and an executive vice president at Miguez Fuel in New Iberia, serves on the board of the Offshore Marine Service Association. He has heard estimates that demand for OSV-type vessels in the Gulf is only a third of what it was before oil prices sank in late 2014. "My own guess is that Gulf utilization is between 35 and 40 percent now," he said. Before crude prices dropped, SeaTran in 2013 was expanding. The company added two 205' class DP2 FIFI FSVs to its fleet, with one in November 2014 and another in March 2015.

Port Fourchon's Discount to Tenants Could Extend into 2017

In October, Chett Chiasson, executive director of the Greater Lafourche Port Commission, said utilization of OSV-type vessels in the Louisiana Gulf was very low. Since March 2015, Port Fourchon has given tenants a 20-percent reduction on basic land rentals. "This discount is approved until December, but given current conditions, we anticipate extending it into 2017," Chiasson said. About 80 firms, including oil and gas companies, hold 140 leases at the port.

The 1,200-acre port services about 90 percent of all deepwater activity in the U.S. Gulf. It's considered a key one-stop service spot by the oil industry. From there, vessels carry water, liquid mud, pipes and other equipment, food and personnel to offshore rigs and platforms. "Though oil prices have improved, we need to see higher prices for a sustained period of time, along with more rig activity, to truly have an impact on port activity," Chiasson said.

Layoffs Grew from late 2015 to Last Spring

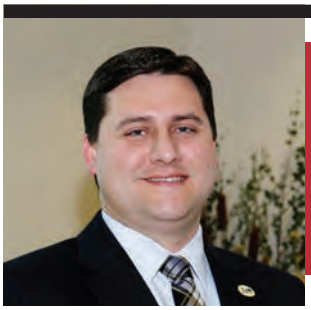
How bad did things get on the coast? "The oil price decline in late 2014 accelerated, and by May and June of last year the industry began to experience layoffs," Houston-based Mitzi Alario, vice president of business development and marketing at SeaTran Marine, said. "From October 2015 to April 2016, layoffs had become massive. Many companies are in their third round of layoffs now. Several have filed for bankruptcy. We've witnessed a gruesome, domino effect."

"Many companies went into a cash-conservation mode early on, fearing the offshore industry's decline could last a long time, as it did from 1981 to 1991," Alario said. "This downturn isn't expected to be as lengthy as that one, but companies are playing it safe. Construction of vessels, except for new builds which had already started, came to a near-halt this year."

"With few plans to drill and a reduction in offshore lease

Aerial view of Port Fourchon, LA

Credit: Greater Lafourche Port Commission



"Though oil prices have improved, we need to see higher prices for a sustained period of time, along with more rig activity, to truly have an impact on port activity."

– Chett Chiasson,
Executive Director of the Greater Lafourche Port Commission

sales, there's no need for rigs, little need for boats and helicopters to transport people, and little need for drilling fluids, tank cleaning, cranes, parts, supplies, truck fleets and client entertainment," she said.

Alario said all the U.S. coastal operators that she knows have stacked vessels – 10, 20 or 100 – and have laid off workers. "One FSV stacked usually results in at least eight people being laid off," she said. "In the OSV sector, a boat stacked means at least 12 crew will be terminated. Less boats working means fewer people are needed in operations, logistics, sales and administration. Most of those who remain have had to take pay cuts. And remaining crew members are working reduced schedules now, partly to keep people employed."

Oil Price Stability is Needed

Vessel owners and operators who had invested heavily in training their staffs have reluctantly released workers, Alario said. A number of these former employees have found new jobs by now, in some cases away from the Gulf. When the offshore market rebounds, companies will have to begin the training process all over again, she said.

"We're waiting for higher prices per barrel, but the industry also wants to see oil-price stability," Alario said. "That would give companies confidence to invest in exploration and drilling programs and would encourage hiring and training by offshore vessel operators." Only time will tell.

All in a Day's Walk

Just over the horizon, a new 'Integration Strategy' promises offshore safety and efficiencies. Kongsberg's Walk-to-Work technology is just the beginning.

Edited by Joseph Keefe

Maritime technology has come on in leaps and bounds since the turn of the century. We have the technology to keep an offshore support vessel on station within a 0.5-meter radius, even in the most severe weather conditions and sea states. We have the technology to manage power output, and control drives and thrusters to the 'nth' degree, providing safety and reliability for all ship handling operations. And we have the technology to deliver gigabytes of data to shore without paying for a helicopter or a mid-ocean drop off of hard drives or DVDs.

So, what's next? Arguably, the 'big' topic is unmanned vessels. And while Norway headquartered maritime technology firm Kongsberg Maritime is involved in this future looking development through initiatives like AUTOSEA and the October opening of the world's first test bed for autonomous vessels, it also has its sights set on something more in the 'now'.

Integration

At the Offshore North Seas (ONS) exhibition in Stavanger this Summer, Kongsberg Maritime announced that it had implemented a new strategy to integrate its energy, handling and operational technology solutions to create a new portfolio of 'Integrated Vessel Concepts.' Through this will come a new integrated platform to enable solutions that network seamlessly to provide tangible benefits with efficient operations on vessels and ashore.

According to Srinivas Tati, VP Business Development at Kongsberg Maritime, this is the next step in their Full Picture strategy, which already sees the company offering systems for all areas of a vessel's operations. "By making our disparate systems more interoperable, amazing operational efficiencies can be achieved. Integration can deliver significant fuel savings. It can streamline specific vessel operations, enabling more work to be carried out in a day. It

"The core SOV vessel application is offshore wind farm maintenance but they are increasingly seeing action in the offshore oil & gas sector also. This puts them firmly in the sights of our integration strategy. The integrated W2W vessel concept really shows how we are moving outside of our traditional 'hydraulic' systems approach by encompassing a stronger focus on electrical and mechanical aspects."

– Srinivas Tati, VP Business Development at Kongsberg Maritime

can even generate power for battery banks that can be used for primary and auxiliary operations," he says.

Integrated vessel concepts are designed to meet the current and future demands of customers in the seaborne, offshore and marine marketplaces. Each is tailored for specific vessel types, combining separate systems to enhance day-to-day performance and long-term asset management. The concepts utilize distributed technology platform architecture, unified into a holistic system working as one across the energy, handling and operational solutions. This provides a mode-based operational environment that collects information, delivers analysis and empowers proof-enabled decision-making.

The top-line drivers, according to Tati are, "cost savings and improved vessel and fleet efficiency, safety, life-cycle management, reliability and availability with complete benefits on each, while strengthening decision making capabilities and enabling the continual optimization of energy use."

Unified solutions are also intended to enhance on-shore expertise that can steer on-board activity, feeding into planning, monitoring and controlling complex operations, and making real-time decisions in close collaboration with crew, while also providing a layer for analysis. This improves performance, efficiency and productivity.

Essentially, Integration is a network and service layer that supports greater distributed control and monitoring functions across diverse equipment on board a vessel.

Such an integrated network provides enhanced fleet management, enabled by increased connectivity, data capture and analysis in addition to continual control and measurement, with information now available on a single integrated platform supporting efficient planning, execution and decision making. Essentially, integration delivers a unified platform helping better resource utilization, sharing and task management.

Energy, Handling, Operations

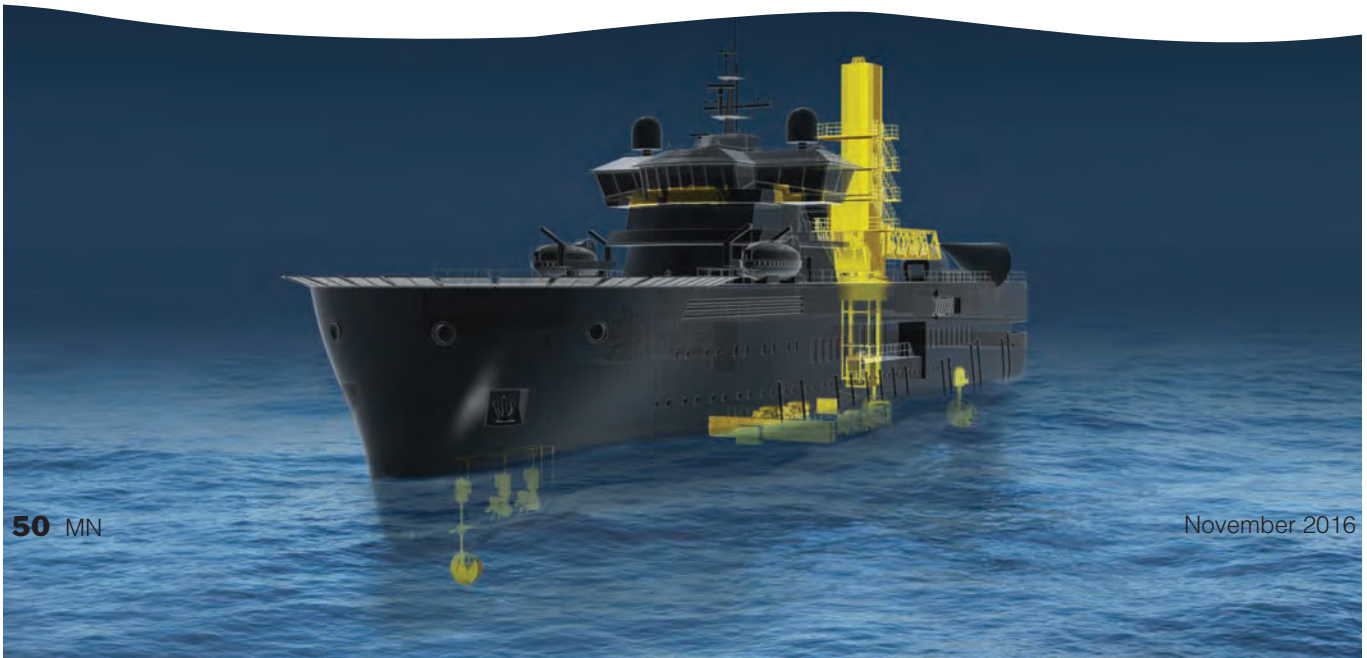
"Through integration, energy management becomes energy control," says Tati. Kongsberg has developed new technical energy solutions that it says work in harmony with dynamic operation environments to monitor, manage and optimize energy use. "The result in addition to optimal energy utilization is reduced impact of maritime operations on the environments and a move towards maintenance free solutions, for all vessels and all power sources, from conventional fuels to battery, hybrid and LNG," he adds.

Other core technology aspects include advanced handling solutions with integrated control and energy management. Kongsberg's truly automated heave compensating, high precision and energy efficient handling solutions support better productivity, reduce costs and improve safety and security for the most demanding handling tasks. Integrated with energy systems, automation and dynamic positioning, maritime handling operations may become even safer and more cost effective.

Handling solutions within the Integration Strategy are designed with the unique principles of utilizing energy from rotating equipment to optimize and regenerate power that reduces energy utilization. The integration of automation with the dynamics of the vessel operations enhances productivity and reduces human error.

Though purposely designed for a broad range of vessel types and customizable to specific requirements, several specific new systems have already been developed for use within Kongsberg's Integrated Vessel Concepts. These include for the first time, the vessel dynamics integrated into the power management layer, providing a new concept for Energy Control. Integrating all elements of the power plant to the energy control layer and distributing control functions closer to the consumers with fast acting sensors, redefines, according to the company, the definition of efficiency.

Dynamic Load prediction (DLP) – a new Dynamic Positioning (DP) system to predict power usage for a vessel's thrusters, Dynamic Inertia Control (DIC) and Dynamic Supervision & Control (DSC) are some of the new features enhancing energy control for DP operations. Solutions for power plant optimization include power regeneration using permanent magnetic electric motors for rotating equipment and enhanced battery solutions for peak shaving and



storage. Examples include systems for vessels with large rotating equipment like winches and electric gangways, which are designed to convert motion into power.

The Morning Commute

The first set of vessels types to receive Integrated Vessel Concept configurations cover a wide spectrum of maritime operations with vessel types including workboats such as Inspection Maintenance & Repair (IMR) vessels, Research vessels, Small Scale LNG, Superyachts, Service Operation Vessels (SOV), Trawlers and Wind Farm Support tonnage.

The SOV is a strong example of the possibilities of integration and is especially relevant due to its recent recognition by Lloyd's Register's (LR). The classification society's range of class notations for offshore support vessels has recently expanded with the addition of two new vessel types joining the ranks alongside Anchor handler, Cable laying vessel and Diving support vessel. In addition to the new Enhanced Weather Protection (EWP) notation, a new special feature notation has been established for 'Walk-to-Work' – W2W. According to LR, W2W can be assigned where the vessel's personnel transfer system is included in the class notation. These systems can be found aboard SOVs, where a gangway enables workers to walk onto a maritime structure.

"The core SOV vessel application is offshore wind farm maintenance but they are increasingly seeing action in the offshore oil & gas sector also. This puts them firmly in the sights of our integration strategy," explains Tati. "The integrated W2W vessel concept really shows how we are moving outside of our traditional 'hydraulic' systems approach by encompassing a stronger focus on electrical and mechanical aspects."

Tati is referring to a new design for the W2W gangway on SOV vessels (called 'K-Walk') that is already in place in the company's portfolio for retrofit and newbuild vessels. In the design, hydraulics are replaced by electric motors which in terms of reliability and maintenance are much

more desirable than the hydraulics normally used in such structure on deck. The motors are deeply integrated with the power management system, which in turn is fully connected to the power generation systems on board – the engines and or batteries. This, says Tati, opens up a very interesting possibility.

"We can make power on board," he says. "The electric motors can harness the energy of the vessel and mechanical movements to create 'free' energy for hybrid or even fully electric power configurations, which are now becoming more viable due to less expensive batteries and more sophisticated power management. We're not just talking about the W2W gangway, either. We're working on producing our own deck winches with electric motors fitted to capture the normally wasted energy of rotation. In fact, anything that rotates creates energy and we want to give it back to the shipowner. But it's only possible when everything is connected back to the power management system, and this is where we are going with integration."

Joining Forces

To facilitate Integrated Vessel Concepts, Kongsberg is further developing its scope of supply to the global shipbuilding industry with focus on electrical systems including switchboards and drives. Electrical systems will be fully integrated with on board technology, ensuring optimal power consumption for dynamic vessel operations. With integration between disparate systems, distributed power management, data sharing on board and ashore can be significantly improved, facilitating enhanced decision making across the operational chain.

Kongsberg is actively developing existing partnerships and creating new partnerships with industry leaders to facilitate its new energy and engineering innovations. Since the launch of its integration strategy in August, Kongsberg has already secured partnerships with Siemens on Variable Frequency Drives and Schneider Electric for switchboards and related systems for offshore and maritime vessels. The company's work in EIT projects forms the basis of its expanded energy focused product line, which will be further developed and integrated with more recognizable Kongsberg technology for automation and operations under the Integration Strategy.

"Our approach to integration goes deep. We have studied in-depth how different vessels operate to understand how the unification of on board technologies can change how we think about and conduct maritime operations at every level," concludes Tati.

From Across the Big Pond

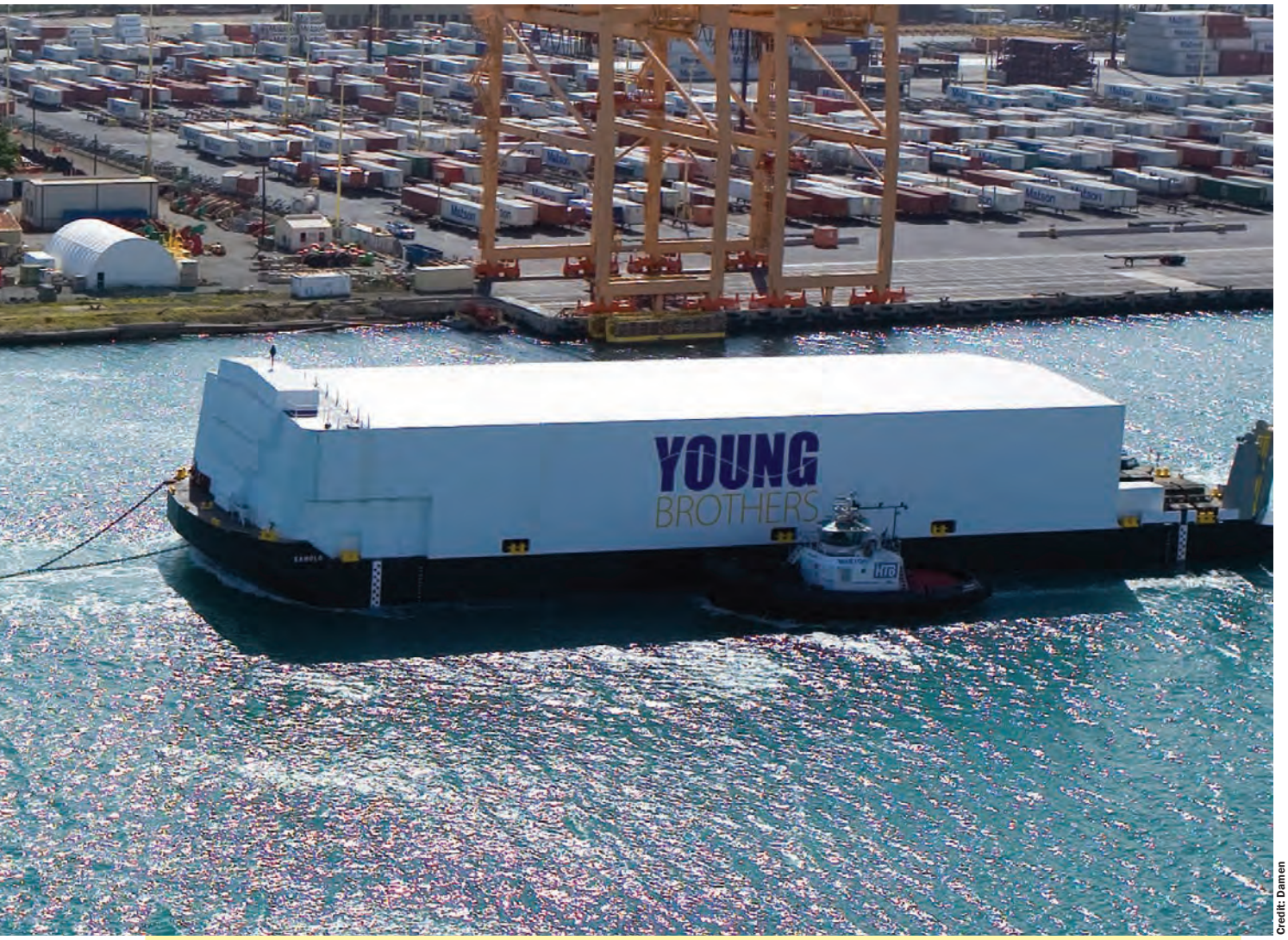
With familiar Faces, new partnerships and Houston office, Damen widens its North American profile with a flurry of new work orders.

By Kathy A. Smith

With a flourish and a flurry of new business, Damen's new U.S.-based office officially opened in Houston, Texas on July 1, 2016. Registered as Damen Area Support North America BV Co., it has been established to provide a local presence and work hand-in-hand with the North American market, offering a full range of ready built, standard and custom design vessels as well as the products and services of Damen Shipyards group 'License to Build' program. In addition, the new office also represents the ship repair and conversion side of the group. It would not be overstating the obvious to say that Jan van Hogerwou, Damen's General Manager of New Construction (North America) hit the ground running and hasn't stopped since.

Fast Start in a Slow Market

In its first three months of operation, the new entity secured contracts for 27 new tugs that are planned or under construction for several different customers, most notably a total of 13 heavy duty mooring assist and escort tugs for two oil projects, an impressive feat coming during a depressed gas market, and a boon for the leader whose proven tug design niche continues to grow.



Credit: Damen

AI02_Stan Tug 3711 - (4x) to be built by Conrad Shipyard for Young Brothers

"If you do a first of a series shipbuilding, and that's for any shipyard in the world, the first of the series is usually a ship that will cost the shipyard money because it's a big learning curve in how to build that ship. We've already done that. We send our planners and then our construction supervisors to these yards and they'll stay there for the entire production cycle of the ship to help our customers, our shipyards and our partner yards in building these ships as economically and efficiently as possible."

– Jan van Hogerwou,
Damen's General Manager of
New Construction (North America)

For example, Edison Chouest Offshore (ECO), has teamed up with Damen to build a total of 13 heavy duty mooring assistance and escort tugs. These will be deployed on two major maritime projects for which ECO has recently won contracts, based in part on the use of well-proven Damen tug designs. The vessels will be built using ECO's network of five shipyards and Damen's support and expertise.

The first of these is a contract that ECO won earlier this year with a new Corpus Christi based LNG export terminal. The agreement is for the supply of four escort tugs with a bollard pull of 80 tonnes, to operate at this new LNG terminal in Texas, which is currently under construction. The Damen tugs will be of the well proven escort / mooring ASD 3212 design.

More recently, ECO won a high profile, long term contract in Alaska. ECO is taking over the ship escort duties out of Valdez, Prince William Sound, from July 2018, for which it will require nine, high-powered escort tugs. For this environmentally-sensitive project, Damen and ECO will work together to deliver four more ASD 3212 tugs with a bollard pull of 70 tons each and five of the most powerful ASD tugs ever built; the ASD 4517 with a bollard pull of 150+ tons, is a joint Damen and ECO developed escort tug specifically designed for the sometimes challenging weather conditions in the Prince William Sound.

Future operations from the new tugs in this environmentally-sensitive region have some local residents and stakeholders concerned that the high standards of previous work will continue to be carried out. Addressing those worries, ECO responded by building safe, Tier 4, technologically-advanced vessels for this demanding work.

Jan van Hogerwou, GM New Construction Damen Area Support North America at the Houston office explains, "In terms of Edison Chouest, we are providing our designs and our knowhow and our engineering capacity. We have engineers that are presently working at Edison Chouest. We have our research team in the Netherlands that is doing all kinds of tow and escort predictions and calculations, so we're a true partner on these projects with Edison Chouest."

"Chouest was pleased to have this opportunity to take Damen's proven hull design and helped create a new, state of the art escort design representing the most powerful ASD tug ever designed or built" said Gary Chouest, President/

Damen Designs: Hands Across the Water

Damen Design	Number	Customer	Builder / Yard
Damen StanPatrol 2600	74	U.S. Coast Guard	Bollinger Shipyards (1994 – 2016)
Damen StanPatrol 4708 (FRC)	36 (of 58)	U.S. Coast Guard	Bollinger Shipyards (2011 – present)
Damen ShoalBuster 2609	1	Weeks Marine	Eastern Shipyards (2005)
'1204' Fast Crew Supplyboat	40	CITGO	Horizon Shipbuilding (2013 & 2014)
'1605' Fast Crew Supplyboat	25	CITGO	Blount Boats (2013 & 2014)
'1204' Fast Crew Supplyboat	15	CITGO	Trinity Shipyards (2013 & 2014)
ASD '3212' tugs	8	Edison Chouest	North American Shipbuilding (2016)
ASD '4517' tugs	5	Edison Chouest	North American Shipbuilding (2016)
Stantug '3711'	4	Young Brothers	Conrad Industries (2016)
Stantug '1907' ICE	10	Great Lakes Towing	Great lakes Shipyards (2016)

(*) Data Courtesy Damen

CEO of Edison Chouest Offshore.

Market Penetration 101

According to van Hogerwou, 95 percent of standard vessels start the production cycle without an owner, and at 50 percent of the cycle, 80 percent of the tugs are sold. "That is a business model that no one in the world of shipbuilding has copied so far," he says. "And it's very difficult to copy because that's a portfolio that takes decades to build up." That's because Damen, the global shipbuilder, has more than 30 yards all over the world and has over time arguably mastered the art of series-build spec tonnage which can then be modified and customized for multiple mission sets.

Helping customers keep construction costs down is one of Damen's market differentiators. "If you do a first of a series shipbuilding, and that's for any shipyard in the world, the first of the series is usually a ship that will cost the shipyard money because it's a big learning curve in how to build that ship," he says. "We've already done that. We send our planners and then our construction supervisors to these yards and they'll stay there for the entire production cycle of the ship to help our customers, our shipyards and our partner yards in building these ships as economically and efficiently as possible." On this side of the pond, especially in the Jones Act trades, Damen isn't here to compete with shipbuilders. They're here to help.

In August of this year, a keel laying ceremony took place at Great Lakes Shipyard for the first of ten Damen Stan Tugs 1907 ICE to be built for The Great Lakes Towing Company. The vessels (GLS Hull Numbers 6501–6510) will be built to ABS Class, and are the first tugs being built to meet the new USCG Subchapter M Regulations. It is good timing to be replenishing the fleet now because many of the upgrades that would be necessitated by Subchapter M will be easily incorporated in the new tugs, says Joe Starck, President of The Great Lakes Towing Company. The new tugs will be a modern-day version of the Towing Company's traditional low profile ship assist tugs that have been in service across the Great Lakes for many years.

Two new harbor tugs per year will

"Damen is providing us with what we call a U.S. variant of their European design. It's the same exact hull form, just modified by them to meet U.S. rules and regulations with regard to tonnage and stability and any other U.S. Flag requirements necessary for our harbor towing application."

– Joe Starck, President of The Great Lakes Towing Company

be introduced for the next five years. Damen is providing full design and engineering support. "We operate our tugs in multiples, as opposed to using a single high horsepower tug," Starck says. As far as the newbuilds, he adds, "They will help us to not only improve the reliability of our fleet for our customers, but also allow us to expand to other ports where we currently don't have tugs stationed."

Starck says going with Damen was an easy choice since the two companies entered into a licensing agreement two years ago where Great Lakes Shipyard offered its customers readily available engineering packages previously produced by Damen. "Damen is providing us with what we call a U.S. variant of their European design. It's the same exact hull form, just modified by them to meet U.S. rules and regulations with regard to tonnage and stability and any other U.S. Flag requirements necessary for our harbor towing application." In other words: hands across the water.

Separately, four new Damen Stan 3711 tugs are being built for Young Brothers, Limited of Honolulu, Hawaii by Conrad Shipyard in Morgan City, Louisiana. The construction is being undertaken under a 'license and materials' agreement with Damen Shipyards Group. Young Brothers, a Saltchuck company operated by Foss Maritime, is Hawaii's largest inter-island cargo service provider. The first vessel will be delivered in the first quarter of 2018 and the last, twelve months later.

"We are investing to serve the Hawaiian Islands for decades into the future. These new tugs are a perfect match for our higher capacity barges and will improve reliability, efficiency and on-time service," said Young Brothers President and COO Glenn Hong in a recent statement.

The four new twin-screw tugs are 123-feet in length with a 36.5-feet beam and powered by G.E. 8L250MDC engines rated at 6,000 horsepower. Designed for high stability and maneuverability, the tug has a maximum bollard pull of 80-metric tons and a top speed of 12.5 knots.

"Damen's approach to standardizing their design and materials is impressive and it's a major advantage that they bring to the table," explains René J. Leonard, VP Business Development and Engineering for Conrad Shipyard. "The number of vessels that they produce worldwide provides the company with excellent leverage in economies of scale, resulting in lower cost to the customer. Their process of shipping materials to us on an as-needed basis allows us to streamline manufacturing schedules and is extremely cost-effective," he added.

Leonard says having Damen as a strategic partner is beneficial not only in design and construction, but also with worldwide coverage for warranty and aftermarket support for spare parts and repairs. "In this instance, with the vessel operator located in Hawaii where access to vendors and suppliers is not easy as elsewhere, Damen's global footprint and rich history of providing these resources is a significant benefit to our customer."

Market Differentiators

Damen's van Hogerwou points out that most shipyards don't have their own service and support and maintenance team in place. He explains, "We have a whole team available 24/7 that will respond to technical issues, and with our buying power and leverage, we can ensure the quickest turnaround possible." Backing up that promise, the family-owned global shipbuilder operates 30+ yards worldwide, and more than 200 vessels have already been built or are being built to Damen designs at U.S.-based shipyards, including over 100 for the U.S. Coast Guard.

The Coast Guard piece of the puzzle is important. That's because more than ten years ago when the Coast Guard's ambitious multi-million dollar conversion plan to rebuild and modernize a fleet of 20-year-old 110-foot patrol craft ran aground as the rebuilt hulls began to crack – one after the other – the next newbuild plan specified just one key ingredient: the hull design had to be a proven one. The Coast Guard turned to Damen.

Damen has grown from a staff of just six in 1969 to over 10,000 employees. To date, Damen has delivered nearly 6,000 vessels; approximately 4,200 of those are tugs – the

ultimate workboat by any definition. Obviously, with that track record, it's no wonder the company is trusted worldwide due to its proven hull form(s) and the ability to quickly and competently build a series for a certain size vessel and a wide variation of hulls on spec that can be fully customized and full support services.

"We have 800 to 1,000 naval architects, engineers on our payroll," says van Hogerwou. "They do nothing else but design ships and make specific custom requested changes to these designs. So we go from absolute 100 percent standard design vessels to 100 percent custom designed and everything in between."

Getting off to a fast start with these new contracts, van Hogerwou is clearly very optimistic. Over time, he expects the Houston commercial office to grow in size with sales, support and technical staff, but at the same time, will stay small enough to comfortably support its market. "We've always been convinced that we needed to be close to our customers," he says. "Now we're in the same time zone. They can reach Damen literally 24/7."

Damen designs are familiar, iconic, and widely used on this side of the pond already. The new office, opened during an unquestionably difficult market, is off to a fast start. With tugs representing Damen's bread and butter globally, the future looks bright for Damen in North America, and the presence of its office in this market means more work for U.S. shipyards. And that can't be a bad thing.

Kathy A. Smith is a Victoria, BC-based maritime writer who has penned over 100 published trade articles.

Location Location Location

Centrally located, experienced in a surprisingly wide range of disciplines, Detyens Shipyard has quietly 'dredged' up a niche in the highly competitive domestic repair and refit game.

By Joseph Keefe

Detyens Shipyards, located in Charleston, SC, has been repairing and converting commercial and U.S. government vessels since 1962. Although perhaps better known for its blue water, deep draft work, the firm boasts a deep portfolio of experience on vessels ranging from tugs and barges to tankers, bulkers, car carriers, container ships and cruise ships. And, if its primary attraction today is its geography, then from that advantage, several key niche business sectors have blossomed for the yard.

In 1982, William J. Detyens sold the business to a small group of employees which included his son-in-law and the yard's current owner, D. Loy Stewart. In those days, U.S. Navy and Government work provided the majority of its business, but in 1993, the Charleston area was dealt a major blow when the Defense Department's Base Realignment and Closure Commission announced the closure of the Naval Station Charleston. Detyens Shipyards naturally felt the full impact of that decision.

Nevertheless, and just three years later, the Detyens group secured a long term lease on Charleston's shuttered Naval Shipyard, moved its entire operation to that location and has operated continually from there ever since. Today, Detyens leverages three (3) graving docks, enclosed shops for all crafts; eight 56-ton gantry cranes (on a continuous rail system); four tower cranes; rail access over 8,000 feet of deep water pier space and a dry dock for smaller vessels. Having successfully transitioned from a full menu of government work to one which includes an equal amount of private sector work, the yard today is always looking for additional sources of income.

Family owned and operated since its inception, the shipyard not only finds itself conveniently located midway between several key markets on the U.S. East and Gulf Coasts, but also in the nation's 9th busiest port that has plans of its own for a rapid, and significant expansion. With a third container terminal planned and the groundwork laid to make the port the East Coast's deepest, Charleston's waterfront is arguably ready to explode. When it does, Detyens will be there to provide service to the vessels that will undoubtedly need it.

DIVERSIFIED CLIENT BASE

Over time, the yard has successfully dry docked dozens of international vessels of all sizes and continues to bid in that highly competitive market, as opportunities arise. With a portfolio that is roughly split evenly between government and commercial jobs, and 98% focused on the repair sector, Detyens services a brown water portfolio that spans government operated NOAA vessels, the nation's research vessel fleet, domestic dredges and a host of other shallow draft work.

According to Detyens President D. Loy Stewart, Jr., the Military Sealift Command is Detyens biggest customer, but the yard also works for virtually every other government agency (other than the U.S. Navy). On the commercial side, the yard's workload is divided evenly between foreign and domestic vessels. Indeed, and before the price of oil took its dive, Detyens was performing a fair amount of Norwegian work – workboats transiting from the North Sea to the Gulf and back, as well as some vessels headed to West Africa. Location had a lot to do with that.

Also on the commercial side, this time in the domestic markets, Detyens found a welcome niche in the refit and repair of dredges. Stewart explains, "We do a lot of dredges; scows, cutter head dredges, and hopper dredges, too. It's dirty, grunt work

"We do a lot of dredges; scows, cutter head dredges, and hopper dredges, too. It's dirty, grunt work and that's what we're good at. Customers know that they can go to Detyens and might pay a little bit more, but it will be fair and the boat is going to leave on time. No question."

– Detyens President D. Loy Stewart, Jr.

Detyens Shipyards, Inc.

and that's what we're good at." He adds, "Customers know that they can go to Detyens and might pay a little bit more, but it will be fair and the boat is going to leave on time. No question."

Another niche for Detyens involves research vessels and NOAA fleets, some of which transit the Charleston area regularly and find the yard to be a convenient stop for both repairs and retrofit work. Recent work of note included the mobilization of the Atlantis before it head out to find the VDR from the ill-fated El Faro.

The dredging work, in particular, might have happened at first as a function of location, but it stays because Detyens gets the job done. Loy Stewart Jr. adds, "There's a lot of dredging in the Gulf, and there's a lot of dredging way up the East Coast. These vessels are constantly transiting. With dredges in particular, time is money. And so, we know that if a dredge is anywhere close, or on its way up or down the coast, we have a better than average chance of getting that work."

Because today's domestic dredging situation – whether storm related or maintenance dredging – is highly fluid, the typical dredge is often its way from one job to another. Often, Charleston, SC is on the way. As a result, Detyens' dredging clients include Great Lakes Dredging, Norfolk Dredging, the Dutra Group, Manson construction and the U.S. Army Corps of Engineers. Getting that work is one thing; keeping it is another. And, that's where the yard's bonus, incentive and benefit package comes in.

THE HUMAN ELEMENT

For Detyens employees, especially; time is money. That reality is manifested in the prominently displayed 'thermometer,' just outside the main gate. Loy Stewart explains the policy, saying, "We pay a bonus the payday before Thanksgiving to every hourly employee. The employees get the number of hours that's on that board, and it's up-

The Detyens Portfolio: Dredging up a Niche business ...

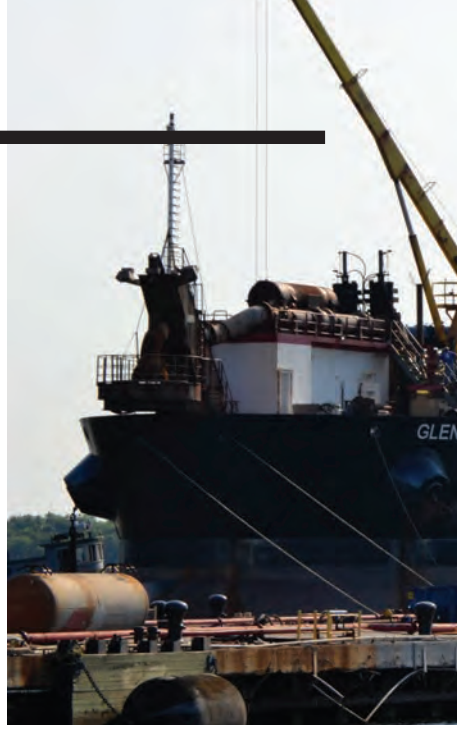
Client	Vessels
Great Lakes	Padre Island, 701, 702, GL 61, Booster 1, New York
Norfolk Dredge	Scow 6001
US Corp of Engineers	Wheeler
Weeks	BE Lindholm
Southern Dredging & Marine	Brunswick
Dutra Group	Scow CK 7
Mason Construction	Glenn Edwards, Scow 2014
Marinex Construction	Savannah, Hampton Roads

dated every month. And, that bonus is based on only two things: *Did the ship leave on time?* and *Was the customer happy?* According to Stewart, if those two goals are met, employees receive one half of one percent gross sales on any job. Stewart adds, "It doesn't matter if the shipyard made a dollar, lost a dollar, it doesn't matter. They get a half a percent of the gross sales, and it's equated to their hourly rate." Similarly, if a ship is late leaving the yard or a customer says, 'I'm never coming back here again,' whatever was going in, half of that comes out. That, according to Stewart, rarely happens.

In September, Detyens had 500 full-time employees and additionally was using about 300 skilled and unskilled temporary workers. Beyond that, another, say 350 subcontractors were engaged in what Stewart describes as turnkey" work; tank-blasting and tank-cleaning, in particular.

Full time employees receive what amounts to all but free healthcare. Self-insured for their healthcare requirements, Detyens healthcare program is arguably the best in South Carolina, and without a doubt, one of the best employee bargains in the country. Perhaps the best part of that plan is that the clinic is located right on the property. It features two doctors, a nurse practitioner, a chiropractor, and a pharmacist staffing an on-site pharmacy. A direct bill relationship with several specialists – for MRIs, CAT scans, colonoscopies, mammograms, X-rays, bloodwork – is in effect and costs employees nothing to use.

It isn't hard to imagine why the yard remains a non-union shop. In fact, says Stewart, "There isn't anything a union could offer these workers that we aren't already providing." And, up until last year, Detyens was actually providing healthcare for some on-site subcontractors (whose coverage, like everyone else's, had gone through the roof), un-



til it was discovered that the practice wasn't allowed under federal law. In the end, Stewart insists, "So, to keep our employees healthy, we offer this. It's virtually free." Beyond this, Detyens focuses on preventative care as well. "We're treating for high blood pressure, cholesterol, diabetes … these things that just weren't being done for the worker. Now, we're educating and teaching. Just because you finished your vial of medicine for diabetes doesn't mean you don't have it anymore. You have to continue to treat. We feel that we treat our employees right and that if we take care of them, they will take care of us, just like our customers."

UPS AND DOWNS

The nature of repair work is anything but certain. That said; while the oil crunch barely impacted the Detyens bottom line, the inconsistent and irregular nature of the government work did. "We didn't see an issue with it (oil). Sure, maybe some ships put off some of the conversion work, but we kept working. Now, the last couple years, it has been a lot more volatile; not necessarily attributable to any one thing," explained Stewart, adding, "On the government side – they just didn't have anything for two or three months. Now, just this last month, they had their whole fleet of oilers in our shipyard."

In late 2015, however, the pain on the waterfront caught up, even with Detyens. For the first time in 55 years, they were forced to let some people go. And, as painful as that decision was, the yard is now back at full strength, working consistently. Aside from the three MSC TAO's only recently completed, Detyens has performed work on five vessels for one German containership firm in just this year alone.

Locally, a dredging firm, Marinex Construction, has also sent a lot of business, as well.

On the horizon, other opportunities are also on the Detyens radar. As the domestic offshore wind business finally comes to life – especially here on the U.S. East Coast

– the potential for putting new life into laid-up OSV tonnage presents very real refit opportunities as operators struggle with Jones Act requirements for wind farm tonnage. To that end, Stewart promises, "For the wind farm service vessels, we're a one-stop shop. You come here, you can get everything done; you'll get it done as quickly and as cost effectively as possible. That's for sure. We guarantee it."

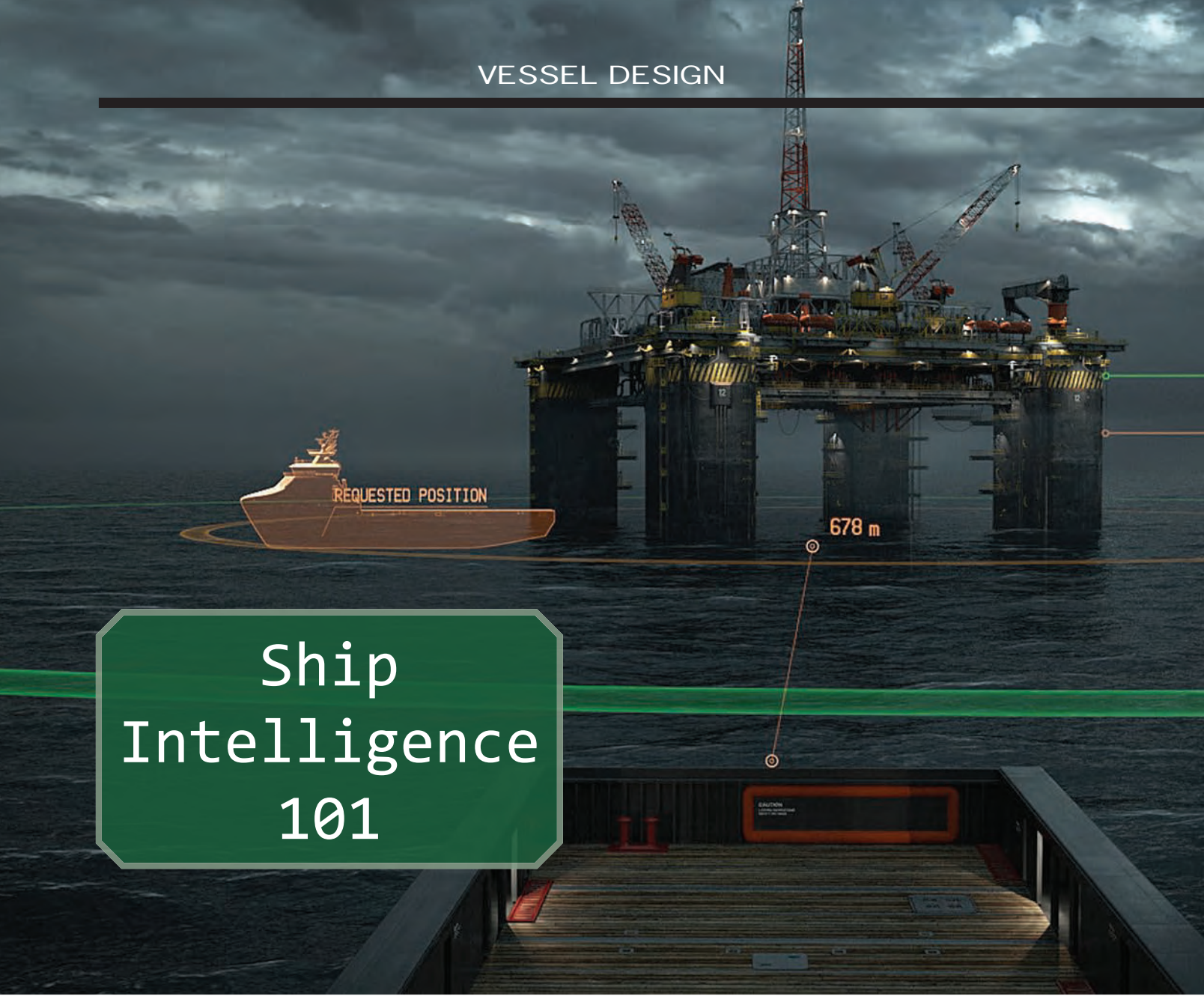
Another area that possibly looms large for Detyens – and the global shipyard community at large – is the recent ratification of the IMO's ballast water convention. And, while it's anyone's guess as to when the U.S. Coast Guard will approve its first OEM technology for domestic waters, it's also no secret that ballast water equipment installations will likely be timed with regular drydocking or yard visits.

Separately, and always looking for new ways to provide service, the new HLB-1 drydock accommodates vessels up to 10,000 tons, or in other words, arguably the perfect size for a myriad of brown water jobs. Measuring 400 by 82 feet between the wing walls, the new drydock has fully occupied since it was put into service in April. A U.S. Coast Guard hull and more than one research vessel has been serviced in a very short period of time. D. Loy Stewart Jr. explains, "It's been fully occupied. And, it's very efficient. We're really setting up an area for the smaller customers that don't want to get lost in a big shipyard."

THE DETYENS PROMISE

Unlike a lot yards, most of what Detyens accomplishes, they do in-house, right on the premises. Very little gets shipped out to another contractor. Stewart explains, "We're right here. There's an electric rewind shop. And, probably the biggest machine shop on the East Coast is in the yard. And, we're wide open. There are no secrets. We don't just want their money now – we want it 10 years from now."

Tying all that together, the Detyens website lays out the simple, but effective motto of the company: "Customer before Company, Employee before Owner, Family before Self and Safety above All." D. Loy Stewart. Jr. puts it best when he says, "That's what we go by. It's like a three-legged stool. We've got employees, customers and the facility. If you don't take care of all three, you don't need the other two." It's a philosophy that's worked well for 55 years and if D. Loy Stewart Jr. has his way, Detyens Shipyards will still be at the job, long after he is gone.



Ship Intelligence 101

The words 'Rolls-Royce' can roll right off your tongue, and when they do, the average person in the maritime space probably thinks first of big, powerful, and environmentally-correct marine engines. That might have rung true just two decades ago, but today, that visual doesn't give justice to what the firm has evolved to become. That's also where Jay McFadyen, Rolls-Royce Senior Vice President for Ship Intelligence, comes in. In a candid interview given at this year's SMM Exposition in Hamburg, Germany, McFadyen laid out for ***MarineNews*** not only what Rolls-Royce is up to today, but also where it is headed tomorrow.

This isn't your grandfather's marine equipment producer. McFadyen, an engineer by training, brings 27 years of aerospace and marine industry experience to the table in his current position. "We are taking products that use the power of digitalization into marine for Rolls Royce. We set ourselves up into three product families: one around health management, one around optimization and decision support, and one around remote and autonomous operations," he explains. And, if that doesn't sound like the engine business, it's because today's Rolls-Royce aims to be so much more.

Ship Intelligence

Rolls-Royce defines Ship Intelligence as the practice of harnessing the power of big data to deliver customer solutions in the areas of health management solutions, optimization and decision support, and remote and autonomous operation. Increasingly sophisticated ships will harness data to drive safer, more efficient and more cost effective operations. Operating across five business sectors – Civil

Ship Intelligence at a Glance ...

Health Management Solutions:	Monitor the condition of equipment in operation, collecting data which will allow customers to make informed decisions about vessel operations and maintenance.
Optimization & Decision Support:	Help turn customers' information into insight providing reports, analytics, and advice to optimize their operations around energy, emissions, payload and safety.
Remote & Autonomous Ships:	The concept of remote and autonomous shipping is growing, driven by the potential benefits. They are expected to be safer, more efficient and cheaper both to build and to run. The technologies needed to make them a reality already exist.

The Rolls-Royce portfolio of equipment and services extends well beyond the engine room, leveraging decades of experience in myriad business sectors.

By Joseph Keefe

Aerospace, Defense Aerospace, Marine, Nuclear and Power Systems – Rolls-Royce arguably has as much business acumen and experience as anyone, to make that happen. "This is about asset and business management," says McFadyen, adding, "We currently offer an energy management solution that provides real time guidance on how a vessel could be operated more fuel efficiently, and as we develop that capability further, we'll be extend it to the total business operation for a customer and provide decision support software to help them make decisions that maximize their returns."

It's why the typical 2016 Rolls-Royce press release isn't always about engines. Often, it talks about integration of equipment and making sure that all pieces of the vessel are talking to each other. It is this turnkey solution that McFadyen and Rolls-Royce hope will set them apart from

Oskar Levander, Rolls Royce Vice President of Innovation, Engineering and Technology

Jay McFadyen, Rolls-Royce Senior Vice President for Ship Intelligence

other folks that are trying to jump in to the digital space. It starts, insists McFadyen, with the domain knowledge across the breadth of the Rolls-Royce portfolio.

"We start right from the design principles of the ship, and then go into systems and components, and within those, we have a deep knowledge of how the mechanics of those elements work. In addition to running the smart analytics, we then also can compare it to what we expect in terms of our failure modes and effect analysis, and actually know what to do about what the data is telling us. In addition, we have 1,000 field service engineers around the world, so not only can we tell you what to do, but we can also turn up with the parts and the people to fix the problem. And so, I think that's what really sets us apart from some of the other folks that are doing the digital work."

As fascinating and useful as the concept may be, there are still clients who are worried that 'big brother' is watching and ready to void an equipment warranty. The first step is to define from the outset what data is going to be accessed and why it is going to be used. McFadyen says the key is to approach this in a collaborative way with the customer and work with them around solutions that are tailor-made for what they're interested in doing. In return, he says, an appropriate level of trust is achieved. "Through the delivery of the reports and the advice and the result in cost savings, we've built up that trust that allows them to expand from a pilot scenario to more of a fleet agreement."

So What?

In a world where big data means many things to different stakeholders, Rolls-Royce wants the data that is mined to be packaged and then delivered to the client in a meaningful and useful format. After all, someone sitting in a room with a bank of video monitors and computers can be bombarded with 100,000 bits of information every minute. It can be overwhelming. In the port security world, they call it the 'so what [?]' factor. "Early in the days of equipment health management and monitoring around engines, the data input overwhelmed both the transmission capability and the analysis capability. So we've worked to develop algorithms that sort through the data on board, and then deliver only the key things to transmit," explains McFadyen, continuing, "That allows us to be able to comprehend them in real time and to pass along the advice in a way that is actionable for the customer. All that data is still collected and is available to go back in after the fact to look for things that can be improved,

Future bridge operation experience concept (oX) for tug vessels

and product enhancements, and the like. But the key, in terms of managing it in real time, is distilling it down to the critical packet that fits within the bandwidth and that the person who's receiving it is able to comprehend it and act on it."

A growing number of operators are beginning to take advantage of 'big data.' In practice, that's a function of bandwidth capability or reliable communications. As that infrastructure becomes better and more reliable, more data will be used and customers will be more reliant on that information. But, cost is still an issue. Still, McFadyen thinks the day is coming when customers will view the process as something more than a cost center. "There is an element of that. Where we're doing things that enhance the safety and facilitate remote and autonomous operation in critical areas, it then becomes a question of the benefit far outweighing the cost." For example, one of the products that Rolls-Royce is working to develop involves improved situational awareness – taking all of the sensors individually and fusing them together into a picture that provides the operator – whether it's local on the bridge or remote ashore, an enhanced view of what's happening. McFadyen

adds, "That kind of safety level is something that customers appear to be willing to pay for."

Technology and the Human Element

There are, says McFadyen, other ways to bring lessons learned from the aero side of the business onto the waterfront. "We're not that far behind in terms of the technology. In terms of the acceptance of operators, we are quite a bit further behind." That hasn't stopped rolls-Royce from bringing industry along for the ride. In their Norway-based simulators, they can model the operation of a PSV or an OSV, simulating the operation of a crane, with multiple participants on deck, in the engine room, etc. "We have customers that view that as critical to their ability to maintain a trained and certified workforce."

The Rolls-Royce approach, as part of the energy manager solution, also allows the customer to identify that there are some crews and vessels that have best practice. A particular operator might want to share that knowledge across their fleet. And, says McFadyen, "By giving them the data and pointing them in the direction of which of their vessels is operating best, it allows them to facilitate that kind of best practice sharing."

Offshore Energy: making Lemonade out of Lemons

In a tough global maritime market, it is the offshore side that arguably has been hardest hit. When this happens, operators typically cut costs, often in areas like the bells and whistles which Rolls-Royce brings to market. And, while McFadyen admits that they've seen a downturn in terms of revenues, that's been driven by the usage of the vessels in the offshore industry. On the other hand, the climate has provided an opportunity to develop a different business model.

"Since the beginning of the maritime industry, maintenance has been traditionally done on a time and material basis. We're looking to flip that into a condition-based monitoring where the OEM takes the responsibility for delivering the life cycle maintenance costs for the equipment, at a fixed price to the customer, or at a price based on the number of operating hours," explains McFadyen. Effectively, this aligns the interests of the equipment manufacturer with the operator. When the vessel's working, the equipment manufacturer is getting paid, and when the vessel is not working, the equipment manufacturer is not getting paid.

McFadyen adds, "So this bit of a downturn – while it has hit our short-term revenues and profits – is providing us an opportunity to enter into those discussions that we think will really form up a more collaborative view of how we approach maintenance going forward." The plan

involves transferring the risk from the customer onto the OEM, over the life of the vessel, amortizing those costs over the same timeframe. The proliferation of sensors and data in real time will allow understanding of the way the equipment is being operated and the way that it's performing. In turn, decisions around maintenance – whether it's doing maintenance early to prevent a failure, or to delay maintenance because the equipment hasn't been used as aggressively as it was designed for. Once the overall cost of the maintenance has been brought down, Rolls-Royce would share that savings with the customer.

Rolls-Royce Intelligence: already on the water

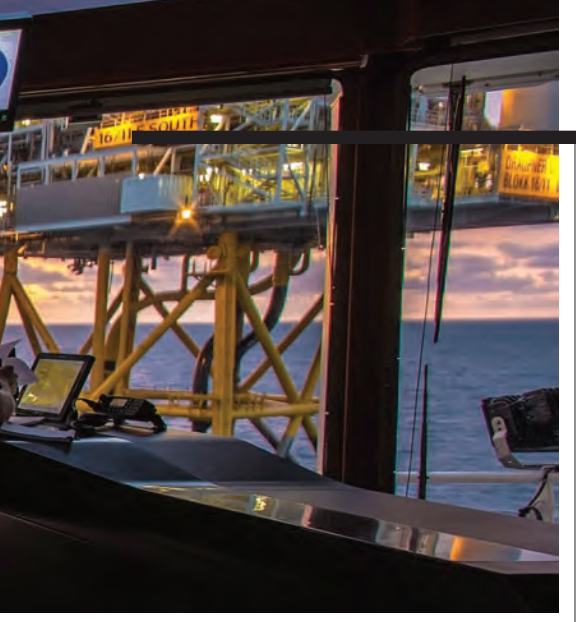
The Rolls-Royce Ship Intelligence Team has only been in place for a couple of months, but McFadyen has been working on Ship Intelligence for the last two years. And, he has specific goals that he wants to accomplish in the near term. In the area of health management solutions, the firm wants to foster fixed price maintenance as the preferred solution with customers. Around the optimization effort, Rolls-Royce will introduce a next level of energy management solution, one which allows real-time customer access via a portal that measures the energy performance of their equipment, with a real time advisory service. Last but certainly not least, the effort to advance remote and autonomous vessels involves a Finland-based project where Rolls-Royce will actually demonstrate that the remote control of a vessel in a local operating environment is feasible. Eventually, that will lead to work on the commercial aspects of such a vessel.

Separately, a Rolls-Royce design has been chosen for the UK's future polar research ship which eventually will be one of the most advanced scientific maritime vessels ever constructed. Rolls-Royce will, of course, also supply machinery and equipment for the vessel in a deal worth $43.6 million. Jørn Heltne, Rolls-Royce Senior Vice President for Sales in Ship Design & Systems, said, "A key part of our extensive delivery for Cammell Laird included in this vessel will be the automation and control systems, including our Dynamic Positioning system and the award winning Unified Bridge. This will provide the crew with the most advanced and innovative working conditions and operator tools on a vessel bridge today."

The latest vision of Rolls-Royce Ship Intelligence – a futuristic ship's bridge concept – could become a reality as early as 2025. Rolls-Royce VP of Innovation Oskar Levander told ***MarineNews*** last year, "We are system integrators." That said; a first glance at their oX Bridge concept reveals that they have already accomplished so much more than that. Rolls-Royce worked together with VTT's researchers and Aalto University to develop the new bridge, known as the Future Operator Experience Concept or 'oX'. It features smart workstations, which automatically recognize individuals when they walk into the bridge, and adjust to their own preferences. Beyond this, the windows of the bridge serve as augmented reality displays of the vessel's surroundings, including visualization of potential hazards that would otherwise be invisible to the human eye.

The real change, according to Levander involves how the system brings up data for the user. He explains, "We provide the right information, for the right user at the right time," adding, "It's a more interactive experience between the anchor handling tug and the rig itself. Using 'augmented reality,' where everyone shares the same information, the goal is to not to overwhelm the user, but instead give them the data that they need and can handle."

And, while the oX bridge might not be ready for a few more years, many of the features of this control system are already in use. For example, the platform supply vessel "Stril Luna" in 2014 became the first vessel to enter service using Rolls-Royce's Unified Bridge. That vessel has begun a long-term contract with Statoil and other operators have ordered the system for their fleets.



Building for tomorrow, Investing in Technology Today

Today, Rolls-Royce predicts that Ship Intelligence will be the next major transition for the shipping industry as ships become ever more complex. As that happens, managing high levels of data in order to operate onboard systems will be a big part of that reality. At first, says Roll-Royce, this will better manage propulsion and navigation systems. Later, it could potentially lead to autonomous vessels.

The firm has put its money where its mouth is. In 2013 alone, Rolls-Royce invested £1.1 billion on research and development while at the same time supporting a global network of 31 University Technology Centers, which position Rolls-Royce engineers at the forefront of scientific research.

On show at the SMM 2016 show in Hamburg was the company's propulsion technology, including the new permanent magnet thruster, the latest green, high tech engines and newest Unified Bridge applications. The company also demonstrated how it is applying experience from the oil and gas sector to specialist ship design in other areas and how Ship Intelligence is creating smarter ships and helping customers cut costs and improve reliability. And, yes, they continue to make a pretty good line of engines, too.

Mitigating Risk *without* Sacrificing Performance

A new entry to the EAL lubricant race emerges from RSC Bio Solutions. Deep roots, new technologies and familiar names create the basis for a different way of approaching marine lubricants.

By Joseph Keefe

It isn't surprising that RSC Bio Solutions, a provider of environmentally acceptable lubricants (EALs) and cleaners, chose the SMM 2016 trade exposition in Hamburg, Germany as the platform to launch its newest product. That's because SMM provided an appropriately large platform for a firm that has deep roots in the chemical and degreaser markets, but perhaps not the name recognition of its higher profile competition. With roots dating all the way back to 1924, and leveraging the acquisition of another now-familiar lubricants firm – Terresolve Technologies – this isn't RSC Bio Solutions' first rodeo. It's also not likely to be the last.

FUTERRA, introduced only in September 2016, is characterized by the firm as a revolutionary product line of bio-based lubricants. According to RSC Bio Solutions, it is today the only hydrocarbon renewable EAL derived from a plant-based material. Designed to outperform other products on the market while meeting the most stringent global environmental regulations at a more attractive price point, its manufacturer points to superior performance in both wet and dry environments, durability in extreme conditions, contact with water, in high-pressure and extreme temperatures, all adding up to greater system efficiency, fewer change-outs and extended equipment life.

RSC Bio Solutions also touts the seal compatibility and a makeup that is miscible with legacy fluids. The firm claims that it does not disrupt operations schedules, increasing system uptime and efficiency and further positions the EAL as a drop-in replacement for mineral oil- or petroleum-based lubricants. Finally, as an Ecolabel-certified product, FUTERRA is suitable for use anywhere in the world, giving marine companies the ultimate route and equipment flexibility.

Credit: RSC Bio Solutions

Meet RSC Bio Solutions

Headquartered in Charlotte, North Carolina, RSC Bio Solutions was founded in 2010 by the owners of Radiator Specialty Company (RSC), a 90-year-old company that houses, among others, the Liquid Wrench and Gunk brand products. More recently, RSC acquired a majority ownership interest in Terresolve Technologies, Ltd., a manufacturer of readily biodegradable hydraulic fluids, gear oils and greases for both marine and land applications. Terresolve brings its own 17-year track record and an extensive lubricants portfolio of products.

Mike Guggenheimer is the President & CEO of RSC Bio Solutions. Last month, from his Indian Trail, NC headquarters, he laid out the history of the firm and its considerable plans the future. "This is a family-owned business comprised of about 150 employees; a good percentage of them are based right here in North Carolina. And that's relevant because the firm is in its third generation and is committed to being here another three generations." Already a household name in other, similar markets, the firm

is nevertheless also looking to grow.

That search first led RSC Bio to Terresolve Technologies. Starting with an initial investment and management help, the relationship has grown to the point where the family owns 100% of that business. In part, and from that investment, RSC Bio Solutions was born. Where the firm hopes to go next, is plainly evident. "In terms of market reach, we will focus on unforgiving or sensitive equipment operated in unforgiving environments. That involves the marine industry," says Guggenheimer, adding, "There you have big vessels that have to perform, going many years before changeovers, and in environments where it's unforgiving – a spill in a port, interface with the ocean, is a big problem. That can be a regulatory problem, or a brand problem, or even just a PR problem. Those two things together are where we thrive – solving those types of problems." And, he says, that's where FUTERRA comes in.

"FUTERRA really is the first and only product of its type. It's an eco-label, certified, renewable, hydrocarbon EAL and that's a mouthful, but where we have focused technologically is in the hydrocarbon and related technologies for lubricants. So these are technologies that are compatible with mineral oils, and they perform really well in tough environments. And what FUTERRA does is take that to the next level. You've got the superior durability in both wet and dry environments. You have superior compatibility – it's the kind of product that can be mixed with both mineral oil and other EALs like synthetic esters."

FUTERRA is a stern tube oil, but RSC Bio intends to roll out its gear oils in the first or second quarter of 2017 and have a full range of lubricants on this base oil technology. Plans for a similarly environmentally correct lubricant for deck machinery are also in the works. As all of that plays out, Mike Guggenheimer is positioning RSC Bio's newest release as "the best of both worlds."

"For many users, the mineral oil or the hydrocarbon technology (the kind of petroleum synthetics are what they're used to), it's what their systems are designed for, it's

FUTERRA Current OEM Approvals(*):

Wartsila	FRAMO	Sauer Danfoss
Denison	Eaton	Vickers

(*) source: RSC Bio Solutions (additional approvals expected in Q1 of 2017)

what the seal materials work with, that's what they're used to, and chemically, they know how it operates. Where the 'best of both worlds' comes in is that you get the performance that you expect from a petroleum-based synthetic or a mineral oil, a high performance mineral oil or a PAO, but you also get the environmental benefits along the way. So we have a line that is a biodegradable, minimally-toxic, and non-accumulative – the three key factors for VGP."

The advantage of all that in the marine world is that it (FUTERRA) doesn't sheen in the water, and is not toxic to the environment when it spills. That's because the new lubricant's base consists of a hydrocarbon that is created from a plant-based material. And there are a number of sources that could be used. In this case, the base oil is coming from sugar cane from Brazil. As Guggenheimer explains further, "Enzymes and chemical technology allow you to convert that and process it just like a PAO – a synthetic base oil. So you get that renewability, the biodegradability, but also the performance of what you would expect from a PAO."

The typical ester technology is an emulsifying technology. So as water comes in to the stern tube, the water gets emulsified with the oil, and eventually the oil breaks down. On the other hand, Guggenheimer recounts reports from clients that have taken the RSC product out after five years, used gravity systems to pull the water out, and put the oil right back in the vessel. Based on those results, RSC Bio even offers a robust warranty. In a nutshell, FUTERRA brand hydraulic fluids will have a warranty for stern tube applications carry a 10-year limited $1 million product warranty. He adds, "We're working on all the details of

"FUTERRA really is the first and only product of its type. It's an eco-label, certified, renewable, hydrocarbon EAL and that's a mouthful, but where we have focused technologically is in the hydrocarbon and related technologies for lubricants. So these are technologies that are compatible with mineral oils, and they perform really well in tough environments. And what FUTERRA does is take that to the next level. You've got the superior durability in both wet and dry environments. You have superior compatibility – it's the kind of product that can be mixed with both mineral oil and other EALs like synthetic esters."

that, but provided that you follow the protocol, we're going to stand behind the technology."

FUTERRA's Future, Built on Performance-based Promises

As shippers work to identify every application where there's a risk – whether it be regulatory or just exposure – RSC Bio hopes to be there to map out strategy for them. Looking ahead, gaining OEM approvals for the new lubricant family will be key to that effort. And, as the excuse that some equipment can't be operated using EAL's goes away for good, RSC Bio is working with all its current equipment partners to ensure that FUTERRA is a big part of the future solution.

Beyond its utility, says Mike Guggenheimer, another

RSC Bio Solutions

KEEP MOVING. FORWARD.

"In terms of market reach, we will focus on unforgiving or sensitive equipment operated in unforgiving environments. That involves the marine industry. There you have big vessels that have to perform, going many years before changeovers, and in environments where it's unforgiving – a spill in a port, interface with the ocean, is a big problem. That can be a regulatory problem, or a brand problem, or even just a PR problem. Those two things together are where we thrive – solving those types of problems."

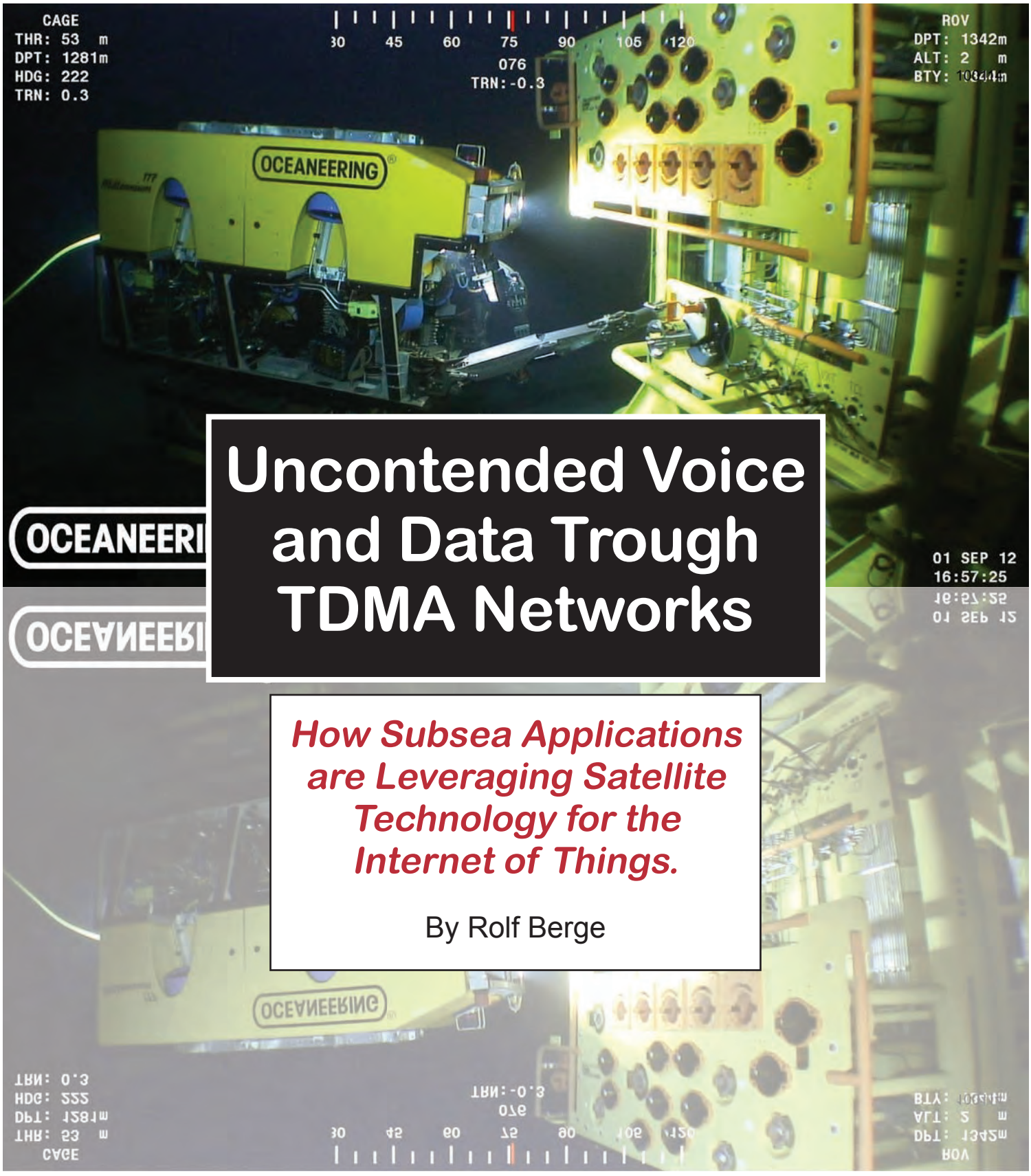
– Mike Guggenheimer, President & CEO, RSC Bio Solutions

real attraction for switching to FUTERRA involves a 10 to 15 percent cost savings over the competition's EAL's. Some of that is rooted in the projected longer lifespan of the product – hence, the ten-year limited warranty – but also in the reduced maintenance costs (and reduced need to buy replacement lubes) during that time frame. He adds, "It's a combination of initial up-front cost being favorable, the long-term durability of the product, and the value of risk mitigation; those three things. And again, depending on the fleet, it could be a little bit of savings or it could be significant savings over the life of the product."

While RSC Bio makes some of the new product here in the United States, a network of internationally based blenders ensures timely global distribution. Right out of the gate, Guggenheimer knows that this will

be important. "Some of our competitors are very big companies that have great histories and they have an availability advantage that we recognize we don't have. I think what we focused on is the performance advantage." But, OEM's will want to know whether the firm they trust with five to ten years worth of lubricant strategy, will be around at the end of that cycle. To that end, seven firms have already granted approvals for the nascent technology. Addressing the road to still more approvals, Guggenheimer says simply, "We can put data in front of a customer that shows over 50,000 hours in a offshore thruster for an offshore drilling company. That's a compelling story."

In the end, RSC Bio will leverage the longetivity of a 92-year old parent, the prior successes of newly acquired technology and the introduction of an even more cutting edge product. Marine operators can look to the heritage of long selling products like Gunk and Liquid Wrench to know that the firm means business as it prepares for its second 100 years. Guggenheimer finishes that thought simply, by adding, "One of the values that the Blumenthal family has instilled in this business is that we make products that work and we do what we say we're going to do. And, I think that a big part of this industry is being able to stand behind what you sell. We're doing that."



Uncontended Voice and Data Trough TDMA Networks

How Subsea Applications are Leveraging Satellite Technology for the Internet of Things.

By Rolf Berge

The Internet of Things (IoT) has been a hot topic across many industries in recent years. Whether it's a fitness tracker, smart refrigerator, thermostat or apps within a car, most people are now connected to electronic devices in ways that they probably wouldn't have imagined 15 years ago. Experts are predicting that there will be more than 24 billion IoT devices installed and $6 trillion invested in IoT solutions by 2020. At this rate of growth, the IoT ecosystem extends beyond consumer electronics to other industries like healthcare, logistics, agriculture and oil and gas, to name a few.

For most of these applications, especially those located in remote areas, the IoT has only been made possible through satellite-based communication. For example, companies such as Harris CapRock work with their customers to provide connectivity through satellite communications, with a specialization in transient environments. One way this is achieved is through Harris CapRock One. It provides a communication service that monitors for and adopts the best-fit satellite, wireless or terrestrial network as a rig or ship moves around the globe. The solution's multi-band antenna is capable of supporting C-, Ku- and Ka-band and is remotely configurable, saving on the costs associated with an on-site service technician.

With this setup, customers are allowed to freely roam wherever they want worldwide and the equipment self-configures to the most appropriate connection in the given conditions – making IoT applications a reality, even in the middle of the ocean. This type of reliability opens a window to what customers can achieve through communications technology and connectivity, allowing them to derive benefits from the IoT that weren't previously available.

Uncontended TDMA Networks

Another way Harris CapRock achieves connectivity is through uncontended Time Divisional Multiple Access (TDMA) networks. TDMA networks are very flexible in supporting highly mobile assets that need to move from one region of the world to the next. What many customers don't realize is that service providers have the ability to offer uncontended TDMA networks with a dedicated committed information rate (CIR). This architecture allows access to committed bandwidth levels at all times – an advancement over traditional TDMA networks.

Under this network model, an uncontended CIR is like a dedicated lane on the freeway that can only be used by a single company, allowing the company to send any mix of cars, vans and trucks as they like. The dedicated lane is unaffected by rush hour, or activity in other lanes. In other words, and for operators tracking multiple assets or remotely monitoring myriad metrics from a wide array of equipment, the perfect match. TDMA networks are able to react to changing traffic requirements from the VSAT to the hub much faster than a single channel per carrier (SCPC) network. This makes TDMA networks much more appealing when dealing with bursts of traffic or IoT applications.

Oceaneering

In one such application, the results are noteworthy. Harris CapRock deploys voice and data services through an uncontended TDMA network with its customer, Oceaneering, to support live video services which are currently utilized for subsea and top-

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side activities offshore. By nature of the work, Oceaneering's fleet is almost always located in hard to reach areas making satellite communications a must.

As a global oilfield provider of engineered services and products, primarily to the offshore oil and gas industry, Oceaneering has a focus on deep-water applications. Oceaneering's business offerings include remotely operated vehicles (ROVs), built-to-order specialty subsea hardware, deep-water intervention and manned diving services, non-destructive testing and inspection, as well as engineering and project management. The company provides the hardware, networking and all communications services to install and backhaul video from even the most remote locations.

For Oceaneering, the IoT is enabled by the use of cameras and sensors on vessels to create feedback to users onboard and onshore. Traditionally, operations personnel were required to monitor gauges and sensors. With the availability of the Harris CapRock satellite communications link, sensors are interconnected and monitored via

various gauges and dashboards instead of through manual intervention.

Through the IoT, companies are given great visibility into their subsea operations. Predictive maintenance has become a more common method to reduce costs, and video is a key tool in validating the wear and use of equipment. Subsea video is used to monitor Oceaneering's ROV operations and to inspect subsea hardware for any damage or erosion and corrosion issues. Video management is provided through an integrated web-based portal for viewing and management of real-time streaming and historical archiving and review. The user has the ability to tag interest areas for subsequent analysis and view multiple streams in a unified display. The analytics around the video enable clients to measure the amount of surface coasting or rust occurring on assemblies and calculate when to replace them.

Harris CapRock in Action

Recently, an operation was initiated to verify a leak in one of Oceaneering's subsea risers which was used to transfer product from the subsea floor to the offshore production platform. With these types of operations, there is quite a bit of ROV work and support around the installation, maintenance and operation of the riser (including frequent inspections) – all requiring subsea video.

To fix the issue, live video was streamed to multiple users in order to design a repair kit for the damaged pipe joint. Measurements were made directly off the video using photogrammetry, which allows precise measurement when two cameras are used in coordination. The cameras on the surface and live streaming were used to conduct operations monitoring and surveillance of activities to provide direct feedback and assistance to crews offshore. Oceaneering was able to successfully conduct a repair of the riser while providing operational visibility to the client – all while the operation was underway through satellite-enabled live streaming video.

Today, several of Oceaneering's clients now conduct operations through an onshore command center and maintain active communications with the crews offshore operating the equipment. As vessels become more automated, the need for connectivity only increases. The visibility that's made possible through Harris CapRock's satellite link has become a necessity for the subsea operations, and through it, Oceaneering has been able to provide more sophisticated solutions because of reliable communications across their fleet of vessels.

Rolf Berge is Harris CapRock's Chief Technology Officer. Berge previously held various positions with Schlumberger, until its acquisition by Harris Corporation in 2011. He holds a Bachelor Degree in Electronics and Telecommunications from the University of Strathclyde, Glasgow, UK.

South American River Tugboats Need Robust Rudder Bushings

Some 20 tug boats on the Parana River, running through Brazil, Paraguay and Argentina, have been equipped with Vesconite rudder bushings.

In the challenging waters of South American rivers, tugboat owners began ordering Vesconite's proprietary thermoplastic rudder bushings starting in 2014. Convinced that the material – which is wear resistant, self-lubricating, environmentally-friendly, requires no grease, and easy to machine and fit – was more suitable than the bronze that has traditionally been used in the application, many firms have permanently made the change. Today, that move is paying dividends.

These companies include large South American mining and agriculture companies, which own their own barges and transport their own cargo. "The Parana River is one of the large water highways in South America," Leandro Panzini of VesArg, the Argentinian distributor of Vesconite products told ***MarineNews*** last month. He adds, "Towboats push barges on the inland waterway, which can be tough and abrasive on boats."

Vesconite and Panzini both hope that there will be a significant rudder bushings market in the area in the near future, as many fleets upgrade their equipment. Already, though, local South American customers include prominent local operators such as Interbarge, Ultrapetrol, Lógico Paraguay (a Louis Dreyfus division), Cargill and Naviera Chaco (an ADM division).

It is a particularly important market for VesArg since river waterways are important arteries via which large cities in South America are linked together and each of these towboats could have four, six or eight rudders and two, three or four propellers. Having introduced the rudder bushings to tug boat owners on the Parana River, the intention is to introduce the product to operators on the waterway in Colombia. "We are currently testing the product in Colombia, which has a smaller water highway and usually has smaller boats operating on it," said Panzini, adding, "We also intend to introduce Vesconite propeller shaft bushings to the South American river-transport market."

DIFFICULT CONDITIONS, APPROPRIATE SOLUTIONS

The South American rivers in which the tugboats operate tend to be wide and deep, and not dissimilar to the Mississippi River in the United States. The rivers also tend to have significant quantities of suspended debris and sand, which makes the water highly abrasive, and results in rudder bushings having to be replaced more frequently than they would be on traditional boats. "This set of conditions makes Vesconite bushings particularly attractive, since they are exceptionally hard wearing," says Panzini.

The Colombian waterway in which the bushings are being tested currently tend to be even more abrasive than the Parana River, and successful testing of the bushings on this River will, says Panzini, demonstrate that Vesconite is able to cope in the most uncompromising of environments.

VESCONITE RUDDER BEARINGS

Vesconite is an internally-lubricated bearing material that is environmentally friendly. It is designed for low wear and minimal maintenance. It is also dimensionally stable, with negligible water swell and a low thermal expansion rate, and

Process of machining a marine bushing

carries loads of up to 30MPa. Vesconite has obtained approvals from ABS, Biro Klasifikasi Indonesia, Bureau Veritas, China Classification Society, China Corporation Register of Shipping, DNV GL, the Korean Register of Shipping, Lloyd's Register, Nippon Kaiji Kyokai, and RINA.

Vesconite Bearings, the maker of Vesconite, has warehouses in Johannesburg, Texas, the UK, the Netherlands and New Zealand, with stocking distributors in Australia, Singapore and Argentina. Vesconite rudder bearings are in use globally in a range of rudder types and configurations, including upper and lower pintle bushes, steerable propellers, flap rudders, efficiency rudders and space rudders. In particular, Argentina is proving to be a significant market for the company's marine products.

EDITORIAL CALENDAR 2017

JANUARY

Ad Close: Dec 15

Passenger Vessels & Ferries

Market: Training & Education
Technical: Thrusters & Inland Propulsion
Product: Interior Design & HVAC
SPECIAL REPORT: Ballast Water Treatment
REGIONAL FOCUS: US WEST COAST

PVA Maritrends,
Jan. 29-Feb. 1, Seattle, WA
ASNE DAY, Feb 14-16, Crystal City, VA

FEBRUARY

Ad Close: Jan 17

Dredging & Marine Construction

Market: U.S. Coast Guard
Technical: Naval Architecture
Product: Fire & Safety Equipment
SPECIAL REPORT: VGP Compliance

Inland Waterways Conference,
March 7-8, Cincinnati

MARCH

Ad Close: Feb 16

Pushboats, Tugs & Assist Vessels

Market: Management & Navigation Software
Technical: Marine **Coatings/Corrosion Control**
Product: Workboat Engines
SPECIAL REPORT: Hybrid Workboat Propulsion

CMA Shipping 2017 ,
Mar 20-22, Stamford, CT
NACE Corrosion,
Mar 26-30, New Orleans, LA
Commercial Marine Expo,
Apr 26-27, New Bedford, MA

APRIL

Ad Close: Mar 16

Boatbuilding: Construction & Repair

Market: Cranes & Deck Machinery
Technical: Workboat Communications
Product: Electronics & Navigation Equipment
SPECIAL REPORT: Inland Port Development

Inland Marine Expo, May 22-24, St. Louis, MO
Tugnology, May 23-24, Rotterdam
OTC, May 2-5, Houston, TX
Electric & Hybrid Marine World Expo
June 6-8, Amsterdam, NL

MAY

Ad Close: Apr 14

Inland Waterways

Market: Barge Building & Outfitting
Technical: OSV & Offshore Trends
Product: Cordage, Wire ropes & Rigging
SPECIAL REPORT: Subchapter M Towboat Rules

SeaWork,
June 13-15, Southampton, UK
MegaRust, June

JUNE

Ad Close: May 18

Combat & Patrol Craft Annual

Market: Shortsea Shipping
Technical: Lubricants, Fuels & Additives
Product: Pollution Prevention & Response
SPECIAL REPORT: Shipyard Exports

JULY

Ad Close: Jun 16

Propulsion Technology

Market: ATB's
Technical: Safety & Fire Prevention
Product: Shafts, Seals & Bearings
SPECIAL REPORT: Workboat Repair

AUGUST

Ad Close: Jul 14

MN 100 Market Leaders

Market: Boatbuilders
Technical: Marine Operators
Product: Water Treatment & Technology

SEPTEMBER

Ad Close: Aug 17

Offshore Annual

Market: Cargo Handling Equipment
Technical: Push Boats & Barges
Product: Deck Machinery & Cranes
SPECIAL REPORT: Regulatory Outlook

SNAME Convention
Oct 23-28, Houston, TX
Clean Gulf
Nov, Houston, TX

OCTOBER

Ad Close: Sep 15

Salvage & Spill Response

Market: Multi-Mission Workboats
Technical: Arctic Operations
Product: CADCAM Software
SPECIAL REPORT: Simulation Tech & Trends

NOVEMBER

Ad Close: Oct 16

Workboat Annual

Market: Outfitting Today's Workboat
Technical: Pumps, Pipes & Valves
Product: Deck Machinery
SPECIAL REPORT: The Marine Fuel Debate

Workboat Show
Nov, New Orleans, LA

DECEMBER

Ad Close: Nov 17

Innovative Products & Boats – 2017

Market: Fire, Patrol & Escort Craft
Technical: Emissions Compliance
Product: Pumps, Pipes & Valves
SPECIAL REPORT: Top 10 Stories for 2017

The publisher reserves the right to update this editorial calendar. All planned features are subject to change in light of industry developments.

Subchapter M: *the Devil is in the Details*

Intelligent LED Commercial/Military (CM) series navigation lights are ready to meet the challenge.

With the long-awaited, much anticipated Subchapter M towboat RULES now upon the towing industry, there are many details to address. None, perhaps, is more important than the need to maintain compliant and safe running lights. And, navigation light upgrades have been added to the list. That said; navigation/running lights may be about as gratifying a purchase as putting tires on your car or a new roof on your house. Nevertheless, all three are absolutely crucial aspects of everyday life.

Sub M requires all towing vessels over 20 meters (65') to have navigation lights certified to UL 1104. Towing vessels larger than 26' and less than 65' are required to have lights certified to ABYC A-16. The Coast Guard is generously allowing vessels two years – until July 2018 – to upgrade the lights to the new standards, but that deadline, like many others, will be here before you know it.

Although 'SubM' only requires a basic certified UL 1104 navigation light, many seagoing towing vessels, depending on the type of inspected vessel, will require additional safety equipment, including:

- *Redundant back up lights;*
- *Dual power feed;*
- *Navigation light monitoring (w/alarm panel.*

Beyond this, manufacturers of UL 1104 LED navigation lights for inspected vessels are required to comply with the International Maritime Organization (IMO) Resolution MSC.253 (83) Performance Standards for Navigation Lights. These standards stipulate, among other things, that the luminous intensity of LEDs gradually decreases while the electricity consumption remains unchanged. The rate of decrease of luminous intensity depends on the output of LEDs and temperatures of LEDs. To prevent shortage of luminous intensity of LEDs, (a.) an alarm function should be activated to notify the Officer of the Watch that the luminous intensity of the light reduces below the level required by COLREGs; or (b.) LEDs should only be used within the lifespan (practical term of validity) specified by

the manufacturer to maintain the necessary luminous intensity of LEDs."

Manufacturer's must specify to either replace the light fixture after (typically) 50,000 hours; or monitor and process the LED intensity and give an alarm if the intensity falls below 72 COLREGS. This monitoring and processing requires more intelligence in the design than just counting hours of use. For example, just because the LED is lit does not ensure the visibility/COLREG requirements are being maintained.

The best approach is to monitor the LED intensity and compare to the COLREGs values. If the intensity is below COLREGs requirements, then the intelligent light will turn off which will trigger the alarm panel. Subchapter M introduces other concerns. Alarm panels on most inspected vessels were designed for incandescent bulbs which have ten times the current of LEDs navigation lights. The alarm panel will need to be modified to work properly with the reduced current of LEDs.

MEETING THE SUBM CHALLENGE

Available in the Fall of 2016, Signal Mate Certified UL1104 LED navigation lights for Sub Chapter M and lights for inspected vessels compliant with IMO Resolution MSC 253 (83) are so constructed to monitor LED intensity to ensure COLREGs nautical mile visibility requirements, as opposed to assuming that the light will maintain the nautical mile visibility for a lifespan of 50,000 hours before replacement, as other manufactures specify. The intelligent light communicates with switch panel to provide light's status and to increases brightness during restricted visibility. Or, in other words, keeps you and your boat safe and incompliance. Signal Mate's LED navigation lights' modular design will feature single, dual, and auto switch-over configurations, and will work with or without supervised panels that are required for most inspected vessels.

At 70,000 hours, the typical LED light will have lost 30% of the original intensity even in a well-designed light. The LED will gradually lose intensity, but the current will not be reduced. Hence, LED navigation lights can fail prematurely before reaching 50,000 hours due to failure rates of electronic parts (MTBF), improper thermal management, improper mixing of thermal adhesives, and assembly procedures. Since Signal Mate turns off the LED when the intensity falls below COLREGs, the current is also turned off, which will trigger the alarm panel regardless of how well the panel was modified from incandescent to LED. The modular design allows the four major components to be replaced without having to replace the whole light. These components include the permanent base – hard coated aluminum heat sink, the LED holder (LEDs, drivers, processor), Lens (UV stable poly carbonate) and the Power hook up/termination circuit board. www.SignalMate.com

Digital Technology Enhances Marine Communications

By Joseph Keefe

On a warm summer morning last July, boat owners and passersby were drawn to a craft not often seen in the sleepy harbor of Wickford, Rhode Island. Tied up at the dock was the new, 37-foot, Multi-Mission Interceptor (MMI) recently produced by SAFE Boats International, where it was making a stop along its promotional run down the east coast. The craft features a sleek, state of the art design and is fully equipped with best-of-breed technology and products from a variety leading marine companies, including Mercury Verado outboard engines, Raymarine navigation system, SHOXS Shock Mitigating Seating and FLIR gyro-stabilized multi-sensor imaging systems, to name just a few.

Comms 101

For critical communications, SAFE Boats partnered with David Clark Company of Worcester, Massachusetts. David Clark specializes in providing communication headsets and system solutions for high-noise environments. The company's 'green dome' headsets are perhaps most recognized in the aviation industry, where they have been worn by private, commercial and military pilots since David Clark pioneered the product category in 1975. David Clark has been supplying the marine industry with wired and wireless headset system solution for the past 15 years. True to form for the new MMI, the vessel is equipped with the new Series 9100 Digital Intercom System from David Clark.

"A major part of what went into the design of this boat was working with our elite partners from engine manufacturers to electronics providers, one of which was David Clark, who provided the digital intercom system and integration of our stereo and radio systems with the headsets," said Rob Goley, Business Development Director for Federal Programs for SAFE Boats. Goley added: "At SAFE Boats, we provide products that demand proven performance during dangerous missions in tough conditions and harsh environments. Communication is critical in these conditions. The David Clark digital system allows operators to communicate internally with one another, but also externally through various radio systems to accomplish the mission."

Versatility for a wide variety of applications

The system versatility that Goley references is a key benefit to users. The modular interface flexibility of communicating both crew-to-crew and externally through radio systems is a key benefit to users. The master station provides high performance Ethernet/IP versatility and is the heart of the system. It is designed to accept modular cards that provide users with access to the entire digital network, connectivity and software-enabled access to multiple mobile radios, loud hailers and Bluetooth devices. "The Digital Intercom System's versatility makes it a great fit, not only for high-performance interdiction craft like the MMI, but also on board a wide range of workboat vessels. Single or multi-channel programming options provide enhanced flexibility for a virtually unlimited number of users. In addition, headsets are interchangeable between wired and wireless configurations to suit a wide variety of applications." said Bob Daigle, Product Manager, Systems for David Clark Company.

Digital system user interface products – Headset Stations, Wireless Belt Stations and Gateways – provide connectivity from the Master Station to the headsets. All units feature "SMART VOX," an automatic VOX technology that adapts to background noise in real time, while applying unique DSP algorithms to discern between noise and speech, for instantaneous and effective mic control with no manual adjustments. "SMART VOX" technology is particularly beneficial in craft such as the Safe Boat MMI, with a maximum speed of 55+ Kts that generate an amazing amount of wind and engine noise.

The Series 9100 Digital Intercom System allows for programming options for each individual user and for multi-channel device assignments/restrictions. Programming choices for critical communications can determine who hears what (e.g., intercom, radios or other devices; how they hear it ("split audio or radio in left ear and intercom in right ear, etc.); who communicates with whom (intercom, specific radios); and how users communicate (hands-free intercom, multiple PTT configurations for intercom and/or radio).

Digital technology simplifies system setup and operation

Of additional importance to both boat manufacturers and users for marine communications is the ability to integrate a system on board a vessel and ensure that it is easy to use for crew members. These considerations

Rob Goley,
Business Development Director for Federal Programs for SAFE Boats

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– Bob Daigle, Product Manager, Systems, David Clark Company

were not lost on SAFE Boats' designers. Rob Goley reports, "As a boat manufacturer, integration is everything to us. The David Clark system was easy to setup and easy to integrate. We had great customer support installing the system from the engineering team at David Clark. For the end-user, it's very easy to operate and works when you need it, and it's very easy to use." Ease of set-up and use is complemented by the comfort and durability of headsets and system components that need to stand up to harsh marine environments and continuous use. Headsets include over-the-head and behind-the-head styles with gel/memory foam ear seals. Quick positioning, flex/wire booms with advanced M-2H microphones optimize noise cancellation while enhancing speech clarity. Noise-attenuating headsets feature a PTT switch located on the headset boom, making it easy to find and actuate in the most stressful situations that can occur in surf and water rescue, maritime law enforcement, migrant and drug interdiction missions. "Many of these missions require long hours on the boat and operators need comfortable equipment that is reliable. That's critical," said Goley.

Meeting the communication needs of tomorrow

The digital architecture of the David Clark system is designed for maximum scalability and allows for future technology upgrades and ancillary interfaces without the need to replace system modules. The Series 9100 is an IP network-based system that provides the marine market with a future-proof communication solution that is compatible with other digital IP networks as well as analog devices like two-way radios and loud hailers.

So how is the system working out on the water? Later that morning Rob Goley put the boat through its paces at full throttle in Narragansett Bay, along with five crew members. Calling on his 21 years of Coast Guard experience, Goley subjected the MMI to a variety of aggressive interdiction maneuvers. The craft and its digital communication system performed flawlessly. Goley concludes by saying, "At SAFE Boats, we're very proud of the MMI and proud of our partners that joined forces with us to develop our product, especially David Clark in providing a rugged system that works, is exceptional in its operability and provides an excellent product to our customers."

Peace of Mind on Deck

Workboat Operators Mitigate Risk by Eliminating Traditional Lubricants

Nabrico

By Joseph Keefe

As a changing regulatory landscape impacts the North American workboat industry, especially in the inland markets, operators are always looking for ways to save money, improve operations, eliminate risk and avoid falling afoul of the tightening regulatory machine. Both the long-awaited Subchapter M towboat rules and the EPA's VGP now cover significantly more hulls than before, and in a very short period of time. Hence, the need to tighten up has never been greater.

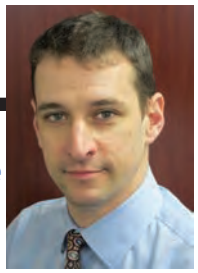
A good place to start is on deck where critical equipment can create environmental headaches if not properly and continuous maintained. It doesn't have to be that way. Traditional appliances such as winches, roller chocks, fairleads, gangway ramps, cranes and davits all need to run free and stay lubricated. Using the usual grease and lubricants can be messy, often neglected, and time consuming when it is performed correctly. Beyond this, the potential for these lubricants to leak into water is omnipresent. Hence, it wasn't surprising that Thordon Bearings – perhaps better known for its underwater shaft bearings in the blue water markets – saw the perfect application for its products on deck. Since then, more than a few workboat operators have come around to their way of thinking.

ThorPlas-Blue Bearings

In a nutshell, ThorPlas-Blue bearings eliminate the need to apply grease on deck to various pieces of machinery. Scott Groves, Business Development Manager for Thordon Bearings told *MarineNews* in September that when it comes to deck machinery, there can be many types of bronze and grease applications, and when there's rain water, there's going to be pollution. For deck applications, Thordon uses higher pressure bearings that can withstand pressures up to 6500 PSI. Groves adds, "We are targeting applications like lifeboat davits and rolling fairleads. Look at steering linkage bushings. Particularly in the inland River system, you'll have grease bronze jockey bars for tiller arm steering and the alignment isn't always good. You'll get abrasives in the area. It is not a clean working environment."

The effort to keep all machinery installed above the wa-

**All images above courtesy of Thordon Bearings (unless noted otherwise)*



"We are targeting applications like lifeboat davits and rolling fairleads. Look at steering linkage bushings. Particularly in the inland River system, you'll have grease bronze jockey bars for tiller arm steering and the alignment isn't always good. You'll get abrasives in the area. It is not a clean working environment."

– Scott Groves, Business Development Manager for Thordon Bearings

terline in good working order is a tall order for any boat's crew. Workboat operating conditions are typically difficult, and equipment maintenance requirements can be demanding and time consuming. Hence, it isn't unusual to see the premature onset of bearing seizure, often as a direct result of periodic maintenance be delayed or overlooked. The combination of poorly greased bronze bushings and seawater shaft corrosion may cause bushing seizure. Fortunately, ThorPlas-Blue can be easily back-fit into virtually all applications where greased bronze is currently installed.

Once installed, ThorPlas-Blue does not require greasing to ensure smooth operation. The lubricants formulated throughout the homogenous ThorPlas-Blue polymer matrix ensure a low, stable coefficient of friction, even as the bearing wears. In applications where movement is infrequent and there is significant exposure to salt water spray, if space permits, high performance Thorseal lip seals can be considered to prevent the ingress of seawater and possible buildup of salt deposits in the bearing. According to Thordon, wear rates are very low compared to greased bronze ensuring long life and dramatically reduced maintenance costs.

On, In and Out of the Water

Thordon markets the bearings not only as something that helps the equipment operate more successfully and smoothly, but at the same time, touts the solution as one which completely eliminates grease from that portion of the vessel. One OEM deck machinery provider, Nabrico, has had especially good results with the ThorPlas-Blue Bearings. With four winches fitted with Thordon bearings in the inland tank barge business, and having proven the bearings with a long term testing stand operation, Nabrico reports good results in their deck equipment. Nabrico has also had the bearings installed in as manay as 56 deck cranes, also with excellent performance.

According to Clint Bryan, Nabrico's General Manager, installing the bearings can involve "a little more work up front," but once installed, the bearings provide service as advertised, all without the need for messy grease and lubricants. And says Bryan, "We do quite a bit of rebuilding and what we find is that some winches get maintained well and some do not. The Thordon bearings eliminate that worry from the equation."

Separately, Seacor's Inland River Services also employs Thordon's ThorPlas Blue materials. In fact, Robert King of SCF Lewis and Clark (a Seacor subsidiary) told MarineNews that his firm had been using Thordon bearings since the 1980's. In those days, SCF Lewis and Clark were primarily using the Thordon shaft bearings, but they've since evolved to using Thordon materials for other applications. In particular, says King, the Thordon ThorPlas-Blue bearings are highly suitable for their jockey bar systems, adding, "We like the one-two punch of the stainless steel with the Thordon bearings."

Still another ThorPlas-Blue user is Signet Maritime's Timothy McFaul, who says that he has relied on Thordon products for more than 20 years. First using Thordon bearings for propulsion and steering systems, he also relies on ThorPlas for Signet's stern roller bearings. "The rollers were seizing up when we used nylon. Replacing that arrangement with a combination of stainless steel and ThorPlas has been a great success," McFaul told ***MarineNews*** in September, adding, "Any chance I get, I'll use ThorPlas."

Robert King, in the ultimate nod to Thordon's bearing systems, told ***MarineNews***, "The AWO RCP says that you have to have 'a grease policy.' Well, we don't need one because we don't use grease." In practice, Thordon Bearings involve a little more expense on the front end, but once the longer equipment lifespan and elimination of grease (and the labor needed to apply those lubricants) is factored in, the overall cost of ownership may even be less than operating with traditional bearings lubricated by the typical deck grease. And, with one less point of egress for pollutants eliminated, operators can sleep a little easier even in the face of a more robust VGP environment. Peace of Mind, Performance and Practicality: that' what Thordon promises, and more importantly, it is what their customers say they deliver.

The Thordon ThorPlas-Blue Advantage:

Easily back fit into bronze applications	Environmentally friendly	Easy to install
No greasing required (lube + labor)	Eliminate unsightly grease	No mess on deck
Eliminates frequent maintenance	Reduced labor/ safety issues	No seized bearings

ThorPlas-Blue Applications

Fairleads, mooring gear	Gangway ramps	Cranes, hoists, loading equipment
Lifeboat/ Tender davits	Winches	Door stay linkage bushings
Tiller arm steering rod ends	Doors and hatches	Vertical Pumps

Measure Twice; Cut Once

How Testing Helps in Evaluating Environmentally Acceptable Lubricants (EALs) for Marine Applications.

By Ben Bryant, Marine Market Manager, Klüber Lubrication

Without a doubt, standardized test data for EALs provides the marine industry with a reliable basis for evaluating how EALs will perform in operation. Comparing the film thickness of EALs and mineral oil shows important similarities and differences in how they separate moving parts at start up and under load. That's why the road to compliance and performance, ultimately starts with rigorous testing.

Assessing Performance

OEMs and operators typically assess lubricant performance by simply comparing product specifications, by direct experience with the product or by references from other users. Following the implementation of the Vessel General Permit in December of 2013, environmentally acceptable lubricants (EALs) were introduced to the market place. With little historical reference on performance, OEMs and operators can look to standardized lubrication tests to understand the potential differences between traditional mineral oils and EALs, in addition to differences between EALs themselves.

One critical difference is film thickness – a factor that determines how well the lubricant separates moving parts at start up and under load.

Recent tests using an elastohydrodynamic lubrication (EHL) test rig show that the film thickness of naturally viscous, high-performance EALS is comparable to mineral oils – good news for marine applications that need to keep equipment lubricated under harsh conditions. But, which tests can be used to evaluate lubricant performance? When assessing lubricants, the test selected should relate to the actual operating conditions of the mechanical element being lubricated. Thrusters and stern tubes are two marine applications where EALs commonly replace mineral oil. Both applications require lubricants that exhibit:

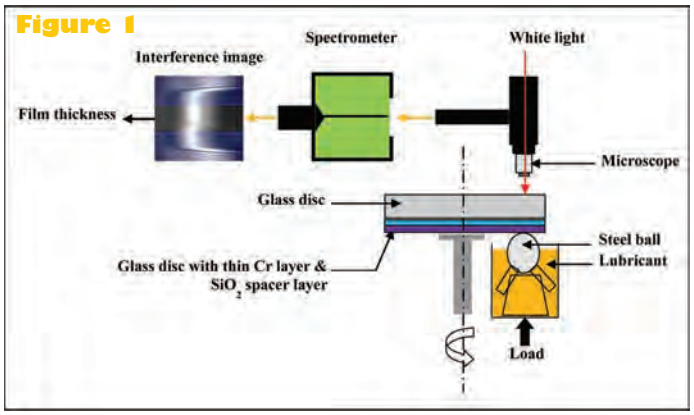
- *Good thermal and oxidative stability*
- *Resistance to hydrolysis*
- *Good viscosity to temperature behavior (viscosity index)*
- *Good antiwear and/or extreme pressure protection*
- *Compatibility with the types of elastomers used for seals, hoses, and o-rings.*

In a recent application in vessels with bow thrusters, an operator used the following criteria to assess EALs:

- *OEM approval (indicator of elastomer compliance and wear protection)*
- *Viscosity Index (ability to maintain viscosity over the operating temperature range)*
- *Dry TOST measure for oxidative stability (indicator of long lubricant life)*
- *Iodine number (indicator of whether the oil is fully saturated. Fully saturated esters resist oxidation and hydrolysis better than non-fully saturated esters.)*

Another operator recently added to the OEM approval by employing a test for water separability to indicate how effectively water can be filtered out of the oil and thus maintain the lubricant's original performance characteristics. Klüber also focuses on two additional performance areas relevant to stern tube and thruster applications: shear stability and fluid film formation.

First, ***shear stability*** is the ability of a lubricant to maintain its viscosity under pressure and shearing. It is tested using Viscosity Shear Stability Test CEC L-45-A-99. Results of these tests indicate that lubricants that use viscosity modifiers to raise viscosity and improve their viscosity index can break down over time due to mechanical stress, which reduces viscosity and therefore component protection. Lubricants that use inherently viscous base oils provide better



protection (see *MarineNews*, June 2015 edition, page 26).

Fluid film formation affects the ability of a lubricant to create a separation between moving components during start up and under load. Some EALs are reported to show significant loss of viscosity under harsh conditions, either temporarily or permanently. In these cases, the effective viscosity and hydrodynamic film thickness may be inadequate for complete separation of contacts, which may result in early wear and surface damage.

Fluid film formation test procedures

Studies of film-forming behavior of EALs are done by measuring film thickness in a rolling point contact formed between a steel ball and a glass disc in an EHL test rig (Figure 1). The rig utilizes optical interferometry principles. A reflective steel ball is immersed in the test lubricant and loaded against a rotating glass disc with a semi-reflective coating. Optical interferometry is used together with a spectrometer to measure the mean film thickness over the central region of the circular contact. Film thickness can be measured at varying speed stages and at varying temperatures.

In Figure 2, the relative film thickness and load carrying capacity of one mineral oil and three EALs at high speed that ensures fluid film condition are presented. The normalized film thickness shown is the ratio of film thickness of lubricant X to film thickness of EAL 1. As shown in Figure 2, mineral oil has the highest factor due to thick film formation and high pressure-viscosity coefficient followed, in order, by EAL 1, EAL 2 and EAL 3. It is important to note that despite all EALs having similar ISO VG grade (100 cSt at 40°C), they exhibit different film thicknesses. In particular, EAL 1 forms 37% and 50% thicker film than the EALs 2 and 3, respectively.

Next, by replacing the glass disk with a steel disk, the testing of friction at different speeds can be measured and related to the ability to quickly form a fluid film at startup. Stribeck curves, which indicate the three lubrication regimes – boundary, mixed and fluid film, are presented in Figure 3 for the four oils tested. The vertical lines in the figure indicate the speed at which transition from mixed to fluid film occurred.

As shown in Figure 3, the reference mineral oil and EAL 1 achieved this transition at a lower speed, followed, in order, by EALs 2 and 3. In simple terms, EAL 1 behaves like the mineral oil reference while EALs 2 and 3 achieve full fluid film at a higher speed, thus increasing the time the components are exposed to higher levels of friction. At all contact pressures investigated in this study, EALs 2 and 3 needed almost double the speed of EAL 1 to achieve the fluid film region. These results agree with the film thickness measurements and shear stability measurements. In all three tests, the EALs that employ viscosity modifiers showed either a temporary or permanent loss of viscosity under test conditions.

Testing provides insights into actual EAL performance

For OEMs, testing has led to a better understanding of the key performance data needed to assess EALs and, ultimately, to gain OEM approval for their use. For end users, OEM approvals provide a good starting point for decision making, while analysis of lubricant test data helps to ensure operational and financial goals are achieved.

Lubricants are developed with an end use in mind. The ingredients and the manufacturing processes are selected to provide a lubricant that best meets the needs of the application at a comparatively good value. When comparing lubricants, vessel operators and OEMs can inform their purchasing decisions with tests that are specific to the requirements of the application and the specific lubricants being evaluated. For thrusters and stern tubes, tests for film forming and load carrying capacity show that different performance levels can be inferred despite lubricants having the same viscosity grade. Vessel operators will benefit from understanding those differences when choosing EALs for marine equipment requiring adequate shear stability and film formation to maintain proper operation over the long haul.

Figure 2

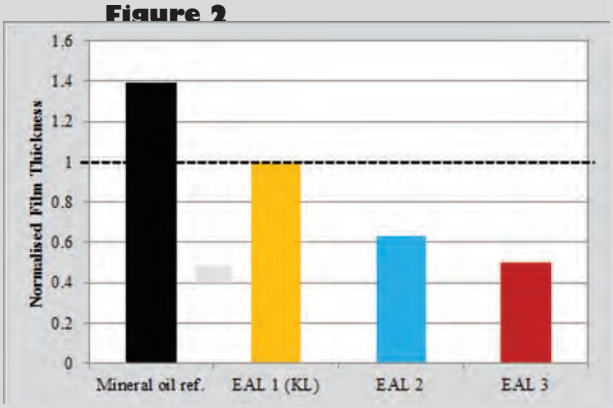
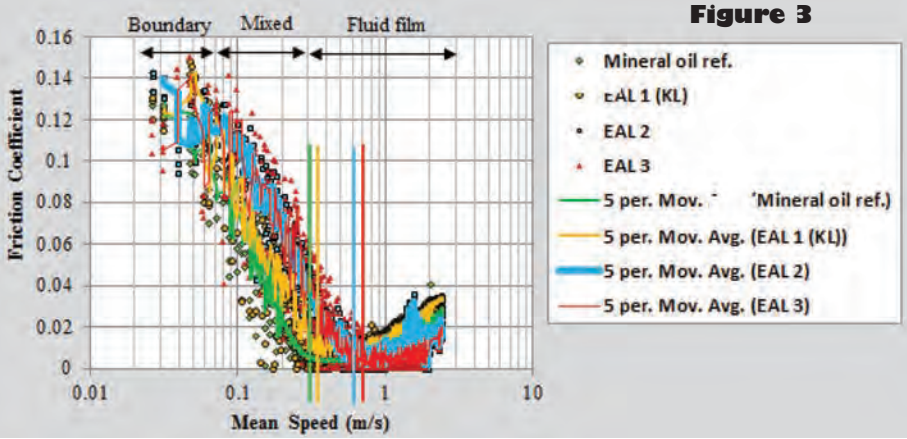


Figure 3



Lake Assault Delivers Fireboat to Conroe FD

Lake Assault Boats has placed into service a 28-foot fireboat with the City of Conroe Fire Department in Conroe, Texas. The craft was delivered in mid-May. The Lake Assault modified V-hull design for Lake Conroe features a landing craft style configuration with a hydraulically operated bow door that enables faster and more efficient rescue operations. The boat is equipped with a T-top-style cabin (with a lockable rollup back wall for added security), twin 250-hp Honda engines, an Optimus 360 joystick control system, a 500 gpm pump, Garmin radar and sonar with SideVu and DownVu, and a forward looking infrared (FLIR) system. Initial pre-production meetings were held in Conroe. Subsequently, the craft was engineered and manufactured at Lake Assault's facilities on the shores of Lake Superior. Prior to going into service, the company provided three days of on-the-water training.

Lake Assault Fireboat at a glance …

Max Load: 4000 lb.	Length: 28'	Steering: Seastar Optimus 360 Joystick
Fire pump: 500 GPM	Beam: 9' 6"	RubRail: 3" Duramax D shaped
Trim Tabs: Volvo QL 450	Max Draft: 24"	Engines: Twin Honda 250 HP outboards

Keel-laying for 10 Damen Stan Tugs at GLS

In August, a keel-laying ceremony was held at Great Lakes Shipyard in Cleveland, Ohio for 10 Damen Stan Tugs 1907 ICE. The vessels will be Ice Class and operated by the yard's affiliate company, The Great Lakes Towing Company, replacing existing tonnage. These will be the first tugs to be designed and built to comply with the new Subchapter M Coast Guard regulations. Under the license, Great Lakes Shipyard will receive full construction, design and engineering support from Damen. The ten 1907 tugs will be the first in the USA to be designed and built to comply with the US Coast Guard Subchapter M regulations under ABS classification. These came into effect in June this year and set new standards of seaworthiness for the towage industry and also establish new rules for safety management, including protocols and inspection requirements. In addition to the Ice Class specification, they will be treated with special, high endurance paint capable of withstanding the abrasion that comes with moving through ice.

Gladding Hearn Delivers Incat Ferry to Hyline Cruises

The Grey Lady IV, the fourth catamaran ferry designed by Incat Crowther, has been built and delivered by Gladding Hearn for Hyline Cruises of Hyannis, Massachusetts. The 47 meter catamaran is the largest in the fleet with additional passenger capacity, an increased luggage space and a VIP lounge. The capacity increase was at odds with docking constraints, which enforced upper limits on both the length and beam of the vessel. In the face of these challenges, Incat Crowther proposed moving the wheelhouse to a third deck, freeing up the front end of the second deck for VIP passengers. Balancing the extra deck's weight with increased capacity and amenity of the passenger spaces, Incat Crowther were able to propose a design that met performance and revenue requirements. The VIP cabin has a superb forward facing view which is the only such cabin on a fast ferry serving the route. Grey Lady IV is powered by a quartet of Cummins QSK60-M main engines. With a rating of 1641kW each, they were selected to be run at a modest engine speeds in day to day running, with reduced wear and tear and increased time between overhauls. The rating allows the vessel to maintain its service schedule on just three engines.

Vard Marine Design for New USCG OPC

Vard Holdings Limited announced that a design developed by its subsidiary Vard Marine has been selected for the US Coast Guard's new Offshore Patrol Cutter (OPC) program. Chosen to build that design was Eastern Shipbuilding Group and its team partners for the detailed design and construction phase for the US Coast Guard's Offshore Patrol Cutter (OPC) program. The OPC design will use proven methods to meet or exceed reliability requirements, while employing new technologies and innovative solutions to address the Coast Guard's stringent and demanding mission objectives.

GLDD Launches Barge Component of its ATB Hopper Dredge

Great Lakes Dredge & Dock Corporation, a U.S. dredging services provider and a major provider of environmental and remediation services, announced today the successful launch of the *Ellis Island*, the barge component of its Articulated Tug & Barge (ATB) hopper dredge currently under construction. The launch occurred on September 30, 2016 at Eastern Shipbuilding's shipyard in Allanton, Florida. After two years of construction and hundreds of thousands of man hours, the launch marks a significant milestone in the construction progress of the vessel. The Ellis Island is 433 feet long and 92 feet wide with a hopper volume of 15,000 cubic yards. The vessel's two 36-inch diameter drag arms are capable of mining sand from the ocean floor 122 feet below the water's surface. The tug portion of the vessel, the *Douglas Mackie*, is expected to launch

later this year. The shipyard has informed the Company that it anticipates sea trials on the ATB vessel in March, and GLDD expects dredging operations to commence in the second quarter. With the combination of the optimized tug and barge hull design and increased haul capacity the ATB Hopper Dredge is expected to provide ship-like productivity and efficiency at the lower operating cost of an ATB.

Vane Brothers Puts Tugboat Baltimore into Service

Baltimore, MD-headquartered Vane Brothers has taken delivery of the tugboat Baltimore. The Baltimore is the third of eight vessels in Vane's Elizabeth Anne Class of 4,200-horsepower tugboats contracted through St. Johns Ship Building in Palatka, Florida. The fourth in the series, the Delaware, is scheduled for completion this fall. The Baltimore is the 30th vessel completed for Vane Brothers. Designed by Frank Basile, P.E., of Entech Designs, LLC, Vane Brothers' Elizabeth Anne Class tugboats are close cousins of the company's Basile-designed Patapsco Class tugboats, 15 of which were produced between 2004 and 2009. Measuring 100 feet long and 34 feet wide, with a hull depth of 15 feet, the model-bow Baltimore utilizes two Caterpillar 3516 Tier 3 engines, each generating 2,100 horsepower at 1,600 rpm. Two John Deere PowerTech 4045, 99 kW generators deliver service power to the boat; a third John Deere 4045 teamed with an Allison transmission drives the chain-driven INTERCON DD200 towing winch. The Baltimore features the latest in solid-state, Simrad electronics and handsomely appointed mahogany upper and lower pilothouses, as well as spacious accommodations for up to seven crewmembers. Primarily tasked with towing petroleum barges engaged in the North Atlantic coastwise trade, the Baltimore has joined the Hudson and the Elizabeth Anne among 20 vessels that are part of Vane's Delta Fleet, based in Philadelphia, Pennsylvania.

Handy Size, Ample Power, Ship Handler

Courtesy of Haig-Brown/Cummins, GA courtesy of A.G. McIlwain Ltd.

"Steady, smooth, powerful, highly maneuverable," these were comments by mariners, who were onboard for sea trials of Jones Marine Group's new tractor tug David J. The new boat was put through its paces in fine form. The boat is an A.G. McIlwain-designed 53 by 26.5-foot handy-sized tractor tug with a hefty14-foot moulded depth. The beam offers remarkable stability while the length allows the tug to work in tight spaces. Built by Sylte Marine of Maple Ridge for Jones Marine Group Ltd, of Chemainus, it is, as company president Daryl R. Jones explains, "A new breed for us, so we have brought in Don Westmoreland, a retired captain who has operated Z-drives in the port of Vancouver. He will be training my crew." Jones has built a successful company with a fleet of nine boats. Until now, all were conventional drives. One, the Helen J, has the same Cummins KTA38 engines as the David J, but with an 850 HP rating and conventional drives. It is also a McIlwain/Sylte tug. The Jones firm handles all the ship docking for Chemainus, Crofton and Nanaimo on Vancouver Island. The compact tug packs significant power with a pair of IMO Tier II compliant, Cummins KTA38-M2 mains each delivering 1200 HP at 1800 RPM through carbon-fiber shafts to a pair of Rolls-Royce Marine US155 P14 Z-drives, with fixed props in nozzles. The soft mounted engines and carbon-fiber shafts serve to isolate vibrations and noise from the tug's hull. The wheelhouse if further isolated on soft mount pedestals to provide improved crew comfort. The controls are mounted on two consoles port and starboard of the operator's central position. An angled hatch set forward between the pedestals provides access to the large forecastle. The starboard console includes the winch controls so that the mate/deckhand, in a two-person operation, can step into the wheelhouse from the foredeck and work the winch while in direct contact with the captain. An additional set of controls is mounted near the hawser winch that was supplied by Vancouver's Burrard Iron Works. Like the rest of the Jones Marine fleet the David J will operate as a two-person day boat. A pair of crew boats, including a big RIB that cruises at 30 knots and can do 45 knots, provide quick crew changes when the boats are working.

Harvey Gulf Receives ABS and USCG Approvals

Harvey Gulf International Marine (HGIM) announced that it has received both ABS and USCG approvals on a 4,000 cubic meter LNG articulating tug barge (ATB) construction drawing package. The design accounts for ship-to-ship transfer and shore side resupply transfers. Working closely with its design partner Waller Marine, and in conjunction with ABS and USCG HGIM has developed the design package ahead of construction, thereby minimizing the potential for delays and significant cost impacts to the project during construction. The ATB has an approved design basis and it's design meets all domestic and International requirement of a gas carrier, including the existing regulatory requirements defined in 46 CFR Subchapter D, 46 CFR Subchapter 0, the International Code for the Design and Construction of Ships Carrying Liquefied Gases in Bulk, 2016 edition (IGC Code), and applicable American Bureau of Shipping (ABS) Steel Barge Rules: Part 5 Chapter 2 Section 5 Liquefied Gas Tank Barges (as modified per 2016 IGC Code), and ABS Steel Vessel Rules Part 5C Chapter 8 Sections 1-19 (as modified per 2016 IGC Code and referenced within the ABS Barge Rules). Working together with Wärtsilä, the cargo systems integrator on the complete design, supply, and integration onboard the vessel, assures both functionality and confidence in the operability of the system. Another key design component of the design is the use of a sub-cooler for boil off gas (BOG) management, the teamwork in conjunction with Air Liquide using their Turbo-Brayton Technology (TB 350) as a means to condition the cargo as necessary to manage BOG.

At a Glance:

Tug Length: 128'	Barge: LOA 324'	ABS +A-1 Towing Vessel, + AMS, ACP, SOLAS, UWILD, OCEANS
Tug Beam: 42'	Barge: Beam 64'	ABS +A-1 Liquefied Gas Tank Barge, ITB, UWILD, RELIQ, OCEANS
Tug Depth: 19'	Barge: Depth 32'6"	Horse Power 5
USCG Sub-Chapter M	Barge: Max Draft 16'	Cargo Capacity 3

Inland Marine Service Appoints New Leadership Positions


Garza


Hammond


Howell


King


Luna

Four professionals have recently joined Inland Marine Service (IMS). The announcement was made by **Dave Hammond**, President of Inland Marine Service. **Kristina Luna** has joined IMS as HR Manager. Luna has 20 years of experience in employee management, human resources, event planning, marketing, and sales. She was most recently Human Resource Specialist for Toyota, where she was responsible for HR issues in nine separate manufacturing facilities. **Moses Garza** will serve as Tankerman Supervisor. Garza will be based out of the Houston office and will be responsible for oversight of the tankering division, regulating safety and compliance. Garza was most recently Barge Operations Manager/Tankerman Service for Martin Marine. Other companies he has worked at include Solute Chocolate Bayou, BASF-Freeport Texas, and Kirby Inland Marine. **Caleb King** comes on board as manager SHEQ/Compliance Director. King will be responsible for safety, health, and environmental quality at IMS. King was most recently Senior Compliance Consultant for Witt O'Brien's where he was consulted with various Coast Guard, OSHA, and EPA regulatory aspects. **Brian Howell** will serve as Assistant Port Engineer and will be responsible for everyday maintenance of all vessels. Howell has 11 years of experience including 6 years as an ACL Engineer.


Kearney


Schneider


Arison

Port of New Orleans Elects Kearney Chairman

The Board of Commissioners of the Port of New Orleans has elected **Michael W. Kearney** chairman. Kearney represents Orleans Parish and joined the Board in December of 2012. He succeeds William Bergeron, whose term as chairman expired this month. Bergeron will continue to serve as a commissioner. In addition, the Board elected Robert R. Barkerding vice chairman and Mr. Laney T. Chouest secretary-treasurer.

Schneider Makes Her Mark in the Marine Industry

Mercury Marine has long partnered with the Marine Mechanics Institute in Orlando to produce some of industry's finest marine mechanics. One of those mechanics, **Kaitlyn Schneider**, has been thriving for the past two years at Lakeside Marina in Oshkosh, WI. While many of her friends took dance and gymnastics classes, Schneider was drawn to the garage where she worked on cars and boats with her dad. After graduating from MMI, Schneider moved back home to Wisconsin and went looking for her first job. Her resume was turned down at various marinas in the area, but Lakeside took a chance on the rookie mechanic and after two-years, both Schneider and the dealer are thriving. Bravo Zulu from *MarineNews*.

Goldstein Named Chairman at FCCA Executive Committee

The FCCA announced that **Adam Goldstein**, President and COO of Royal Caribbean Cruises, will become Chairman of the FCCA, effective January 1, 2017. **Micky Arison**, Chairman of Carnival Corporation & plc and current FCCA Chairman, broke the news during FCCA's annual CEO Roundtable, where both the current and future Chairman shared insight into the industry's and their lines' inner workings while addressing questions tailored to the region and increasing the audience's cruise tourism business.

Coast Guard Foundation Honors Bouchard CEO Morton S. Bouchard III

Bouchard Transportation's President & CEO **Morton S. Bouchard III** was honored at the Coast Guard Foundation 36th Annual Salute to the United States Coast Guard National Awards Dinner. Mr. Bouchard has been a supporter of the Coast Guard Foundation since 1985, helping to grow various programs including, education and the Fallen Heroes Scholarship program, support for USCG members both ashore and at sea, and relief for USCG members and their families during times of critical injury, or worse. Bouchard was introduced by Coast Guard Foundation Chairman and ABS Director, **Will Jenkins**, accepting the honor on behalf of Bouchard's employees.

Stubkjær Presented With 2016 Connie Award in Long Beach

Knud Stubkjær, CEO of SSA, received the 2016 Connie Award presented by

Goldstein

Bouchard (L) & Jenkins (R)

Stubkjær receiving Connie Award

the Containerization & Intermodal Institute(CII) in Long Beach, CA, on September 20. In addition, CII presented nearly $20,000 in scholarships for students pursuing careers in logistics. Stubkjaer was honored with the prestigious award for significant contributions to containerization and world trade and transportation industry, as well as for a pioneering spirit in his career and at the companies at which he worked and for a positive influence on the individuals up and coming in the industry. The Connie Award luncheon, to be held in Newark, NJ on December 5 will honor **Carol Lambos**, a maritime lawyer, and will give a Lifetime Achievement Award to the Sandy Hook Pilots.

Chris-Craft Appoints Short as Regional Sales Director

Chris-Craft announced that **Justin Short** has joined the team as Regional Sales Director. Having spent the last 10 years with the Yamaha Marine Group, Justin comes to Chris-Craft with an extensive marine industry background in both sales and operations management. At Yamaha, Justin served as a District Manager in the Mid-Atlantic was most recently the Supervisor of Operations and Supply Chain Management.

NTSB - Safer Seas Digest 2015

The National Transportation Safety Board (NTSB) issued its Safer Seas Digest 2015, examining 29 major marine casualty investigations closed by the


Short


Wiernicki


Fireman

agency during the year and the lessons learned from each. Access the report at: *www.ntsb.gov/investigations/AccidentReports/Reports/SPC1601.pdf*

ABS Chairman Delivers Keynote at Coast Guard Foundation Awards Dinner

ABS Chairman, President and CEO **Christopher J. Wiernicki** addressed the Coast Guard Foundation at the 2016 Pacific Area Awards Dinner on 23 September. Wiernicki confirmed a commitment on the part of ABS to continue working with the USCG to help the maritime industry develop cyber resilience and to move cybersecurity and cybersafety forward, calling it a "shared responsibility."

ABS to Direct DHS Cybersecurity Project

ABS has been awarded a research contract by the Maritime Security Center (MSC) – a U.S. Department of Homeland Security (DHS) Center of Excellence, led by Stevens Institute of Technology – for a two-year research program focused on defining the future of cybersecurity for the maritime industry. Study participants, which include DHS and the Department of Defense, will focus on key areas that will help define future research and guidance. "Cybersecurity is one of the most pressing and evolving technical and operational challenges impacting the maritime industry today," said ABS Chief Technology Officer **Howard Fireman**, continuing, "Our goal with this research program is to leverage the skills and expertise of leading thinkers to build a framework the industry can follow to contend with cyber challenges."

Foss Receives 2016 AMS Award

American Maritime Safety (AMS) recognized Foss Maritime's efforts in building and maintaining a strong culture of safety by awarding the company the AMS Award for the implementation and management of zero-tolerance drug and alcohol policy. Foss was presented with the award at the 2016 Annual Membership Meeting and Safety Awards Luncheon on October 13. "For decades Foss has built a strong reputation of being always ready," said Foss CEO Paul Stevens in a recent video to employees about the policy. He added, "In more recent years we've added always safe. One way that we deliver on this commitment is by upholding a drug and alcohol policy that keeps employees and equipment safe and ready for whenever we report to work." American Maritime Safety (AMS) is a non-profit maritime


Mourning the loss of
Aaron Hendry, Hendry Marine President & CEO

Aaron W. Hendry, husband, father and grandfather, as well as a noted Florida business leader, has died at the age of 80. Aaron passed away peacefully after a battle with pancreatic cancer. Aaron leaves behind his wife Barbara, six children, and three grandchildren. Aaron's father, Captain F.M. Hendry, started the family business more than 90 years ago. Over time, the company grew dramatically as the dredging fleet expanded and additional maritime services were performed to meet the demands of infrastructure. A fourth-generation Floridian, Aaron started his career at Hendry Corporation as a teenager in 1952 as a deckhand, working his way up through the ranks as a boatman, foreman, mate and leverman. Knowing education was essential to the success of the family business, Aaron earned a Civil Engineering degree from Georgia Tech, an MBA from the University of Tampa, and also graduated from the Harvard Business School's prestigious business owners program. As a result of Aaron's dedication – and the dedication of his employees – he leaves behind businesses that are among the oldest and most recognizable in the Tampa Bay area: Hendry Marine Industries, a holding company for Hendry Corporation, celebrating its 90th anniversary this year; Gulf Marine Repair, a leading ship repair company in the Southeast; Universal Environmental Solutions, providing marine environmental services; and Port Hendry Terminals, a stevedoring and terminal operations company.


Stevens


Banister


Boles

trade association that facilitates the maritime industry's compliance with international shipping protocols and U.S. Coast Guard regulations.

Tug and Barge Solutions Teams up with Helm CONNECT

Tug and Barge Solutions (TBS) announced its new working arrangement with Helm Operations. The arrangement allows TBS to deliver its safety and compliance management program through Helm CONNECT for customers that elect to use an electronic system to manage their safety and compliance, particularly for Subchapter M. This integration of the two product lines allows for towing operators preparing for Subchapter M to experience a smoother Towing Safety Management System (TSMS) implementation process with TBS, in addition to leveraging Helm CONNECT to provide cost savings related to Sub M's record-keeping requirements. **Patrick Boles**, Managing Director of Tug and Barge Solutions, said, "We chose to work with Helm because its software is the best fit for our customers," said Boles. **Rodger Banister**, VP of Marketing for Helm Operations echoed Boles's sentiments, "It's great to have Tug and Barge Solutions using Helm CONNECT to help its towing vessel customers who need to comply with Subchapter M. The incorrect impression many smaller operators have is that they're too small to afford software, which just isn't the case with Helm CONNECT," said Banister.

Signal Mate's Intelligent LED Navigation Lights

Signal Mate Certified UL1104 LED navigation lights comply with Sub Chapter M and IMO Resolution MSC 253 (83). Signal Mate Monitors LED intensity to ensure COLREGs nautical mile visibility requirement is maintained for a lifespan of 50,000 hours before replacement as other manufacturers specify. Intelligent light communicates with switch panel to provide light's status and increase brightness during restricted visibility.

www.SignalMate/commercial

Louisiana Cat is Region's first Gold Level Dealer

Louisiana Cat is the first Caterpillar Dealership in the Americas to reach all requirements for training and technical sales and support to become a Gold level dealer for the full line of Cat Propulsion equipment. Expansion of the entire marine propulsion system package maximizes uptime, while reducing operating costs for offshore platform service and towing vessels, inland vessels, and governmental vessels.

www.louisianacat.com/new/power-systems/

Sherwin-Williams High-Solids, High-Gloss Polysiloxane Coating

Delivering long-term asset protection in the most aggressive service conditions, Sherwin-Williams Protective & Marine Coatings' Sher-Loxane 800 is a versatile, high-performance polysiloxane coating that offers enhanced durability and aesthetics, as well as cost savings. Sher-Loxane 800 provides a high-gloss finish to bridges, water tanks, structural steel, and many other steel surfaces in just two coats, reducing total operational costs for a better bottom line.

www.protective.sherwin-williams.com

New Website for Advanced Polymer Coatings

Advanced Polymer Coatings is rolling out a new re-design of its corporate website to better reflect the capabilities of its leading high performance coatings brands, MarineLine and ChemLine. MarineLine is a cargo tank coating protecting chemical and product tankers transporting a wide range of chemicals. The newly designed web format offers viewer-friendly features, delivering optimal viewing experience, whether seen on desktop, laptop, tablet/pad, or smartphone.

www.adv-polymer.com

Wiper Maintenance Keeps the View Unobstructed

Helmsmen need clear, unobstructed views ahead. Preventive maintenance of the wiper blades and mechanism helps avoid annoying streaking, skipping and squeaking. Schmitt & Ongaro offers simple tips for keeping this important equipment working in top form. Schmitt & Ongaro is known for innovative, high-quality marine equipment. It builds stainless steel and polyurethane steering wheels, wiper systems, horns and other parts.

www.schmittongaromarine.com

MOB Device Provides Immediate Alert for Fast Response

Mariners know the life-threatening hazards of falling overboard, but may not consider how critical the recovery window is, especially with a moving vessel. Compact and easily carried on a PFD, the ALERT2 Man-Overboard Alarm System from Emerald Marine Products immediately sets off a piercing audible alarm in the wheelhouse upon immersion, and can be wired to stop an engine and/or set waypoints on chartplotters.

www.emeraldmarineproducts.com

Miller Electric Showcases Weld Quality, Productivity and Safety

Miller Electric's product innovations include ArcReach multiprocess welding systems which allow welding operators to change welding parameters at the weld joint without the use of control cables, helping to improve productivity for stick, TIG, MIG and flux-cored welding by eliminating unnecessary trips to the power source and providing greater arc-on time. This encourages best-practice while also improving safety by reducing tripping hazards and operator fatigue.

www.MillerWelds.com

Sennebogen Worry-Free Electric-Drive Material Handlers

Sennebogen purpose-built material handlers are an indispensable part of bulk handling. The crawler-mounted SENNEBOGEN 830 electric-drive has a robust boom range of 55'8", allowing reach to the farthest edges of barges. The electric unit is emission-free, and there is zero chance of nightmarish fuel leaks. The electric 830 delivers fuel savings, a 50% reduction in operating costs, maintenance intervals are longer, and hydraulic components last longer.

www.sennebogen-na.com

Kabola Keeps Wind Farm Vessel Crews Warm

Kabola has installed its 136,000 Btu, KB 75 series hydronic heating systems aboard Atlantic Pioneer, a wind farm support vessel. The vessel's heating system had to be robust, reliable, light weight, low emission and rated for continuous duty. The KB series rely on a super high efficiency burner, with low flu gas temperatures, production of soot, nitrogen oxides and other harmful emissions.

www.marinetec-us.com

Honda Marine Debuts New BF4, BF5 and BF6 4-stroke Engines

Portability, performance and reliability are the hallmarks of Honda Marine's redesigned portable engine models, the BF4, BF5 and BF6 4-stroke outboards. Packed with the latest technology, the 127cc 4-stroke, single cylinder engines offer the choice of four horsepower (BF4), five horsepower (BF5) or six horsepower (BF6). All three engines are available with either a short (15 inch/38 cm) or long (20 inch/51 cm) shaft.

www.marine.honda.com

Beijer Electronics X2 Marine Panel Family

Beijer Electronics' X2 marine family of high performance panels are available in 7 and 15". The panels are UL and CE approved, certified by DNV-GL, ABS, LR, and KR, and have optional hi-bright displays and integrated CODESYS control. The X2 marine family X2 marine panels offer user-friendly, reliable operation offshore, on ships and in other maritime applications.

www.beijerelectronics.com

MagnaShear Hazardous Duty Brakes

New MagnaShear hazardous duty brakes from Force Control Industries employ oil shear technology to provide longer service life with virtually no maintenance or adjustment. Now meeting Class I and Class II Div 2 specifications, MagnaShear motor brakes can be sized to the correct torque independent of the motor frame size or horsepower, with "quick mount" features for drive motors in NEMA frame sizes 56 to 405.

www.forcecontrol.com

PJ Valves launches PJ Piping in Houston

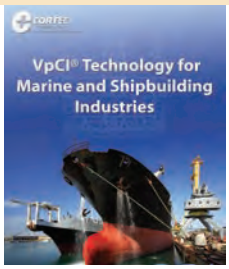
PJ Valves (PJV), the specialist manufacturer and supplier of valves to the global energy industry, has launched a new piping business, PJ Piping (PJP). Located in Houston, TX, the company – operating as part of the PJ Group – will supply specialist pipe fittings, flanges and other piping components to the oil and gas, petrochemical and desalination sectors.

www.pjvalves.com

Rule LoPro 900 Series Bilge Pumps

The LoPro 900 Series Bilge Pump from Rule, a Xylem brand, provides intense pumping power and can pump up to 900 GPH at 12 volts for compact spaces. The LP900S automatic and LP900D standard have four discharge port options can be mounted horizontally or vertically. The discharge body swivels a full 180 degrees for easy installation. Tricuspid check valves are included to help prevent backflow.

www.xylemflowcontrol.com



Cortec VpCI Technology for Marine and Shipbuilding

Cortec's VpCI inhibitors are recommended for protection of inaccessible areas of marine structures such as keels, rudders, and rubbing strips. After contact with the metal surface, vapor condenses into air and forms a thin monomolecular film that protects the metal. Protective layer re-heals and self-replenishes through further condensation of the vapor. VpCI provides complete product protection during storage as well as shipments.

www.cortecvci.com

Webasto's Powerful Chillers Keep Things Cool

Webasto Thermo & Comfort North America's BlueCool P-Series Chillers consist of up to 25 models with different cooling capacities ranging from 30,000-572,000 BTU/h, using up to four compressors. This offers large flexibility in functionality, leading to a high level of customization. Ideal for mid-size cruisers, megayachts and commercial vessels, a new electronic box simplifies access to components, and offers advanced circuit protection.

www.webasto-marine.com

Seatools Intelligent Active Heave Compensation Module

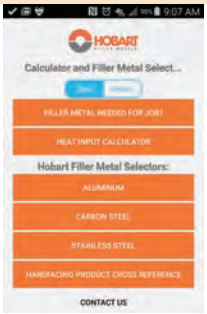
Seatools' intelligent active heave compensation module, HeaveMate, is an easy-to-integrate system for both new as well as existing offshore equipment such as winches, cranes, and LARS systems. HeaveMate can be delivered either as an OEM package with the essentials for heave compensation (black box controller with sensors and software) or as part of a complete turnkey system, including mechanical and hydraulic hardware.

www.seatools.com

Weather Closures Upgraded for Easier Fitting

Delta "T" Systems has made an important upgrade to its line of efficient, rugged-duty marine Weather Closures. Electric actuators are now fitted inside the box frames. This new design not only protects the actuators from damage, it also makes the Weather Closures easier to install. They are custom manufactured to fit any size or shape opening.

www.deltatsystems.com



Hobart Filler Metal Selector and Calculator App

The Hobart Filler Metal Selector and Calculator for Android devices can be had via a free download at the Google Play Store. The app was previously available only for iPhone and iPad in the App Store. Both versions of the app provide a quick reference with multiple functions to help users calculate the amount and type of filler metal necessary to complete a job.

www.HobartBrothers.com

High Speed Cables for Signal Integrity

TE Connectivity's Raychem high-speed data transmission cables for IEEE 1394 applications are designed for use with commercial marine systems. The ruggedized cable helps block out excess noise in harsh environments to enable dependable signal integrity in extreme conditions. Offering greater flexibility and a tight bend radius for easy routing through small spaces, the cable is available in four-conductor configurations ideal for propulsion control applications.

www.TE.com

Harrington Hoists Spark Resistant Manual Hoists and Trolleys

Harrington Hoists' RCB Ex Certified Spark Resistant hand chain hoists and RPT / RGT manual push and geared trolleys are manufactured to reduce risk of sparks produced by impact or friction in heavy-duty applications. Hoists and trolleys are Ex certified to level Ex II 2G c IIB T4 and Ex II 2D c 135°C and are in compliance with the ATEX Directive 2014/34/EU. The line is available in ½, 1, 2 and 3 Ton capacities.

www.HarringtonHoists.com

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Statement of Ownership, Management, and Circulation (Requester Publications Only)

1. Publication Title	2. Publication Number	3. Filing Date
Marine News	0 1 3 - 9 5 2	September 28 2016
4. Issue Frequency: Monthly	5. Number of Issues Published Annually: 12	6. Annual Subscription Price (if any): None

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4®): Maritime Activity Reports, Inc. 118 East 25th. St. New York, NY 10010 — Contact Person: Dale L. Barnett; Telephone (Include area code): 212-477-6700

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer): Maritime Activity Reports, Inc. 118 East 25th. St. New York, NY 10010

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

Publisher (Name and complete mailing address): John C. O'Malley, Maritime Activity Reports, Inc. 118 East 25th. St. New York, NY 10010

Editor (Name and complete mailing address): Greg Trauthwein, Maritime Activity Reports, Inc. 118 East 25th. St. New York, NY 10010

Managing Editor (Name and complete mailing address):

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

Full Name	Complete Mailing Address
John C. O'Malley	Maritime Activity Reports, Inc. 118 East 25th. St. New York, NY 10010

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☒ None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)
The purpose, function, and nonprofit status of the organization and the exempt status for federal income tax purposes:
☒ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form **3526-R**, September 2007 (Page 1 of 3 (Instructions Page 3)) PSN: 7530-09-000-8855 **PRIVACY NOTICE:** See our privacy policy on www.usps.com

13. Publication Title: Marine News	14. Issue Date for Circulation Data Below: September 2016	
15. Extent and Nature of Circulation: Requester	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	22,983	23,109
b. Legitimate Paid and/or Requested Distribution (By Mail and Outside the Mail) (1) Outside County Paid/Requested Mail Subscriptions stated on PS Form 3541 (Include direct written request from recipient, telemarketing and Internet request from recipient, paid subscriptions including nominal rate subscriptions, employer requests, advertiser's proof copies, and exchange copies.)	21,540	21,208
(2) In-County Paid/Requested Mail Subscriptions stated on PS Form 3541. (Include direct written request from recipient, telemarketing and Internet requests from recipient, paid subscriptions including nominal rate subscriptions, employer requests, advertiser's proof copies, and exchange copies.)	0	0
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Paid or Requested Distribution Outside USPS®	0	0
(4) Requested Copies Distributed by Other Mail Classes Through the USPS (e.g. First-Class Mail®)	554	601
c. Total Paid and/or Requested Circulation (Sum of 15b (1), (2), (3), and (4)) ▶	22,094	21,809
d. Nonrequested Distribution (By Mail and Outside the Mail) (1) Outside County Nonrequested Copies Stated on PS Form 3541 (Include Sample copies, Requests Over 3 years old, Requests induced by a Premium, Bulk Sales and Requests including Association Requests, Names obtained from Business Directories, Lists, and other sources)	0	0
(2) In-County Nonrequested Copies Stated on PS Form 3541 (Include Sample copies, Requests Over 3 years old, Requests induced by a Premium, Bulk Sales and Requests including Association Requests, Names obtained from Business Directories, Lists, and other sources)	0	0
(3) Nonrequested Copies Distributed Through the USPS by Other Classes of Mail (e.g. First-Class Mail, Nonrequestor Copies mailed in excess of 10% Limit mailed at Standard Mail® or Package Services Rates)	238	1,100
(4) Nonrequested Copies Distributed Outside the Mail (Include Pickup Stands, Trade Shows, Showrooms and Other Sources)	296	0
e. Total Nonrequested Distribution (Sum of 15d (1), (2), (3) and (4))	534	1,100
f. Total Distribution (Sum of 15c and e) ▶	22,628	22,909
g. Copies not Distributed (See Instructions to Publishers #4, (page #3)) ▶	355	200
h. Total (Sum of 15f and g)	22,983	23,109
i. Percent Paid and/or Requested Circulation (15c divided by f times 100) ▶	97.6%	95.2

16. Publication of Statement of Ownership for a Requester Publication is required and will be printed in the November 2016 issue of this publication.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Dale L. Barnett Circulation Department — Date: Sept. 28, 2016

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

PS Form **3526-R**, September 2007 (Page 2 of 3)

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MaritimeJobs.com

where employers and job seekers connect

The Maritime Industry's Leading Employment Website. For more information contact: Jean Vertucci at vertucci@marinelink.com

EMPLOYMENT

LIFEBOAT AND DAVITS INSPECTIONTECHNICIAN
Full Time, Technical Manager
Category: Vessel Operations
Job Location: 8920 Lawndale Suite A HOUSTON, TEXAS, 77012 USA
Contact
OVERSEAS MANAGER
Email: service@extinval.com
Work Phone : +1 504-466-1662
Cell Phone : +1 281-851-2886
8920 Lawndale Suite A HOUSTON, TEXAS, 77012 United States

Skills:
Experienced in lifeboat and safety inspections
Performed annual and five yearly testing and inspections for lifeboat and Davits
Effective in developing strong working relationships with all levels of staff.
Excellent abilities to set, meet, & execute all goals efficiently.
Ability to work under pressure & execute positive out of the box solutions.

Strong work ethic, progressive thinker, and extremely organized.

EXTINVAL USA has a department dedicated to maritime safety staffed by highly qualified people. Our company is strategically located in the Ports of Houston and New Orleans, enabling us to provide services on board vessels all around the US Gulf.

Annual and five-yearly inspections, including 1.1 overload test of Lifeboats and Launching Appliances in compliance with the SOLAS Regulation, as set out in MSC.1/Cir. 1206. To perform the load test we use modern water bags placed in the lifeboat, as well as using other specific water bags to carry out the test directly from the davits.

VESSELS FOR SALE / BARGES FOR RENT

NEW PRODUCTS

Marine Marketplace

NEW PRODUCTS

Marine Marketplace

NEW PRODUCTS

PROFESSIONALS

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37	Gencorp Insurance Group	www.gencorp-ins.com	(800) 232-0582
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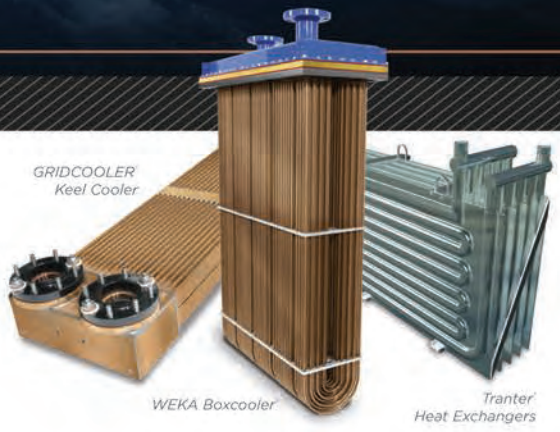

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