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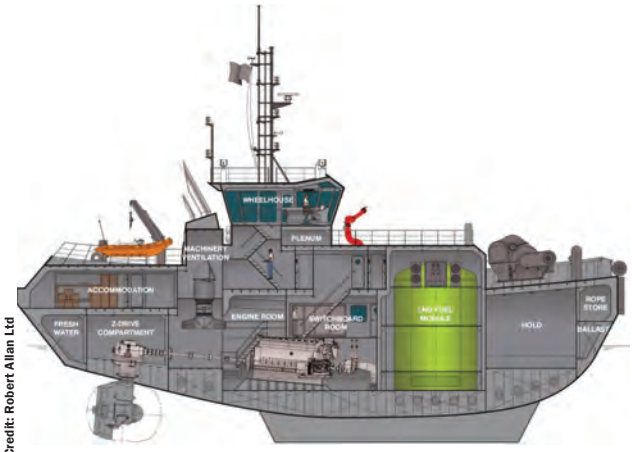

Credit: Robert Allan Ltd

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Features

ON THE COVER

Pictured on the cover is one of the new Citywide Ferry vessels being built at Horizon Shipyard in Bayou La Batre, Alabama. The contract is one of the biggest ferry deals in a generation, and a true collaboration involving Hornblower, Horizon, Incat and Metal Shark. See Story starting on page 38.

(Photo Courtesy Horizon Shipyard)


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You can put aside, just for a moment, your concerns about overcapacity, the price of oil, low freight/day rates and the looming shortage of (qualified) mariners. That's because this edition of *MarineNews* focuses tightly on emissions and the impact of marine traffic on the global environment – specifically, which fuels to use, what propulsion system gets you to the Promised Land, how to navigate the regulations and everything else. I can't think of any more pressing issue facing the marine industry – workboats in particular – in today's business climate. If environmental compliance – for a myriad of legal, ethical and business reasons – isn't at the top of your list of concerns as we head quickly for 2017, then it should be.

This month's *INSIGHTS* feature sees industry propulsion expert Robert Kunkel weighing in on all things to do with environmental compliance, vessel emissions, and the shape of things to come. To my mind, it is one of the best summaries of current conditions that I have ever seen. And, I didn't have room for all of it. Think about everything you ever wanted to know about emissions, but were afraid to ask. The answers are waiting; starting on page 10.

Also in this edition, we look back on the previous twelve months and give light to the best output of North America's shipyards and naval architects during this calendar year. They answered the bell admirably, giving substance to the collective requirements of business and shape to the visions of their operator clients. It was enjoyable process; and the effort gave light to the impressive products that they delivered. SCA President Matt Paxton – also within these pages – tells us that U.S. shipyards, this year alone, produced more than 1,000 vessels. Imagine what we can do in better times. In the pages that follow, I picked out the best of the bunch, based on the sectors they serve, the innovation inside the hull and where they might minimize impact to the environment.

It was only appropriate that I wrapped up this year's travel schedule with a flight to New Orleans, which set me up for a 500-mile meandering drive through three states and visits to two key shipyards, along the way. It was there that the scope of collaboration between soon-to-be New York City ferry operator Hornblower, Gulf Coast builders Horizon Shipbuilding and Metal Shark and boat designer Incat Crowther became apparent. The unique contract split between these two longtime builders gives each an opportunity to showcase their impressive series-build skills in a competitive environment, on an equally aggressive timeline. That story begins on page 38.

Nobody ever promised you (or me) a Rose Garden. And, many of us didn't get one in 2016. But, there were plenty of positive stories to tell, and much excitement along the way. You came to *MarineNews* – the number one ranked, fully audited and verified trade publication in this workboat genre – for those stories, and we didn't disappoint. Look for all of those metrics to continue in the New Year.

Joseph Keefe, Editor, keefe@marinelink.com

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U.S. Coast Guard's 2015 Recreational Boating Statistics

The U.S. Coast Guard's annual look at Recreational Boating Statistics thoroughly chronicles numbers and types of boats, where they are registered and takes an even closer look at casualties. It's a somber reminder as to just how dangerous it is out on the water. Conversely, and since this is a commercial marine and workboat publication, you might wonder why we give these numbers a second glance when we typically don't concentrate on the recreational markets. On the other hand, the nation's 39,500 brown water, workboat hulls of all types regularly interact with the boating public. Sometimes, it doesn't go well. Nevertheless, those waterways must be shared. This month, we ask, *"Is it getting any safer out there?"*

The answer, as it turns out, is 'Yes' and 'No.' For example, boating fatalities nationwide in 2015 totaled 626, the third-lowest number of yearly boating fatalities on record. Total injuries also decreased 2.4% from 2014 to 2015. On the other hand, deaths increased from 610 to 626, a 2.6 percent increase; and the total number of accidents increased from 4,064 to 4,158, a 2.3 percent increase. It is also true that the long term trend is one that shows the boating public is (slowly) getting safer.

The fatality rate of 5.3 deaths per 100,000 registered recreational vessels reflected a 1.9 percent increase from the previous year's rate of 5.2 deaths per 100,000 vessels. What that movement doesn't reflect is the slow, but steady decrease in both deaths (-18%) and total accidents (-9%) over the course of the past 5 years. Beyond this, the number of registered pleasure craft soared from 8.6 million in 1980 to almost 12 million in 2015; albeit with that number peaking at about 13 million in the year 2000. Nevertheless, recreational boat totals are again on the rise (0.5% increase last year alone). Hence, fewer accidents are being reported despite the explosive growth in the recreational markets.

Property damage in 2015 was a whopping $42 million and, predictably, alcohol was the leading known contributing factor in fatal boating accidents and was listed as the leading factor in 17 percent of deaths.

Operator inattention, operator inexperience, improper lookout, machinery failure and excessive speed ranked as the top five primary contributing factors in accidents. Where the cause of death was known, 76 percent of fatal boating accident victims drowned; of those drowning victims, 85 percent were not wearing a life jacket. Where boating instruction was known, 71 percent of deaths occurred on vessels where the operator had not received boating safety instruction. Hence, just as STCW training has been deemed critical in the commercial world, so, too, is proper training for pleasure boaters and too many simply do not get any. Among the most common types of vessels involved in accidents was the ever-dangerous 'personal watercraft,' something that has, over the years, spawned its own little admiralty/personal injury law cottage industry.

Regionally, California and Florida (closely followed by Minnesota, Wisconsin and Michigan) had the most registered vessels (14% of the totals between the two coastline rich states) and, not surprisingly, they also experienced the most fatalities – 16% of the nation's totals between them. But, as one of my long-suffering readers once admonished me (the last time I looked at these numbers), Florida and California both have extremely long boating seasons, unlike our Great Lakes states. Given that reality, it's possible that these warm weather states are actually safer than most.

It wasn't too long ago that former U.S. Coast Guard Commandant Thad Allen told me that the recreational small boat issue was a difficult one, primarily because – unlike the process of credentialing and training necessary to earn an automobile driver's license – most people view the right to operate a pleasure craft as a right, and not a privilege. Until that changes, the numbers of accidents, injuries and deaths emanating from this sector will continue to be unnecessarily high. The message to our commercial and professional workboat mariners is therefore clear: *Stand an alert watch at all times, especially in crowded coastal waters.*

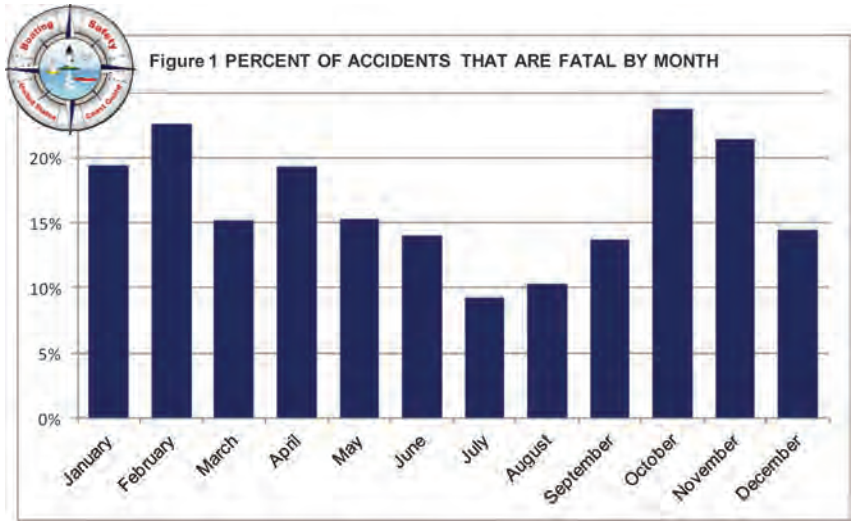

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Table 36 • RECREATIONAL VESSELS REGISTERED BY YEAR, 1980-2015

Year	Registered Vessels
1980	8,577,857
1981	8,905,097
1982	9,073,972
1983	9,165,094
1984	9,420,011
1985	9,589,483
1986	9,876,197
1987	9,963,696
1988	10,362,613
1989	10,777,370
1990	10,996,253
1991	11,068,440
1992	11,132,386
1993	11,282,736
1994	11,429,585
1995	11,734,710
1996	11,877,938
1997	12,312,982
1998	12,565,930
1999	12,738,271
2000	12,782,143
2001	12,876,346
2002	12,854,054
2003	12,794,616
2004	12,781,476
2005	12,942,414
2006	12,746,126
2007	12,875,568
2008	12,692,892
2009	12,721,541
2010	12,438,926
2011	12,173,935
2012	12,101,936
2013	12,013,496
2014	11,804,002
2015	11,867,049

Figure 11 DEATHS, INJURIES, & ACCIDENTS BY YEAR, 1997-2015

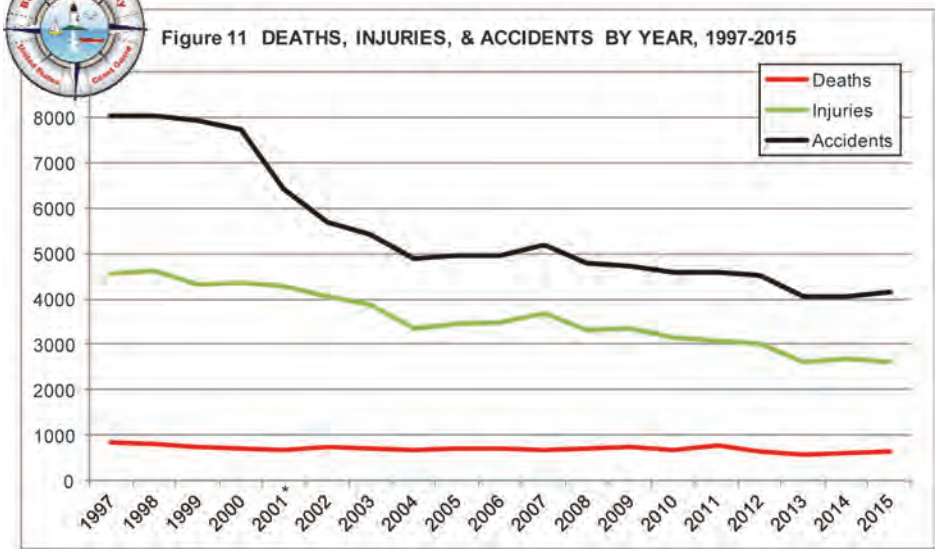

Table 37 • RECREATIONAL VESSEL REGISTRATION BY LENGTH AND MEANS OF PROPULSION 2015

Mechanically Propelled	Not Mechanically Propelled	Total
11,034,479	832,570	11,867,049

STATE REGISTERED BOATS THAT ARE MECHANICALLY PROPELLED

	Means of Mechanical Propulsion			Auxiliary Sail		
	Inboard	Outboard	Sterndrive	Inboard	Outboard	Total
Under 16 feet	1,236,077	2,826,218	175,002	5,626	15,591	4,258,514
16 to less than 26 feet	680,382	4,392,892	1,090,946	11,947	35,416	6,211,583
26 to less than 40 feet	155,107	131,157	150,789	36,885	8,877	482,815
40 to 65 feet	44,719	7,244	12,242	5,648	641	70,494
Over 65 feet	6,230	1,883	2,842	94	24	11,073
Total	2,122,515	7,359,394	1,431,821	60,200	60,549	11,034,479

STATE REGISTERED BOATS NOT MECHANICALLY PROPELLED

Rowboats	Sailboats	Canoes/Kayaks	Other Boats	Total
97,067	110,261	419,536	205,706	832,570

View the 2015 Recreational Boating Statistics:
http://uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2015.pdf

For more information on boating responsibly, go to:
http://www.uscgboating.org

President,
Alternative Marine Technologies, Inc.

Bob Kunkel, President of Alternative Marine Technologies, previously served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the Maritime Administration and Department of Transportation from 2003 until 2008. A past Vice President of the Connecticut Maritime Association, he is a contributing writer for ***Maritime Logistics Professional*** Magazine and of course, ***MarineNews***. A graduate of the Massachusetts Maritime Academy, Kunkel sailed as a licensed engineer and eventually continued his career in ship construction at NASSCO, and yards in South Korea and Mainland China. He is a senior member of the Special Committee on Ship Operation with ABS and an elected member of the National Cargo Bureau. In a nutshell, Kunkel knows propulsion. And, he spends a lot of his waking hours dealing with and trying to improve engine emissions on all manners of tonnage. This month, as our featured INSIGHTS executive, he weighs in on emissions control and compliance, as perhaps no one else in industry can.

Tier IV (EPA): when does it arrive, and when is it mandatory for everyone?

Tier IV (EPA) is no longer knocking on the door. It has arrived and is already sitting at your dinner table waiting for a cocktail. Tier IV has not been invited to dinner while you operate your existing fleet. It is all about new construction. The revised Annex VI has introduced the prospect of retrospective NOx certification, regulation 13.7, in the case of diesel engines of more than 5000 kW power output and a per cylinder displacement of 90 liters and above installed on ships constructed between 1 January 1990 and 31 December 1999. For these engines, if a Party, not necessarily the ship's flag State, has certified an 'Approved Method' which results in an emission value no higher than the relevant Tier I level and has advised that certification to IMO, then that Approved Method must be applied no later than the first renewal survey which occurs more than 12 months after IMO was advised. However, if the ship owner can demonstrate that the Approved Method is not commercially available at that time, then it is to be installed no later than the next annual survey after when it becomes available. In new construction, the regulation is clear – January 2016 was the compliance date. The retroactive emission compliance date is still gray and you can imagine the debate at the dinner table when we revert back to the previous discussion of 'economic hardship.'

Tier "beaters" – the practice of using multiple smaller engines to produce the desired power but staying under the HP of a higher tier engine – is gaining wide acceptance. You've called it 'simply good design' and you've said it will continue. That said; does it further the cause of lower emissions? If so, how?

Most of this argument is based upon the company's environmental ethics. It is no secret that good design can circumvent a regulation or provide a path around it. We have seen IMO Tier 3 blocks go into contract after the January 1, 2016 date and we have seen engine manufacturers struggle with meeting Tier IV compliance that has pushed them aside in a competitive bid for newbuilds. The regulations do not address the collective emissions from each engine on board a vessel only the emission of a specific engine installed. The regulatory bodies at some time will look to measure emissions at the stack. When that comes into play, the multiple engine 'work around' may become an issue.

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Compliance with emissions regulations is one thing; reporting that compliance (and proving it) is yet another. OEM's have acquired sophisticated monitoring technologies, and there are myriad choices out there touting consumption reporting, geofencing and other recordable metrics. When will this sort of thing become mandatory and where will it happen first?

A quick stroll around any trade show will show that most if not all major engine manufacturers pitch a sophisticated engine monitoring system monitoring fuel efficiency, consumption or operating parameters. The actual compliance of the engine is based upon its ability to meet the IMO or EPA standards on the test bed. Daily compliance within a specific voyage or operating area is dependent on fuel and for now, fuel alone. The EPA and USCG Penalty Policy was developed primarily to address violations of the fuel sulfur standard contained in Regulation 14.4 of Annex VI as it applies to the U.S. portion of the ECAs, but a ship burning non-compliant fuel may also be in violation of other requirements of MARPOL Annex VI. There are many examples, as ships are required to maintain a written procedure showing how the fuel oil change-over is to be done (Regulation 14.6), and maintain a log recording change-over details. The vessel is required to record certain fuel tank measurements prior to entering an ECA or again after exiting. Failure to use compliant fuel in an ECA may also mean failure to establish and/or follow a change-over procedure, and/or make and record measurements required by Regulation 14.6 – all of which carry a separate penalty. Regulation 18.6 requires ships to receive and maintain bunker delivery notes for a period of three years after the fuel oil has been delivered onboard. Regulation 18.8.1 requires ships to maintain a representative sample of the fuel oil, collected by drip method at the bunker line when delivered to the ship for a period of twelve months from the time of delivery. Each failure, on each day it occurs, is a separate violation. The EPA may calculate penalties for violations of MARPOL Annex VI, APPS, and regulations other than those covered by this Penalty Policy on a case-by-case basis, may amend their Penalty Policy, and/or may create a separate penalty policy at any time. Any single violation can reach levels of $25,000 or more depending on the incident. To answer where it will happen first? In the ECA's and in many cases it already has. What will become more significant and also require new monitoring methods is when the global sulfur content is reduced in 2025.

LNG, billed as the 'white knight' fuel, has its advantages, but also its shortcomings. Clean, but containing less BTU's per volumetric measure, the differences in cost are hard to calculate. What's the real bottom line? Is it the future, or is this merely a stop gap on the way to some other solution?

LNG is by no means a temporary 'stop gap' to meet current emission regulations or, for that matter, future requirements. The commitment to develop and employ natural gas as a propulsion fuel is an enormous undertaking that not only takes into account ship design and operation but also shore side infrastructure development. It is a serious commitment and a huge cryogenic education and training evolution for everyone involved. LNG is a large investment that comes with the decision to embrace natural gas as a permanent fuel change. We have not seen the reduction in BTU being a show stopper, nor has it resulted in any drastic change in power. Imagine your "white knight" going into battle without his horse and that is where LNG stands at the moment. The bunkering infrastructure needs to be built around the trade routes and historical bunker ports currently in use by the owners that are looking to make the change. We are currently handling construction supervision for the Tote LNG bunker barge at Conrad Shipyard in Orange, Texas, which will receive LNG from a newly constructed liquefaction plant under construction with Clean Marine Energy built to supply the recently delivered Tote Marlin Class container ships entering the Puerto Rico domestic trade. Imagine the environmental and economic commitment from Tote to put those three paces of the puzzle together. It's a long term commitment to cleaner energy and in my opinion others will follow.

ECA incidents: Starting in California waters and now extending to the rapidly proliferating ECA's elsewhere, one of the most prominent bi-products of this practice of switching to low sulphur distillates once inside the ECA is the unintended consequence of 'loss of propulsion' incidents. What's the primary cause of these casualties and what can be done about it?

The problem is due to the temperature differential between heated heavy oil and a marine distillate that in turn creates a thermal shock in the fuel system. That shock experienced when changing to low-sulphur distillates having reduced lubricity and as a result can cause sticking/scuffing of the fuel valves, fuel suction valves and fuel pump plungers, which can lead to a failure of the main engine. In most cases, a little practice makes perfect. Temperatures are adjusted and the changeover completed in safe zones that would not affect maneuverability of the vessel.

The introduction of Low Sulphur Diesel to the marine propulsion world has both good and bad consequences. One analogy compares the introduction of low sulphur diesel to that of unleaded gasoline (for the automotive industry in the 1970's). Both moves removed critical lubricity for fuels. How does the marine industry cope and what's the long term downside for engine OEM's, maintenance, etc?

The fuel change will result in the major oil companies developing lube oils and additives that correct the oil TBN and the lubrication for each fuel utilized. It is too early to trend the long term impact. That said; manufacturers will find a way to correct it. There are still plenty of U.S built muscle cars running around that changed for leaded to unleaded without seizing an engine. The chemists in the labs will solve the problem.

SCR After Treatment: it's been proven to work, produce tier IV results, and it fits into a tight space (think workboats). Is its cost the main reason more operators and OEM's haven't adopted the technology?

The first reaction was to build around these regulations. On the foreign side you saw a large build out of contracts placed before the IMO Tier III regulations took effect as the estimated cost to move to Tier III was an added three to four million dollars in construction costs. The second reason is the lack of historical data to prove all of these systems work. It is new technology for most of us and very few marine operators has jumped at the chance to embrace it. You had the issue of providing Urea, the decision to uses caustic soda or build open or closed loop. SCR and Low Sulfur fuels will prove to be the simplest answer for many operators as the regulations progress.

Methanol or "liquid gas" is another option being discussed. As clean as natural gas, (though containing fewer BTU's), methanol does not contain sulfur and can be created from renewable and non-renewable feed stocks such as sugar cane, corn and other agricultural products and is more cost effective than the application of liquefied natural gas. Why hasn't it taken off faster and with more stakeholders? Will its use ever become widespread?

We have been aboard several newbuilds at our Hyundai South Korea office that are working towards the use of methanol as a fuel. The vessels are tankers trading methanol and the theory is similar to the early LNG ships burning boil off gas as a way to work around the missing bunkering infrastructure. Methanol is an easier fuel to carry and store as a liquid and it removes the costs and application of cryogenics to transport and store LNG. As such, the fuel makes sense and the theory is existing fuel tanks can be utilized to carry it. That said; the applications we are familiar with required the fuel tank to be positioned above deck. It is too early to predict 'widespread' use but we do know that the major engine manufacturers have methanol engines on the test beds and we have seen an attempt to enter the commercial market.

Is there any way to calculate the financial impact of tighter emissions regulations on the global maritime industry?

In new construction, the answer is yes. The impact can be calculated simply by looking at the cost of equipment and its installation requirements. Those numbers relate to an estimated rise of new construction ship costs at three to four million dollars for bluewater tonnage. How long that cost lasts depends on how many vessels are built moving past the regulation IMO Tier II period and how owners decide to solve their emission problems. At this point in Korea, there are very few IMO Tier III engines on the test stand or under contract. The locomotive market estimated the reduction of NOx at $730/ton and particulate matter controls at roughly $7,500 per ton of PM reduced. From an operating perspective I don't think we have enough historical data to give a solid number. That said; you will see an increase in fuel consumption along with higher fuel costs. Couple that with added maintenance costs to keep all of this new equipment running and you have a major impact in all marine markets.

GE's latest engine meets both EPA Tier 4 and IMO Tier III emissions standards without the need for exhaust after-treatment by Selective Catalytic Reduction (SCR). NOx emissions have been reduced by 70 percent compared to EPA Tier 4 and IMO III emissions limits. Does anyone else out there have something equally promising in their stable?

All of the engine manufacturers will have a horse in the race now that the regulations are in effect. And each horse will be a different color. Industry can expect a wave of announcements during this trade show season. SMM in Hamburg was all about technology innovations. Owners and operators will be looking for a solution or be forced to scrap and start new.

Hybrid Energy and Batteries have come a long way for marine applications – in terms of weight, size (volumetric space taken upon by batteries and the power that they can generate). Witness the 40 meter Vision of the Fjords which was delivered earlier this year. That vessel, a passenger vessel, 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. Do you foresee a time when this will become common on myriad workboat platforms, or is it an application destined to fit niche applications only?

Hybrid Energy has grown well beyond niche applications. The ability to store energy in the new world of Alternative fuels is paramount and battery technology will work towards allowing us to push fuel cell, solar and wind power forward into commercial marine applications. Weight and size is fast becoming a problem of the past and Tesla is patenting removable batteries for their automobiles and your car will soon be as simple as changing batteries in your flashlight. We have several Hybrid projects we are working on with MARAD Marine Highway applications and the development of wind farm maintenance vessels all of which need to address sustainability and the reduction to near zero tolerance emissions. Despite these innovations redundancy in a marine application is beyond important and the 'hybrid' allows both a parallel application of diesel electric along with a stand-alone battery operation.

Shipping's Energy Challenge

By Ian Adams

Adams

There is no more economically and environmentally efficient way of transporting the world's goods than by sea. Compared to air or road freight, based on per ton of cargo shipped, shipping's carbon footprint is small. Yet with the 60,000 or so ships that transport 80% of the world's goods emitting about 1.12bn tons of CO2 each year, almost 4.5% of all global greenhouse gas emissions, it is unequivocal that we need a viable way of reducing our environment impact. As other sectors reduce their carbon footprint shipping's is likely to increase as an overall percentage.

The wider take up of liquid natural gas LNG as a marine fuel, however, is not the answer to meeting the great energy challenge that shipping and indeed other industrial sectors face. This is principally because in its unburned state, LNG is methane gas – a GHG with a global warming potential much higher than CO2. The slightest slip or leakage should be a real concern.

While it is well documented that LNG is an excellent solution for reducing non-GHGs such as SOx and NOx, it is wrong to promote it as a solution for reducing GHGs as some industry segments are doing. The figures simply don't add up.

For example, almost twice as much LNG must be used to get the same energy output as heavy fuel oil. LNG has an energy density of about 22.5J/liter while fuel oil has an energy density of 40J/liter, therefore to produce the same amount of energy you need to burn almost twice as much (by volume) LNG. Then you have the problem of methane slippage, fuel passing through the engine unburned, and released to atmosphere.

Methane is proven as having a global warming potential of 28 on a 100 year time horizon while CO2 on the other hand has a warming potential of 1 on a 100 year time horizon. So if we rather conservatively accept that burning LNG will reduce CO2 emissions by 20% over the current level then it would require less than a 1% slip released to atmosphere to counter any GHG emission reduction benefits LNG fuel might bring. Taken over the entire supply chain, 1% is not unrealistic.

Indeed, this is something Stamford University researchers confirmed last month. "Even small leaks from natural gas wells can create large climate concerns because methane is a potent greenhouse gas – it's about 30 times more effective at trapping solar heat than carbon dioxide over a 100-year period," the researchers reported. UCI and Stanford also concluded in 2014 that natural gas does not significantly lower greenhouse gas emissions, even if no methane leaks during production and shipping.

What I find interesting, is that we have eliminated the problem of CFC-based refrigerants and are looking at restricting the use of HCFCs, so why are some quarters, particularly Class, keen to use another aggressive GHG in even greater volume. We cannot risk adding an additional source of methane emissions to atmosphere when there is already a possible thawing of the Siberian permafrost. Releasing more methane to atmosphere could result in a positive feedback loop.

LNG fuel proponents are keen to emphasize the 70% reduction in emissions burning LNG as a marine fuel could bring, and if there was no possibility of methane slip, then this would be a very attractive proposition. By mass, LNG contains less carbon than heavy fuel oil (but only about 20% maximum). But much of the improved energy efficiency and emissions is afforded by the technical advancements made by the builders of marine engines and exhaust treatment technologies irrespective of the fuel used.

It is true that the ability of marine engines to effectively burn LNG more completely has improved resulting in less 'slip', and this is to be welcomed. What cannot be avoided are the operational situations that require venting LNG to atmosphere for the safety of both man and machinery.

Continued improvements in combustion efficiency could see emissions targets met with the use of existing fuels. Engine technology has advanced since the 1940's and 1950's, when residual fuel was pioneered as a fuel for use in diesel engines, and marine engineers have worked hard to improve efficiency as fuel changes. For instance, the residual fuel oil of the early days bears little or no resemblance

to the more complex residual fuel currently in use: today's fuel requires a greater amount of pre-treatment which is achieved in the complex machinery now being used.

This is not a Luddite reaction to progress, but a recognition that marine engineers are capable of a more effective change. We will be better off looking at technology that allows for the continued use of HFO or MDO/MGO until cost-effective fuel cell technologies have been developed.

The continued use of existing fuels, rather than the adoption of LNG, will have another benefit from a GHG perspective. With the refining process what goes in must come out, otherwise a refinery will eventually effectively become clogged. The processes currently used produce the spread of products we see today, including fuel oil. If the market for fuel oil disappears then the refiners are left with the issue of what to do with the residual stream produced during the crude oil refining process. It will have to be processed somehow. This will undoubtedly require energy resulting in the production of CO2 and therefore additional GHG.

Unfortunately, the LNG myth has progressed unchecked with very few challenging those lobbying for a wider take up of LNG. I certainly think that if there is now a change of heart in the U.S. power sector about converting coal-fired plants to run on LNG, then the shipping industry should not be quick to accept that this 'cleaner' fuel is a panacea to meeting its emissions reduction requirements.

LNG has a limited effect on the reduction of CO2 and the risks of its rollout to the entire fleet are unacceptable. Rather than spend millions of dollars and man hours working on a solution that barely scratches the surface of the problem, more time, money and effort would be better spent on seeking a truly effective solution to the emission of GHG.

Ian Adams, *FIMarEST, is the Chief Executive of Association of Bulk Terminal Operators (ABTO) and the former CEO of the International Bunker Industry Association (IBIA). These are his opinions alone and furthermore may not necessarily reflect that of* ***MarineNews*** *and/or its publishers.*

Commercial Opportunities for U.S. Shipyards in 2017 ... and Beyond

SCA's Matt Paxton weighs in on the state of domestic shipbuilding – workboat building & everything in between.

By Matt Paxton

Paxton

As President of the Shipbuilders Council of America, the national trade association representing the U.S. shipyard industrial base, we are constantly evaluating the status of the nation's commercial vessel building and repair base. American shipyards continue to build to the highest standards for diverse range of customers. These vessels built by American workers go on to serve an integral part to our national economic well-being and basic security responsibilities.

In the last year, our shipyards have delivered a diverse group of more than 1,000 vessels ranging from the world's first LNG-powered containerships to ATBs. There are areas of concern in the industry including the impact of reduced offshore oil and gas activities in the Gulf of Mexico and the continued development of various oil shale plays that is causing some shipyards to slow build to prevent delivering vessels that customers cannot put to work. However, there are some bright spots in the industry on the horizon.

One emerging market our association is excited for is the increased U.S. offshore wind development. The Block Island Wind Farm, America's first offshore wind farm, is scheduled to be online in 2016. The farm is expected to produce approximately 125,000 megawatt hours annually and will lead the way for similar projects along our coasts.

The U.S. offshore wind industry will benefit from the existing shipyard industrial base and skill-set while enriching their coastal communities. Already, we've seen Jones Act vessels used for construction, maintenance and repair, and only expect this market to grow in the coming years. Our shipyards will continue to pursue advancements in vessel designs, market acceleration, and advanced technology demonstration to support American energy investments.

In response to those who have questioned our industry's capability to modify current OSV designs to meet the docking systems and boarding platforms required to deliver technicians to the unmanned towers, we are confident that the U.S. industry is not only more than capable to design and build for this market's requirements, we are ready and open for business.

Another bright spot is the domestic ferry market. Our shipyards have responded to the recent strong demand with robust competition and innovation having already matched last years' delivery count. From Washington State to New York City, states and localities are looking for safe, efficient and environmentally friendly alternatives to transport their citizens, and U.S. shipyards are delivering.

New private fishing vessel builds also continue to be a strong sector for our industry. These fishing vessels promote environmental stewardship and sustainable fishery resource management to offer the highest quality fish products. Our shipyards are advancing energy efficiency commercial fishing vessels that assist in the sustainability and usability of fishery resources and efforts to keep our waters clean and pollution to a minimum.

As fleets look to recapitalize, the next generation fishing vessels will be equipped with fishmeal and fish oil production onboard. As a trade association we offer a forum for to designers, operators and builders to come together to innovate in these emerging markets.

Inland barge builds continue to be a majority of new builds. The demand for inland barges looks promising as ever, as the State of Indiana is exploring adding a fourth port and the Port of Kansas City reopened earlier this year. These ports highlight the success of marine highways in transporting freight. As similar projects continue to unfold we continue to see positive investments into reducing pollution and congestion on roads. The growing demand for inner waterway ports is encouraging news for our shipyards.

In order to adapt to the current market challenges our shipyards continue to forge new business operations – in-

novating manufacturing process or business lines and doubling down on workforce development investments. In regards to regulatory changes, we expect the repair industry to quickly comply with the new U.S. Coast Guard Subchapter M regulations for inspected tow vessels. Additionally we expect to see the necessary investments in technology development to meet the demands of the new unmanned vessel and hybrid capabilities.

The bedrock of these domestic commercial markets is the Jones Act. Not only does the Jones Act industry support nearly 500,000 jobs across the United States, but it also serves as vital component of our nation's national and homeland security. While some foreign countries have propped up their shipyard production with government subsidies, preferences and government backed new build programs. The U.S. does none of that but instead proudly maintains the Jones Act to allow for stable and predictable domestic production.

We can now see folly of the foreign shipbuilding policies, preferences and practices that resulted in the enormous financial struggles some of the Asian shipyards are going through because of their unfair market distortions. The Jones Act does not create false markets or the over building of certain market segments, instead the Jones Act provides for a consistent level of production in American shipyards. American ingenuity remains a standard bearer for first-rate quality.

Additionally, Shipyard jobs provide family-waged employment in communities across the United States, jobs which only multiply the shoreside jobs. These jobs provide workers and their communities a livelihood, which cannot be replaced. These highly skilled men and women form an industrial base strongly supported by Congressional leaders, the Department of Defense and every modern President.

The Navy, also, has repeatedly cited the Jones Act, and the resulting commercial private shipyard industrial base, as an asset that would cost tens of billions of dollars to replace if the U.S. flagged fleet went away. Not only is the industrial base essential to national security but is also indispensable to keep our more than 95,000 miles of shoreline and 25,000 miles of navigable waterways safe. We are very much a maritime nation.

Fundamentally, our shipyards use the most advanced manufacturing techniques to create the world's most sophisticated vessels, providing the very best for not only our commercial customers, but our Armed Forces as well. The critical jobs our industry provides constitute the economic backbone to hundreds of communities and also enable the industry to respond and deliver to the emerging commercial opportunities on the horizon.

Matthew Paxton *is the President of the Shipbuilders Council of America, the national trade association representing the U.S. shipyard industry. SCA members constitute the shipyard industrial base that builds, repairs, maintains and modernizes U.S. Navy ships and craft, U.S. Coast Guard vessels of all sizes, as well as vessels for other government agencies. In addition, SCA members build, repair and service America's fleet of commercial vessels and also represent the critical supplier companies that are the foundation of the U.S. shipyard industry.*

EFG: *Energy, Finance & the GoM*

Some positive market indicators could presage an investment revival in the U.S. Gulf of Mexico – and beyond.

By Richard J. Paine, Sr.

Paine

The good news, reported by Bloomberg, is that in the third quarter of 2016, the largest oil companies increased cash from operations by nearly $26 billion. This reflects a 67% increase from the previous quarter and more than twice the amount of the first quarter of 2016. Exxon Mobil, Royal Dutch Shell, Chevron, Total and BP indicated that the increase was due to lower spending, increased output and rising crude prices, although the numbers were still below last year's numbers.

Current Conditions, Future Trends

It is obvious why this is good news. More cash means more production which in turn means more work for Gulf Coast operators. It comes at a time when many lenders and lessors have fled the Gulf market. While the number of active lenders has significantly decreased, it is only part of the cycle that many of us have experienced before.

With a new, more energy friendly Trump administration soon to be in place, the probability is good that the reversal of the trend may begin early in 2017. This may be just in the nick of time as the reticence of equipment finance sources to lend or lease has increased dramatically. Many have been forced to back off one way or another, and take a seat on the sidelines. During this downturn, as more borrowers and lessees have taken significant hits to their bottom lines, more vessels are cold stacked, underutilized or overpopulated and are not creating the revenue necessary to service an obligor's debt load.

In normal times, lenders were not as accommodating as they have been forced to become now. Missed or late payments lead to forbearance which could, if the deficiency was not remedied, would lead to foreclosure and seizure of the vessel. Forbearance is an agreement between a lender and borrower to temporarily postpone payments or otherwise amend the ships mortgage to avoid foreclosure and seizure of the collateral. Rather than repossess the vessel, it may be in the bank's best interest to leave custody of the vessel in the hands of the borrower and have the maintenance, dockage and other costs of a vessel continued to be paid by the obligor. It also allows the obligor to work the vessel and generate revenue from its operation.

While many lenders have left the mainstream borrower high and dry, the solvent, near investment grade credit is still the apple of their eye. The process begins with origination of the loan or lease with rate, term and conditions being acceptable to the obligor. From there, the lender determines it's "appetite" for the amount of debt it is willing to hold for an obligor. All bank and equipment finance companies have loan size or credit risk limits. To lend outside of those limits, they may choose to sell the entire loan or a portion of it to other lenders or investors. They can either retain the servicing of the loan or sell servicing off as part of the sale. This is known as syndication. Another method to reduce loan size or credit risk is known as participation. If two or more creditors agree to share the amount and credit risk of a transaction equally, all having equal rights of payment or seniority, the participation is considered ***pari passu*** (Latin for 'equal footing').

In order to have originations, syndications or participations, it is necessary to have an obligor and one or more funding sources. Historically, commercial marine finance companies have come and gone alternately pursuing the market aggressively or disappearing by choice or necessity, buyout or merger. When the marine market is strong, lenders come out of the woodwork. When it hits rough waters, they disappear beneath the waves. Neither scenario benefits the industry as when times are good, "stupid money" drives rates down, but also drives credit quality

In normal times, lenders were not as accommodating as they have been forced to become now. Missed or late payments lead to forbearance which could, if the deficiency was not remedied, would lead to foreclosure and seizure of the vessel. Forbearance is an agreement between a lender and borrower to temporarily postpone payments or otherwise amend the ships mortgage to avoid foreclosure and seizure of the collateral. Rather than repossess the vessel, it may be in the bank's best interest to leave custody of the vessel in the hands of the borrower and have the maintenance, dockage and other costs of a vessel continued to be paid by the obligor. It also allows the obligor to work the vessel and generate revenue from its operation.

down. When times are bad, the chickens come home to roost. Bankruptcies, foreclosures, seizures and depressed collateral values are the result of too many uneducated, inexperienced, and possibly naïve lenders making too many risky, underpriced loans.

So, who is lending?

2016 saw two major lenders exit the market by selling off their loan portfolios. GE Commercial Credit, who had over the last decade bought the commercial marine assets of many other lenders, sold to Blackstone Group, a private equity firm and Wells Fargo Equipment Finance. Banc of California Commercial Equipment Finance sold its assets to Hammi Bank; a California-based lender. Notwithstanding its sales and marketing issues, Wells Fargo is arguably the largest commercial marine lender operating today.

Over the last decade, Bombardier Credit, The Associates, debis, Citicapital, GATX, Sorus, National City and Prudential Finance, to name just a few, have either curtailed their lending efforts, been bought or simply have gone away. Most of their loan portfolios have been folded into or refinanced by existing lenders.

The equipment finance companies that seem to be providing the bulk of the funding going into the current commercial market are active based on region and asset type. The East and West coast fleets are similar, generally comprised of tug and barge companies, ferries and dinner/excursion boats. Refined products – heating oil, gasoline, and diesel – the predominant barge cargoes, plus various types of passenger transportation vessels, make up most fleets. Umpqua, Bank of the West, Signature, JP Morgan Chase, Peoples, Caterpillar, Fifth Third, Bank of America, Stonebriar Capital, Suntrust and others, are active.

Separately, the Gulf of Mexico was and is primarily the oil and gas capital of the United States. PSVs, OSVs, AHTs, crewboats and other inshore and offshore boats service the energy exploration and production segment. Wells Fargo, Capital One, Regions, Bank of America, Bank of Texas, Key, Caterpillar, PNC, and Regions have active marketing efforts to top shelf credits. The Inland Rivers/Great Lakes regions operate aggregate, grain, and various other commodity barges, towboats, and tugs. Here too you will find Caterpillar (the last captive finance company), TCF, U.S. Bank and others.

Throughout all markets, unnamed individuals, banks, finance companies and other capital sources invest in the commercial marine market through syndications and participations in credit facilities originated by experienced marine lenders. But due largely to the confidential nature of borrowing activities in most companies, the foregoing list of lenders active in the marine market is incomplete.

So ultimately, the good news is that there is no more bad news. With luck and fulfillment of campaign promises, the coming Trump presidency could be a great stimulator for economic and thus marine industry recovery and growth.

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Port Infrastructure and the Role of Government

By Lauren Brand

Brand

We are in the midst of a revolution over port infrastructure. This revolution is not about the role of ports as silent engines for our economy and the need for better intermodal infrastructure. Rather, it is about why governments – local, state and federal – believe ports exist, and whether or not public and private entities, other than those directly responsible for ports, should help build or improve port infrastructure and their intermodal connectors.

Ports are rightfully linked to a maritime industry that is steeped in tradition. Their definition, which predates the age of pirates by over 450 years, reflects this fact. Per Merriam Webster's Dictionary, ports have had the same two definitions since before the 12th Century: *'a place where ships may ride secure from storms*'; and *'a harbor town or city where ships may take on or discharge cargo'*. The next logical question to ask is: should the 21st Century definition of a port remain the same as it has been since Latin was a common language? Are maritime ports primarily a safe haven for ships? Or are they the ultimate intermodal hub, where trucks and trains come alongside ships and barges to exchange freight. And why does this matter?

Traditionally, ports were built by the people and communities who lived near waterfronts. They owned ships or worked in or near a port, basing their local economy on cargoes transported through their region. Today's ports serve larger, more heavily populated, regional economies, and some serve national needs. Yesterday's ports were made from timber and were designed for yesterday's ships. Docks built as recent as 1985 have been built from stronger materials, and have a life expectancy of 40 to 50 years, but were not designed to accommodate ships that began sailing only 15 years later, in 2000. Today's intermodal logistics operations – from ships to trucks and trains – are evolving rapidly, outgrowing infrastructure built less than 20 years ago. Who should ensure that the regional or national ports and multimodal connectors being built today are capable of transporting people and freight 20 to 40 years from now?

The new South Harbor of America's Central Port, located just north of downtown St. Louis in southwestern Madison County, Illinois. Significant TIGER grants from the U.S. Department of Transportation helped make this possible.

Photo: America's Central Port

An analysis of TIGER funded projects tells the story. MARAD has helped complete 44 intermodal projects at ports that were funded through the Department's TIGER discretionary grant program. Analysis of data collected from these projects reveals a wide range in costs for four main project types. If we just look at the average cost, it does not seem daunting for regions to get port and intermodal infrastructure ready for the next 40 to 50 years.

There has been a flurry recently of government interest in ports. This is also true within the U.S. Department of Transportation, which is responsible for the many facets of our national transportation system. With a strong heritage of safety, and a mission that strives to ensure a fast, safe, efficient, accessible and convenient transportation system, the Department views ports as a part of the overall system. When the American Recovery and Reinvestment Act was launched in 2009, it established the first national multimodal infrastructure discretionary grant program that included ports as eligible applicants.

Beginning in 2010, the TIGER discretionary grant program also offered funding to infrastructure projects for all modes of transportation including ports, and it has been oversubscribed in every one of its eight Rounds. The FAST Act of December 2015 established the freight infrastructure grants under the FASTLANE program – and ports are once again invited to compete with the other modes. A pattern is emerging where ports are eligible to compete for freight infrastructure funds because they are a part of our nation's transportation system … and not because they are ports.

In 2010, the National Defense Authorization Act authorized the Maritime Administration (MARAD) to establish the Port Infrastructure Development Program to promote, encourage, and develop ports and transportation facilities in connection with water commerce. MARAD works hard to assist ports and communities meet future regional and national freight needs. We do this by administering programs such as TIGER and FASTLANE, as well as exploring what other federal programs may be available to help ports. But sometimes ports – the ultimate intermodal hubs of the U.S. – have difficulty competing for funds under other programs. And why does this matter?

An analysis of TIGER funded projects tells the story. MARAD has helped complete 44 intermodal projects at ports that were funded through the Department's TIGER discretionary grant program. Analysis of data collected from these projects reveals a wide range in costs for four main project types. (This is understandable as some projects are more complex than others.) If we just look at the average cost, it does not seem daunting for regions to get port and intermodal infrastructure ready for the next 40 to 50 years.

But we need to realize that these grant awards cover only a portion of the industries' infrastructure needs. In 2015, the American Association of Port Authorities identified 125 additional projects at its member ports that are estimated to cost $28.9 billion, and we can wonder how those improvements will be made. If ports cannot afford to improve facilities through traditional means, what options are available to them? Will investors – public or private – see a good investment in a safe harbor?

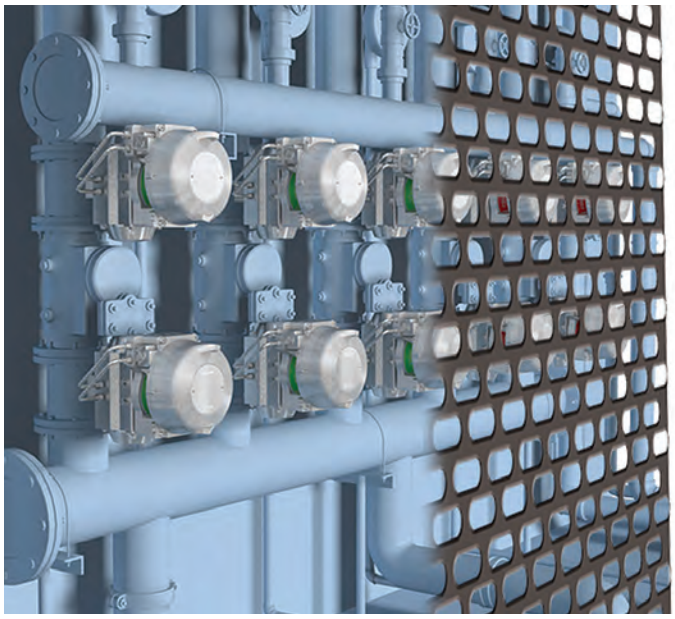
I argue that the definition of ports, our perception of them and how we talk about them will determine the future ability of communities and our nation to attract partners who will care enough to ensure that ports – as part of our national system of transportation systems – will be able to meet our future freight needs. Who will rise to champion a revolution in our public perception of ports – and who will champion a better definition for the 21st Century?

Projects completed / Cost Ranges

Number Completed	Project Type	Average Cost	Range in Millions
15	Berths	$18.56M	$2.32 to $47.8
6	Connector Roads	$1.58M	$0.15 to $3.50
13	Connector Rail	$14.31M	$1.89 to $43.15
10	Rail Yards	$18.48M	$2.40 to $108.80

Source: U.S. DOT / Maritime Administration

***Lauren K. Brand**, a member of the Senior Executive Service, became the Associate Administrator responsible for Ports and Waterways programs within the Maritime Administration in January 2015. In this capacity, Mrs. Brand directs StrongPorts, a national port infrastructure modernization program in excess of $1.7 billion – that includes TIGER and FASTLANE discretionary funds as well as other federal assistance. She is responsible for the continued development of America's Marine Highway initiative and manages the Agency's offshore energy licensing projects (the Deepwater Port Program).*



Valve Commissioning and Maintenance with Wireless Technology

Bluetooth Enabled Discrete Valve Controller Offers Savings, Safety and Convenience. The Future is Now.

By MarineNews Staff

Imagine being able to walk up to a valve located in a tight engine room and be able to communicate with it using your smart phone without having to open its cover and connect any wires. Believe it or not, that day has arrived and it unlocks the ability to conveniently and cost-effectively commission, operate and maintain automated valves in marine applications using commercial off-the-shelf equipment that is secure and affordable.

In the Beginning

Early valve control systems were comprised of individual devices (such as limit switches and solenoid valves) that were mounted on the valve and individually wired back to a control panel. The large number of long cables required made these systems relatively costly to purchase, install and maintain.

Discrete valve controllers repackaged the individual devices into one assembly mounted on the valve reduced the cost, complexity and maintenance associated with the installation.

Migration to network (bus) communications significantly reduced cost but also introduced more complexity. In particular, commissioning and maintaining networked discrete valve controllers require specialized knowledge. In addition, communication equipment such as a handheld calibrator may be required because distributed control systems (DCS) and programmable logic controllers (PLC) provide limited (if any) access to the setup parameters in the valve controller. Further, the communication equipment is temporarily connected to the valve controller wiring which not only consumes time but can also negatively affect the safety of the technician – especially when the valve controller is difficult to access and/or located in a hazardous location.

Wireless Link Capabilities

Discrete valve controllers communicate to the DCS or PLC via a wired network. With wireless access, the technician (nearby) can make a remote connection to the device to perform setup and operational parameters without having to climb to the valve (when access is poor), open its valve controller and wire his/her handheld device. As such, the technician can perform necessary functions faster without hampering physical safety (such as when climbing) while eliminating the chance of creating a spark that could cause an explosion in a hazardous location. In addition, reducing the time required to access valve parameters and diagnostics can also be a concern for valve manufacturers, OEMs and system integrators – especially when it is more convenient and cost-effective to configure valve controllers after the system is built.

Valve controllers enabled with Bluetooth wireless technology utilize an iOS device (iPhone or iPad) as the operator interfaces with a wireless link app that can be downloaded and installed for free with no special training required. Therefore, the need for expensive and cumbersome handheld devices is completely eliminated because the app can be economically installed on every technician's iOS device.

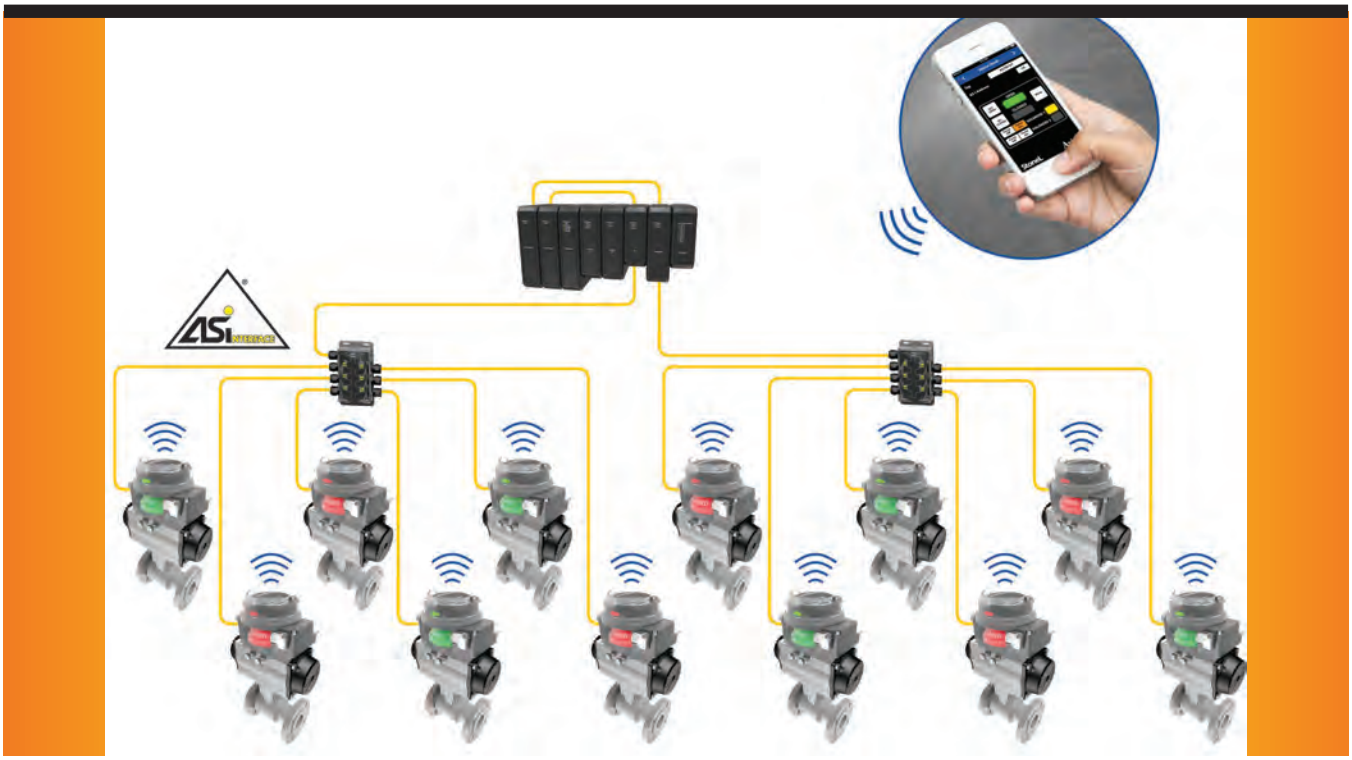
Not only is the interface cost-effective but it also saves time and provides the technician with more flexibility because he/she can proceed directly to the valve controller to perform the required functions without returning to the maintenance area to get one of a limited number of bulky handheld devices that are often already in use and/or not fully charged. Network security is generally not a concern because the device connects to the valve controller using Bluetooth low energy (Bluetooth LE, BLE or Bluetooth Smart) so the signal transmission is limited to up to approximately 50 meters. The net result is that the person accessing the valve controller must be on the vessel and be within reasonable proximity to the specific valve controller.

New Capabilities

The cost associated with configuring or modifying an existing configuration in a discrete valve controller with wireless technology is substantially lower than performing the equivalent function(s) in a controller that does not have wireless capability. Consider:

- *To commission a Bluetooth enabled valve controller on the bench, power (typically 24 VDC) is connected to the controller and wireless access is obtained using the valve controller manufacturer's wireless link app. In contrast, commissioning of a controller without wireless capabilities entails connecting power (as before) plus physically removing the device cover and connecting a specialized industrial portable or handheld device.*
- *Conventional valve controller configuration is performed using handheld devices that utilize menus to navigate among parameters that are configured individually. In contrast, using the app, the technician can navigate the device features intuitively with the graphical interface.*

Figure 1



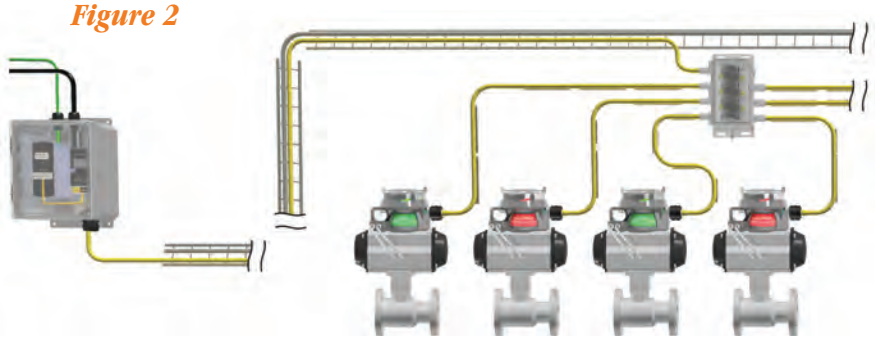
- *Multiple parameters are displayed and can be modified within the graphical menu on the app that allows faster commissioning of parameters such as the initial limit switch setup, bus addresses, baud rate…*
- *Vessel safety is enhanced if technicians make fewer input errors. The app's intuitive graphical display can help reduce the number of input errors made by technicians as compared to using a handheld device that is more abstract in nature.*
- *The safety of personnel is enhanced when the technician does not have to be directly at the valve controller in order to perform the required functions.*

Valves are often located in areas that are physically inaccessible, but, in general, if you can see the valve – you will most likely be able to communicate with it wirelessly. Similarly, nameplates with information about the valve controller may be located in an orientation that cannot be readily seen by the technician from a safe location. Many times, the nameplates are so faded as to be unreadable from any angle. The wireless link allows this information to be readily available to the technician on the app's display.

The operational and diagnostic information about the valve is easily retrieved because the data is stored in the Wireless Link capable module in the valve controller. This access occurs without interfering with or affecting the device's operation over wires to the DCS or PLC. The configuration can only be changed with the wireless link app if the controller is configured to allow such changes. This gives the end-user the option of allowing the technician to only monitor valve controller operation but not change any parameters.

The app allows the technician to directly connect to the valve controller manufacturer's website and download the appropriate maintenance and operation manual. This is in stark contrast to using a handheld device that is menu-driven (with no internet connectivity) so the technician must return to the shop to search for appropriate literature when questions arise.

Figure 2



Installation, Commissioning and Maintenance

Valve controllers enabled with wireless technology are mounted on valves and wired via networks to a DCS or PLC in a manner similar to previous hard wired networks. However, after downloading the free app to an iOS device and conveniently pairing to Bluetooth enabled

valve controllers in range, the connection presents significant advantages with regard to their commissioning and ongoing maintenance using wireless access. The app can be used to:

- *configure valve controllers in less time because only 24VDC power (No communication signal) is required*
- *import configuration information from spreadsheets to the valve controllers which reduces the configuration time*
- *export configuration information from valve controllers to spreadsheets to quickly provide accurate documentation of each valve controller*
- *Operate the valve in the vessel with improved safety because no wired connections are required --- especially when the valve controller is difficult to access (as is often the case)*
- *access valve controller diagnostics in real time that can be exported to a spreadsheet for storage and/or further analysis*
- *access the maintenance manual because it is available through a web link in the app*

In addition, the wireless link app allows information about the valve controller (such as tag number, maintenance history…) to be entered into text fields.

Security

Valve controllers with Bluetooth wireless technology are wired to a DCS or PLC under normal operating conditions so they are just as secure as previous designs. The network protocol (Bluetooth wireless technology) is so secure that it is also used for critical medical applications.

Once communication over the network is enabled all of the operating and input parameters are "Locked Down". However, all valve controllers may be fully monitored and installation manuals accessed in the locked down mode. Individual valve controllers may be unlocked by the control system if needed for special situations to enable inputs to be made and operation from the wireless link app.

Further mitigating security concerns is the maximum distance of approximately 50 meters for the Bluetooth signal from the valve controller. The wireless signal also will not penetrate nonporous vessel metal infrastructure insulating the controller from any unauthorized Bluetooth signals not in or on the vessel.

Documentation & Future Trends

Valve controllers with advanced wireless features can not only import configuration information from a spreadsheet but can also export their configurations for documentation and export diagnostic information for further analysis. This provides accurate and efficient information transfer from the valve controllers to the app and vice versa that saves time for the technician – not only when performing these functions per se but also should a valve controller need replacement.

Wireless access to valve controllers are but one part in a number of trends that are playing out over the long term and will likely continue into the future. Looking at the past, recent decades have seen a clear evolution from technicians using their "muscle" to using their brains. Valve controllers evolved from individually-wired individual discrete devices to individually-wired integrated devices to networked integrated devices to networked integrated wireless devices – each of which illustrate steps in this evolution.

Looking forward, it has been said and written about the Internet of Things (IoT) and the Industrial Internet of Things (IIoT) where everything is connected and can communicate with everything else. To date, there has been lots of "talk" and few products to actually show. That said; valve controllers with wireless capabilities significantly lower the costs associated with commissioning, installation and maintenance while significantly increasing safety – which reduce vessel downtime, increase vessel reliability and increase the profitability of the vessel.

LNG: *Lagging, Not Gone*

Samar Shipyard

Low energy prices, depressed day rates and slow growth of bunkering infrastructure has dampened progress for the marine industry's 'white knight' of environmentally friendly fuels. LNG, nevertheless, is here to stay.

By Barry Parker

Slow Start

Liquified Natural Gas (LNG) is a clean fuel in abundant supply. The green advantages of LNG are well known: Class Society DNV-GL, a pioneer in the commercialization of LNG fueling for maritime applications, offers that use of LNG fuel provides *"the complete removal of SOX and particle PM emissions and a reduction of NOX emission of up to 85% ... in addition, LNG also reduces CO2 emissions by at least 20%."*

A few years ago, any conversation about LNG fueled vessels would invariably include some mention of the 'chicken and egg' quandary where boats first need a fuel source, and fuel infrastructure first requires customers. Today's operators fret about low day rates, still lower energy prices (and a tighter spread between distillates and LNG) and bunkering options which are being developed, but not necessarily fast enough to make it convenient for everyone. The use of LNG as a fuel nevertheless is growing, and the innovation needed to foster its continued use, is certainly keeping pace. At the same time, the need for environmental improvement in an era of increasing Tier (IMO & EPA) requirements, regulatory pressure and expanding ECA's is not going away.

Early leadership on LNG came from Europe. Later to the game in the North American market, where an armada of support vessels service the oil business, Harvey Gulf Marine International LLC made the bold steps of ordering six LNG fueled OSVs, built an LNG bunkering facility at Port Fourchon, and then even bought the shipyard constructing the vessels. That momentum is continuing today, and Harvey Gulf is no longer alone. More importantly, the viability of this fuel for use in workboats has been shown to have everyday applications.

Ramping Up

Chad Verret, Harvey Gulf EVP, explained to ***MarineNews*** that so far, three vessels (*Harvey Energy*- which began work in March 2015, *Harvey Power* and *Harvey Liberty*) have already been delivered and have been on charter to Shell. They provide logistical support for Shell production

platforms (such as Olympus, tapping the huge Mars field) in the Gulf of Mexico, based in Port Fourchon, where they also take on LNG as fuel. The 5,150 DWT boats were built at Gulf Coast Shipyard in Gulfport, Miss., based on a design from Vard Marine (part of Fincantieri Group). The design, dubbed Vard 1 311, has gained the ABS ENVIRO+ certification. The trio are the first U.S. flag vessels to have this notation.

In discussing the performance of the boats, Mr. Verret told ***MarineNews***, "We are extremely proud of their performance so far. The three boats have been operating for 1,261 total days and we've had no forced downtime." The vessels are powered by 3 Wärtsilä 6L34DF dual fuel main engines, providing 7.5MW (just over 10,000 hp) of power. He added, "We run almost exclusively on LNG; we are always burning 1 percent diesel fuel [for piloting the ignition in the cylinders]. With the flip of a switch, we could go to 100 percent diesel if we needed. If there's ever a problem with the gas, the engines would automatically switch over to the diesel backup."

Harvey Gulf has three additional boats delivering, *Harvey Freedom* in March 2017, and *Harvey America* in October 2017. Both of these vessels will be placed in service to Shell. The final boat in the series, *Harvey Patriot*, due in 2018, is currently uncommitted.

A Little ahead, Across the Pond

In other offshore markets, Eidesvik, a Norwegian operator of PSV's, is running a trio of dual fueled boats supporting oil producers in the North Sea and Barents Sea. The company's pioneering efforts go back to 2004, when its *Viking Energy* delivered from the Kleven Verft in Norway's west coast. The latest vessel, *Viking Prince*, delivered in 2014; these boats are also deploying dual fuel engines from Wärtsilä. Eidesvik also operates a pair of dual fueled supply vessels built at the Westcon yard, one of which, the fuel cell equipped *Viking Lady* (with cells fueled by LNG), built 2009, had subsequently demonstrated the feasibility of battery power in 2014.

Kleven built another dual fueled PSV, also with propulsion and storage/ containment from Wärtsilä, *Rem Eir*, for Romoy Shipping, also on charter in the North Sea. In waters northwest of Australia, where major new gas production projects have been steadily coming online, gas producer Woodside Petroleum has contracted with another Norwegian operator, Siem Offshore, for a five year charter of a PSV being built in Poland at the Remontowa yard.

Spurred by the pioneering efforts of the Norwegians, and now, closer to home – with Harvey Gulf – LNG fueling has gained a wider acceptance, and other boat builders are jumping into the fray. Also in the States, Conrad Shipyard, based in Morgan City, La, in the news with its construction of a barge to handle fuel for Tote's new containerships, has recently launched a business unit to specifically handle LNG projects. Brett Wolbrink, who will lead the new effort, told ***MarineNews*** that Conrad LNG would "take advantage of our experience and knowledge gained during the construction of North America's first LNG bunker barge. We believe that LNG as a marine fuel will prove to be instrumental in reducing emissions and providing operators with long term economic advantages."

Caveats & Collaboration

On supply boats, the placement of LNG tanks is not constrained by vessel dimensions. But practicalities may militate against LNG fueling of small tugs. Robert Allan, Executive Chairman of the Board at Vancouver-based naval architects Robert Allan Ltd, said, "LNG is a fuel option that makes a lot of sense in bigger vessels, where you have the storage capacity," but he cautioned that LNG fueling required a multiple of six times the space of an equivalent diesel powered tug, for the storage of the fuel and the equipment needed to regulate and burn the gas. Thus, a pure LNG burning tug would have a very limited range.

Mr. Allan, whose firm is considered a leader in the design of high performance escort and ship-handling tugs, added: "At the moment, you pay about 50% more for the same size and power tug … compared to conventional diesel." For these reasons, Mr. Allan is a strong advocate of duel fuel systems, "…because you take the range limitation out of the equation." He highlighted a building program of three boats (with the RAstar design) being built at Astilleros Gondan, in Spain, for the Norwegian owner Østensjø Rederi. All three will be working for Statoil.

In June, 2016, the Gondan yard, at Figueros (in northern Spain), launched the first of the three boats, followed by a second vessel in September- both to be delivered in early 2017. The vessels, 40.2 meters length and 16 meters beam, will provide tug and escort services at a Statoil terminal in the northern reaches of Norway, at Melkøya, near Hammerfest. He explained, "The tugs are a true "dual-fuel" vessel. For purely spatial reasons the volume of gas which can be carried is somewhat limited so the tugs will work on gas when in harbor doing ship handling, but virtually any other time where somewhat longer range/endurance is required will be on MDO."

Importantly, Melkøya is the terminus of an underwater pipeline that transports natural gas over 100 miles from

"Conrad LNG will continue to develop and market various vessel concepts and bunkering and supply chain solutions that include bunker vessels, FLNG's, FRU's, LNG fueled towboats and storage and cargo handling systems."

– Brett Wolbrink, Conrad Industries

the Snøhvit gas fields in the Barents Sea, to an onshore liquefaction plant. Asked about the choice of a yard, Mr. Allan replied, "The owners have a long-standing excellent working relationship with Gondan Shipyard, who have built many of their vessels over the past 20+ years."

Another service provider in the North Sea, Buksér og Berging AS, has taken on the challenges of LNG fueling for escort tugs, building two boats, *Borgoy* and *Bokn* (both delivered 2014), at the Sanmar yard in Turkey. These vessels, working for also Statoil, in the North Sea, are classed by DNV-GL, both pair Rolls Royce engines with a Rolls Royce Z-drive configuration. The gas storage/containment system is from Aga Cryro.

In another innovative design from Robert Allan Ltd., the RANGLer tug (which uses a body design similar to the RAstar design being deployed for Østensjø Rederi), problems with LNG storage inherent in conventional tug design have been addressed. The spacious crew accommodations are located within a stern 'castle' replacing the below deck accommodations of conventional tug designs. The space forward of the engine room is used for maximum LNG storage capacity, and is configured to allow easy installation and removal of the entire LNG tank system as an 'LNG Fuel Module.

LNG: Here to Stay

Designs of LNG-powered PSV's and tugs are no longer in the "experimental" category. In June 2015, the International Code of Safety for Ships Using Gasses or other Low Flash-Point Fuels (the "IGF" code) was adopted by the IMO. Reflecting a group of amendments to SOLAS, it will come into force on January 1, 2017. Requirements for newbuilds include independent engine room spaces with frequent air changes, piping (ventilated double sheathed), gas detection, automatic shutdown of gas supply and disconnecting of electrical equipment, and other safety measures to automatically shut down the gas supply.

LNG propulsion has turned the corner beyond logistical 'chickens and eggs.' Investment in liquefaction facilities during oil's boom years means that more LNG is available onshore at marine hubs such as Port Fourchon in the Gulf of Mexico and Melkøya in the Barents Sea. Brett Wolbrink, from Conrad Industries, notes, "There are significant efforts being put forth in the areas of reliable and stable fuel supply infrastructure and small scale equipment technologies to allow LNG as a marine fuel to be widely adopted in more downstream markets. However, there is still a considerable amount of work to be done and Conrad LNG is actively driving towards viable solutions with

LNG transfer operations in progress

Harvey Gulf

"We are extremely proud of their performance so far. The three boats have been operating for 1,261 total days and we've had no forced downtime."

– Chad Verret, Harvey Gulf EVPv

industry participants."

Eventually, says Wolbrink, LNG's scope will go well beyond PSVs and escort tugs. He adds, "Conrad LNG will continue to develop and market various vessel concepts and bunkering and supply chain solutions that include bunker vessels, FLNG's, FRU's, LNG fueled towboats and storage and cargo handling systems."

Skeptics point out that lower energy prices generally have reduced the price spreads of diesel fuel over LNG, lengthening the payback on investments in LNG powered newbuilds (or retrofits). However, continued social pressures for 'sustainable transportation' (particularly where 'name brand' charterers are footing the bill) will drive the trend towards more LNG propulsion of support vessels, tugs, and other vessels serving the energy and other critical sectors of the maritime business. It is no secret that oil majors in pursuit of environmental excellence – Statoil and Shell, for example – have actively pursued and gladly paid a premium for the benefits of LNG as fuel. That's just good business. And, if industry is on the ball, it is also business that won't go away any time soon.

Barry Parker, *bdp1 Consulting Ltd provides strategic and tactical support, including analytics and communications, to businesses across the maritime spectrum. The company can be found online at www.conconnect.com*

Robert Allan

Wartsila

Image: Jensen Marine Consultants

Where's the Fire?

San Francisco's Jensen-designed super pumping fireboat is like none that came before her. As a result, the City by the Bay is prepared like never before, for its next crisis.

By Joseph Keefe

Christened on October 17, appropriately enough on the anniversary of the 1989 Loma Prieta earthquake, the city of San Francisco's first new fireboat in almost 60 years is an especially unique boat, designed and built for a specific purpose. When the infamous quake burst the domestic water lines beneath San Francisco, it left local firefighters scrambling for a water source from which they could fight the fires that ensued. Today, Fireboat 3 – named locally by a young grade school student as the *St. Francis* – will now be there to ensure that the city's Auxiliary Water System (AWS) has the water needed to protect citizens and property. The AWS consists of five large saltwater inlet manifolds along the waterfront.

Vigor built the boat in Seattle, Washington, having laid the keel in November of 2014. At the same time, the unique vessel, designed by Seattle-based Jensen Maritime Consultants, also exemplifies the evolution and growth of the naval architecture and marine engineering firm since it was acquired by Crowley Maritime in 2008. The reasons why are plain enough to see.

Uniquely Different

Fireboat 3, designed from the keel up by Crowley's Jensen Maritime, is, like many other fireboats today, a multi-missioned hull. Unlike every other fireboat on the planet, this one was specifically designed to do at least one thing very well: pump water, lots of it and to shore connections in times of great emergency. Jensen's Johan Sperling vice president of Crowley's marine solutions group and closely involved with the Jensen design team from start to finish, told ***MarineNews*** in November, "Contrary to most other vessels, less attention was spent on hull form to allow the boat to fly at high speeds, like other fireboats. In other places, speed is one of the things that they care about. In this case they were most concerned with being able to hook it up to pump to a fire main on shore. During the last earthquake in San Francisco, it became apparent that any firefighting capability would need to come from the water." Because of that, says Sperling, the vessel is less of a fast attack platform and more of a parking space in the water.

Notably, the boat is designed for providing continuous pumping onshore for 72 hours through discharge manifolds where hoses from fire engines could be hooked up. In extreme emergencies, the new fireboat can pump for up to two weeks.

Nevertheless, the boat is also equipped and fitted for the traditional roles of search and rescue, accident response on the water and providing EMT-type service, where and when necessary. That comes with a myriad of high-tech bells and whistles. The NFPA Type II Fireboat will operate in San Francisco Bay, San Pablo Bay and the Pacific Ocean within five miles of shore. Designed primarily for Pumping, Firefighting, Rescue, EMS and Patrol, the vessel will also have CBRNE detection capabilities. The vessel is designed in accordance with ABS rules, but will not be classed.

The vessel's formidable pumping capacity – 18,000 gallons per minute (gpm) at 150 PSI and 6,000 gpm at 300 PSI – isn't the only unique aspect of the nation's newest fireboat. That's because the propulsion system is so fitted to run off the front end of the engine and the pump is run off the back (where propulsion normally runs). "The operators are much more concerned with getting (more) maximum power and pumping capability out the water, explained Sperling, adding, "There are other boats with more pumping capabilities, but for the mission profile, this is right where it needs to be. Pumping isn't an auxiliary function of this vessel."

With three Cummins Tier III engines, the vessel can be tied up and used purely as a pumping station, with each producing 6,000 GPM pumping capacity. Power is transmitted to the pumps via three Logan LC318 SAE #0 air actuated clutches and Elbe cardan shafts with a Centa Centaflex-R flywheel mounted torsional coupling. In normal operation, says Sperling, "Obviously, two of those engines are also propulsion engines, so if one of the propulsion engines failed then you would still have the ability to maintain station. And, you've got a bow thruster power, taken from one of the two smaller auxiliary engines, which also power the hotel load and lights. We can actually move at 8 KT, using water as a propulsion method."

The Jensen Way: Experience Counts

On any workboat, a vessel's layout, its systems and seakeeping ability are all critical to the vessel's operational success. In the case of this fireboat, there were many challenges, not the least of which included a tight budget for a municipality who was funding the vessel largely on the back of grant money. Because of that, the vessel was also smaller than it might otherwise have been. "When you

The fireboat under construction in Vigor's Seattle yard.
Courtesy: Vigor

consider how much equipment was packed into this hull – more than you might otherwise think is humanly possible – you can see that the shipyard and Jensen did a good job making it all work together, said Sperling. "Beyond this, San Francisco's other fireboats have been in service for 50 years – so we had to use materials that were going to last. This boat will likely be in service long after a commercial hull might be changed out. This effort included stainless steel, fiberglas, special coatings; all with the long term viability of the vessel in mind."

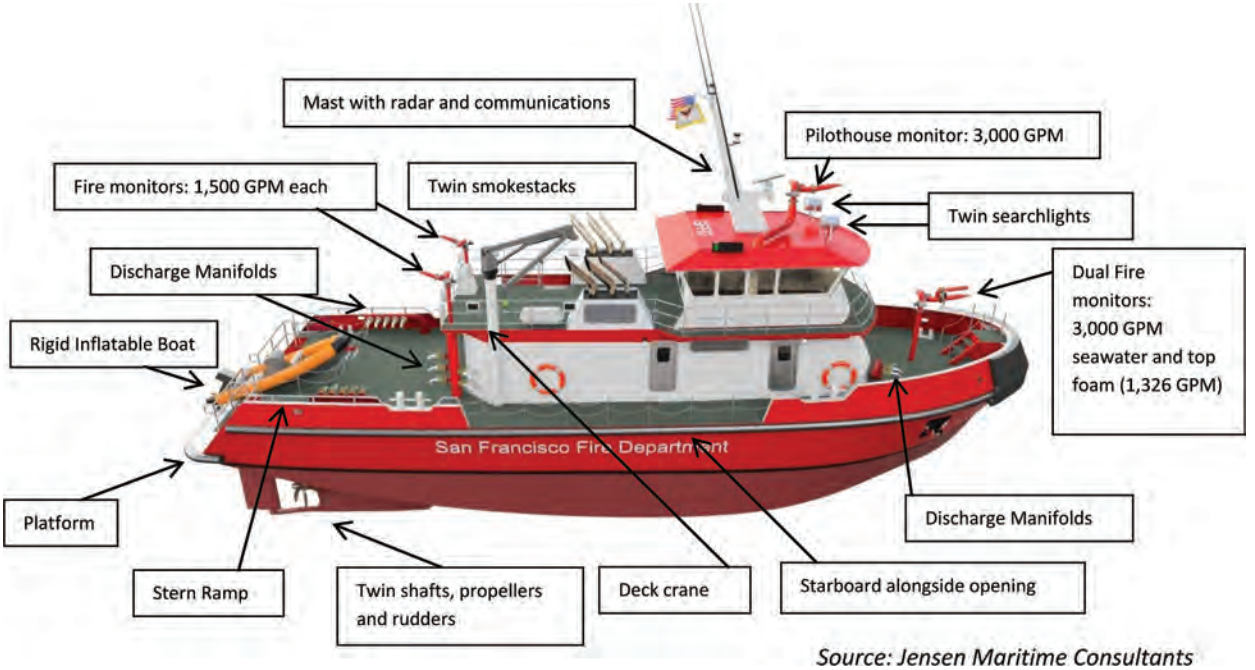
That type of effort and result took experience, both from design shop and from the deep knowledge that rests in Crowley's operational team. The knowledge sharing between Jensen and Crowley team members, says Sperling, "has been very powerful. Because we have operators on staff, mariners and maritime graduates, unlike some other naval architects, we have a very diverse team. Just by osmosis, get some that experience and imbed that into our designs. Beyond this, Crowley has a lot of boats. We have many tugboats with firefighting capability. So, there are a lot of things we've learned from the operators; what works and what does not work."

For some operators, their comments and input don't necessarily make it to the naval architect. Sperling insists that, at Crowley, that doesn't happen. "Our team really benefits from getting direct feedback from the operator. We sit in the same office as the harbor tug staff and they're not shy about telling us about something, if and when it doesn't work. And, that helps us get better in replying to and catering to third parties, as well."

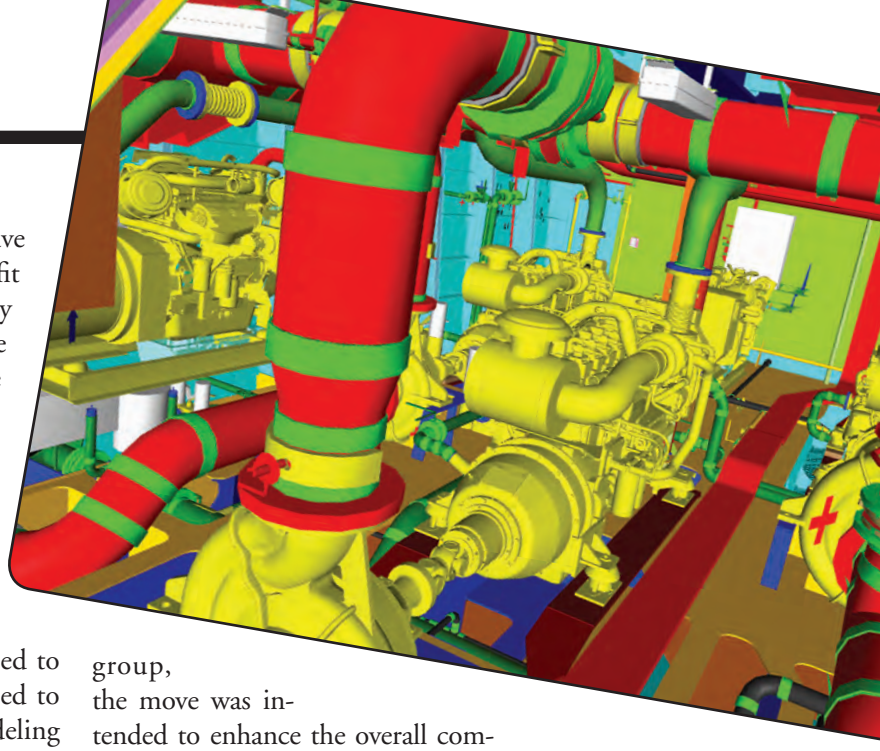
According to Sperling, in the first few years of the Crowley/Jensen relationship, Cowley operations personnel simply flooded Jensen with comments, but now, we're getting much better at managing and taking advantage of that internal skill set. And, he admits, "To me as a naval architect, there are certain times when something looks perfectly correct on paper from a naval architecture, USCG and/or class standpoint, but in actual practice on board, it might not work. So, here, we take everything in, extract the best and get the right designs and quality. And, we're getting better at it."

The new SFFD Fireboat at a glance ...

Builder: Vigor	Construction: Steel	Lubes: 175 gal @ 95%	Propulsion: 2x Cummins QSK19-M
LOA: 88'-0"	Draft: 9'-0"	Fresh Water: 250 gal @ 100%	HP:2 x 750 bhp (559 kW) 1800rpm
Breadth: 25'-0"	Crew: 3 + 4 Firefighters	Fire foam: 1,000 gal @ 95%	Fire Engine: 1 x Cummins QSK19-M
Depth: 14'-4"	Fuel: 10,900gal @ 95%	Speed: 11.5 knots	Fire Pumps: 3 x CounterFire ESF



Source: Jensen Maritime Consultants



Screen capture for the computer assisted work done at Jensen Maritime

CAD/CAM, the 3D Approach

In today's naval architect shop, 3D programs have come into play, something that make everything fit better into the hull. This isn't unique to Jensen by any means, says Sperling, adding quickly "But in this case you can now actually walk the customer through the 3D design, through the rooms and up and down the stairs, show them everything you are planning before sending the drawings to the cut shop. For this fireboat, we modeled everything. Both the owner and the shipyard managed to walk through the design and look for issues and that gives us the opportunity to move one thing from here to there. So, the technology has helped a lot and we have tried to maximize the use of technology to eliminate the need to change things later in the building process." The modeling scheme also helped to fit all that equipment onto a workboat platform with limited extra room for it.

The 3D modeling approach was especially important, especially since some of the trickiest work involved the unconventional installation of the Cummins QSK19 propulsion engines. Similar to the retrofitting of a ballast water treatment system on existing hulls, every inch of space was important and had to be planned meticulously. Using advanced technology, Jensen provided computational fluid dynamics that allowed the customer to receive highly optimized drawings for all aspects of the vessel.

Evolving to Produce Unique Solutions

As Jensen became part of Crowley's marine solutions group, the move was intended to enhance the overall company's menu of engineering services and capabilities. Evolving from a small firm that handled mainly fishing boats in 1979, then to tugs, ferries and high speed vessels, and finally to a business that drives innovation in public safety, transportation engineering and other sectors, Jensen has over time grown from 21 to 85 employees today with additional offices in Jacksonville, Houston and New Orleans.

Leveraging those resources and the collective expertise represented by one of the nation's largest and most diverse operators of marine vessels, Jensen today performs larger and more complex projects with outcomes that benefit a wide range of customers. Today, the San Francisco Fire Department's response capabilities are markedly better because of it.

Metal Shark

Innovative Boats, Unusual Collaboration

Hornblower, Horizon, Incat and Metal Shark team up on one of the most significant newbuilding projects of the year.

By Joseph Keefe

When New York City Mayor Bill de Blasio earlier this year announced the selection of Hornblower to operate as many as 20 ferries to connect a similar number of New York City neighborhoods, the magnitude of the award immediately outweighed the details of the contract. The vessels, intended to eventually form the backbone of a modern, comfortable and efficient urban ferry fleet, will also be New York City's first city-wide ferry system in over 100 years.

Now on track to launch in 2017, the news service is predicated on the on-time delivery of high tech, newbuild hulls now being constructed on the U.S. Gulf Coast. It is here where an unusually collaborative effort – in more ways than one – is shaping up as the model for future projects.

The selection of Hornblower ended a year-long competition controlled by the New York City Economic Development Corporation (NYEDC). According to NYCEDC, the City received multiple responses to that RFP and selected Hornblower on the basis of its ability to provide the highest quality service at the best value to taxpayers.

Hornblower in March promised to create more than 150 new jobs in New York Harbor, augmenting their already significant presence of local maritime professionals in the Empire State. But before any of that can happen, the new boats must be built and delivered. A focused visit to the U.S. Gulf Coast by *MarineNews* in October showed that not only are building plans on track, they include a collaborative approach that includes Hornblower itself, two boatbuilders and the vessel's designers.

MEET THE BUILDERS

In the immediate wake of the exciting NYEDC announcement, Hornblower wasted little time in awarding two familiar Gulf Coast shipbuilders the contracts to build the new fleet of ferries. Metal Shark of Franklin, LA and Horizon Shipbuilding of Bayou La Batre, AL immediately got to work. Each has been awarded and undisclosed number of hulls in the initial building phase, with options for more in the future. The two yards will construct identical Incat Crowther designed, 26-meter, 149-passenger aluminum high-speed ferries.

For its part, Hornblower didn't put all their eggs into one basket, effectively splitting the risk between two yards both known for their ability to produce high quality series-build hulls, on time and on budget. Separately, Incat Crowther also immediately set about delivering production engineering to satisfy an aggressive build schedule at multiple shipyards, with at least a dozen boats scheduled to be delivered in 2017. Hornblower's decision in this case sets up both a unique competitive process while at the same time fostering a collaborative atmosphere for one of the largest – and most aggressive – multiple hull contracts seen in some time.

In October both yards were building the hulls totally under cover and expanding local workspaces to make sure that remained the case. Horizon, which has expanded its facilities and production capabilities in recent years, will build the ferries using an assembly-line type roll-out with the first boat ready for delivery in the first quarter of 2017. Travis Short, President of Horizon Shipbuilding, told ***MarineNews*** during an extensive tour of its Alabama production facilities, "We started building on the 6th of July. Our history has been about 30-35 percent of our output is aluminum. So, we're no stranger to the exacting needs of aluminum hulls."

Separately, Metal Shark's newbuild program is also moving full steam ahead. One of the better known U.S. builders in aluminum hulls, Metal Shark also knows how to execute a series-build, high volume contract. In advance of the contract award, Metal Shark also won a MARAD grant and will complete a 150' x 80' auxiliary structure for final assembly, which was partially funded by the MARAD grant. A new 160-ton Marine Lift transporter arrives in January and will significantly facilitate the movement of boats around the yard and to the water for launch.

HORIZON SHIPBUILDING

Horizon Shipbuilding President Travis Short declined to disclose the number of hulls that Horizon had been awarded, instead saying, "We received the contract from Hornblower in June 2016. There are several, with options for more." Asked why Horizon was chosen for the contract, he replied, "Quick turnaround. For example, we recently completed a job where we had to complete 40 crewboats in 20 months. So, we've been set up before to do multiple hull construction and they knew that we had the physical capacity to do it and the fact that our area is known to have skilled aluminum boat fabricators." Horizon has already brought on 100 additional workers just for this project.

Aerial view of Horizon Shipbuilding's yard in Bayou La Batre, Ala. The new ferries will be constructed in the West Yard, visible in the upper right quadrant of the photo.

Courtesy of Horizon Shipbuilding, Inc.

As for experience, Short has Horizon is up for just about anything industry could ask. "We've always tried to be as diverse as we can. We've done a lot of government vessels over the years and my first aluminum boat, we built in 1992. And, we've competed in the foreign markets; we've done that in places like West Africa. And, I think the biggest reason we can compete overseas is that we build a good quality boat. Over time, we've delivered over 50 boats to foreign customers."

Without a doubt, there is a lot riding on this contract. That reality wasn't lost on Short, who explained, "There's a lot at stake; there's a lot of good that come out of this project for a job well done. And, our history has always been, 'We've gotten the next project because of the last project.' It might six months apart or it could be six years later, but you'll get good projects because of a job well done on another project. And this project, it will take us to new ones."

And, Horizon has ridden out the storm that the last two years have wrought, arguably as well anyone. Current projects and contracts include a utility vessel for an undisclosed East Coast client, Florida Marine Transport pushboats (another series build project now on its 20th hull), multiple

escort tugs for McAllister, and repair jobs for both the U.S. Coast Guard and the U.S. Army Corps of Engineers. Short adds, "We're also doing a yacht refit and we've got options for more boats with two of our current clients."

For Travis Short, the long-term picture is most important. "I want to develop a longstanding relationship with Hornblower. And, secondly, I want other operators, when think of Horizon, they think of a place where they can get a lot of good boats in a short amount of time. We're as customer-friendly as you can get." He points to his proprietary Gordhead software package – actively being used by all players in this multi-company project – as the perfect manifestation of that.

According to Short, Hornblower liked the transparency of the software and its ability to collaboratively track the building process, share information between all parties in real time, all without having to have boots on the ground at all times. Short even set up closed circuit TV in all work areas common to the Hornblower project. He explained, "Hornblower requested it and we set them up. I think it had everything to do with informing their clients as what was going on at all times."

Separately, Cameron Clark, Vice President and General Manager for Hornblower, commented on the contract award, saying, ""When we were looking for shipyards, we wanted to work with builders that had the same can-do attitude and innovative approach to business that we have. Being able to stay connected with the project 24/7 to resolve issues quickly was critical for us. We were impressed with the transparency of Horizon and their software, and we are confident in their ability to deliver a world class ferry product for our future NYC customers."

A late October stop in Bayou La Batre showed the Hornblower work in full swing, with the yard expanding its indoor workshops in order to accommodate the new work. Short told ***MarineNews***, "The goal is to keep ALL of it inside. When we were building the 40 crew boats, every week we flipped a hull, started a hull, and once we got rolling, we delivered a hull every Friday. We've got a similar schedule here with the ferries – the boats are twice as big, so the intervals will be longer, but the concept is exactly the same."

METAL SHARK

Almost 4 hours and 250 miles to the west of Bayou La Batre, Alabama sits Franklin, Louisiana, and the other half of Hornblower's ambitious newbuild equation. ***MarineNews*** drove east to west in late October to find that Metal Shark currently houses about 60 out of its current 250 strong workforce there, with the remainder at its second, Jeanerette, LA production facility. The firm expects to have 100+ personnel at Franklin by the second quarter of next year. Metal Shark President & CEO Chris Allard told MarineNews, "As of today there are roughly 45 people involved in aspects of the production of the first three ferries. This number will increase significantly as the vessels take shape and additional boats enter production."

Metal Shark will produce its version of the ferries at its Franklin, Louisiana shipyard, a 25-acre waterfront facility which recently received a Small Shipyard Grant from the United States Department of Transportation's Maritime Administration (MARAD) to expand its facilities and shipbuilding capabilities. Since the start of Hornblower production, Metal Shark has hired approximately 20 additional employees involved either directly or indirectly with this project. Allard adds, "At the moment we are actively recruiting new employees to support Hornblower and numerous other upcoming projects."

Horizon isn't the only yard known for efficient series-build production, and Metal Shark has set a brisk pace from the outset. Aluminum cutting for Hornblower hulls commenced in July with assembly beginning shortly thereafter. The first hull is on schedule, set to be delivered in the 1st quarter of 2017, with Metal Shark set to deliver one every other week after that. According to Allard, in late October, the first boat was 90% welded and outfitting had begun. The second hull was 60% welded, and the next hull's had already commenced.

Allard summed up the yard's progress succinctly, saying, "We are right on schedule. Trials for vessel number 1 will commence in mid-February 2017 and the vessel will be ready for delivery in the first quarter. A second hull is following close behind and hulls 3 and 4 will complete in April. We received orders for two more vessels last month, and we will deliver both of those in May. By mid-March we will be delivering a ferry approximately every two weeks."

Metal Shark assigned four naval architects/marine engineers to the project for production engineering and to provide assembly drawings. This, said Allard, enables shop workers to focus solely on assembly, not fitting compo-

nents or problem solving. He explained further, "That, coupled with tight planning, a dedicated project management team, extensive use of jigs and fixtures, and our rigorous QC processes, are keeping us on track."

Like horizon, Metal Shark remains busy on other fronts, as well. In addition to the Hornblower boats, Franklin is currently producing 45' patrol boats for an 18-boat FMS contract. Other contracts include a 60' dive tender for the US Navy, a survey boat for the Army Corps of Engineers, a 70' supply boat for Long Island, a multi-boat Navy contract for 50' high speed vessels, a 45' pilot boat for the Caribbean, and a 48-meter Incat catamaran for a private client.

And, with all of that going on, Metal shark was preparing to commence construction of a new, fully enclosed, 200' x 80' large vessel assembly building enabling weather-independent construction of vessels up to 180 feet in length. In addition, a new stand-alone office building with over 4,000 square feet of space for Franklin executive, engineering, project management, and administrative personnel will be up and running by the second quarter of 2017.

"The tremendous support we received from Incat Crowther helped make this project a reality," according to Carl Wegener, Metal Shark's director of commercial sales. "The entire collaborative process between Hornblower, Incat Crowther, and Metal Shark has been outstanding, and we're proud to be a part of one of the largest domestic ferry builds in the past decade."

Separately, Cameron Clark, VP and GM at Hornblower said in a prepared statement, "It's full steam ahead for New York City's first citywide system in over 100 years and a system that will offer a new way to work, live, play. We are using the most advanced maritime practices and Metal Shark's experience delivering large quantities of state-of-the-art vessels under a tight window to ensure that the newest additions to New York Harbor are up and floating before Summer 2017."

COLLABORATION + COMPETITION = SUCCESSFUL COMPLETION

During the design part of the project, all four parties to the boats – Incat, Hornblower, Horizon and Metal Shark – are collaborating on design and production through one web site. Given that operational reality, it might be easy to forget that Horizon and Metal shark are still competitors. They are also competitors with an important, common client, one who would like all parties to work and play well together to the successful completion of a common goal.

The USCG subchapter T ferries will ultimately delivers a 25-knot operating speed while reducing environmental impact by incorporating low emission engines and low wake technology. The bicycle and stroller-friendly vessels are ADA-compliant and boast 360-degree views. Passenger amenities include onboard WiFi, power ports for small electronics such as computers and cell phones, and large LED infotainment screens.

Before anyone gets to use any of those amenities, the boats have to be built and delivered. That part of the equation, ***MarineNews*** found out in October, is in very good hands. The first vessels from both yards are expected to be delivered in the first quarter of 2017. From our perspective, those morning commutes in the Big Apple will very soon be just a little more pleasant.

INNOVATIVE BOATS
the Best of 2016

MarineNews looks back at the past twelve months and showcases the best of North America's workboat design shop and shipyard output.

In a year where some stakeholders might not rank 2016 as the best of years in the shipyard or on the waterfront, we might disagree. And, there is plenty to write about. New contracts, deliveries and designs all combine to show that the collective workboat waterfront is moving forward, with technology, the environment and replacement tonnage requirements as the main drivers. Inland operations, Arctic requirements, LNG propulsion, dredging, government requirements, offshore wind, inland operations, harbor assist, shortsea shipping and a host of other needs were addressed and met in 2016 by North American builders. The best of those designs and deliveries are chronicled below:

Vard Marine Design for New USCG OPC

In the long-awaited decision for the U.S. Coast Guard's high-profile Offshore Patrol Cutter sweepstakes, Vard Holdings Limited earlier this year 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. Building that design is 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.

Harvey Gulf Receives ABS and USCG Approvals

In September, and signaling that it had no intention of slowing down on its quest to make 'LNG as a fuel' viable for commercial operators, Harvey Gulf International Marine (HGIM) 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 with its design partner Waller Marine, and in conjunction with ABS and USCG, HGIM developed the design package ahead of construction, minimizing the potential for delays and significant cost impacts during construction. The ATB meets all domestic and International requirements of a gas carrier. 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.

Tuco Marine's Arctic Workboat Daughter Craft

In 2016, Danish producer Tuco Marine introduced an all new Arctic Workboat Daughter Craft. Developed in response to international requests and specifications, the unique craft has been in every detail optimized for Arctic and/or cold weather operations. Tuco Marine ProZero series of Daughter Crafts, Workboats and FRC´s are designed to meet the needs of the huge number of Arctic Patrol Vessels, Icebreakers and Polar Research Vessels that are currently under development and construction. Tuco worked closely with Arctic operators and ensured that end users were closely involved in the workboat's design and layout. A module-based business model allows for quick delivery time even when the boats is customized during the design phase.

Avalon Freight Services: Redefining Shortsea Shipping

A new freight service began operation in southern California this past April. For the businesses and residents of Catalina Island who depend on freight from the mainland, this new service aims to provide the safest, fastest, quietest, most efficient, eco-friendly and state-of-the-art freight transportation in the island's history. Customers will also benefit from the use of unique and innovative tonnage built specifically for this niche trade. In doing so, Avalon Freight Services is redefining the concept of short sea shipping. Custom-designed vessels were built, and a new style of self-propelled Landing Craft named the Catalina Provider, which meets EPA Tier 3 emission standards, allows for transportation of freight or evacuation of residents. In addition to Provider, the fleet currently includes one tug – the Lucy Franco – and two deck barges. The 150-foot x 150-foot Catalina Provider, was built by Diversified Marine in Portland, Oregon, a company that had provided similar landing craft for the Alaskan fleet. Catalina Provider can carry up to 12 passengers in addition to a small number of trucks with containers as well as smaller loads.

ATB Design Comes of Age

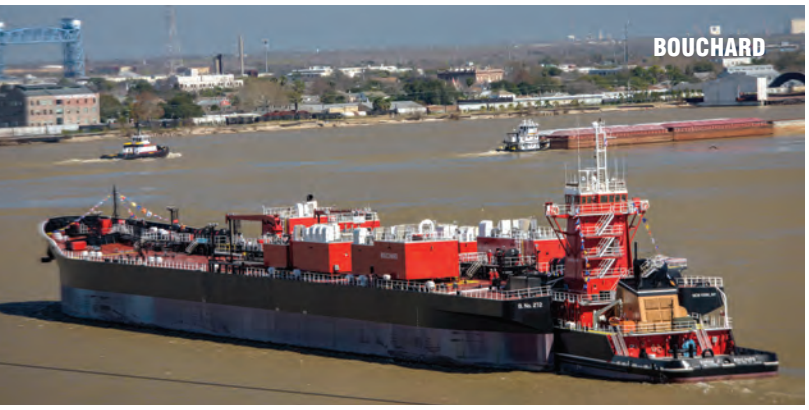
The emerging trend of marrying the design of an articulated tug and barge (ATB) to a particular propulsion system to maximize efficiencies of that system has taken hold in workboat markets. This year, a partnership between Bouchard Transportation, Guarino & Cox, Nautican Research & Development and VT Halter Marine shipbuilders aptly demonstrates the concept in practice. What the collaboration produced, is even more important. New York-based Bouchard Transportation recently launched and put into service two ATBs that operate in the U.S. Gulf and East Coasts. The tugs are first in their class designed to be double-hulled for superior environmental protection, and both barges have cargo capacity of 255,000 barrels of petroleum products. Additionally, each tug and barge is equipped with a Hyde ballast water treatment system. GCL consulted Canadian-headquartered Nautican on their propulsion system before going ahead with the design phase. While Nautican is no stranger to ATB jobs, this was their first project with Bouchard. GCL had oversight of the model test program that was carried out at Oceanic Consulting Corporation in St. John's Newfoundland. The model test confirmed the efficacy of the barge's blended skeg stern developed by GCL. Hydrodynamically, the tug and barge unit then more closely resemble a single ship-like unit with a significant reduction of resistance. The need for towing the barge is virtually non-existent, but if ever necessary, the tapered deep notch sides and the drag of the notch face will provide sufficient course stability to obviate the need for appended skegs further reducing resistance.

Moose Boats' M2-38: a Multi-Mission Wide Cabin Oil Response Catamaran

Moose Boats, an aluminum boat builder for military, law enforcement and firefighting applications in Petaluma, CA, earlier this year delivered its new M2-38 Wide Cabin Oil Response Catamaran for California Department of


TUCO MARINE

AVALON FREIGHT SERVICES


BOUCHARD

MOOSE BOATS


JENSEN

Fish and Wildlife. The catamaran's 120 square foot cabin is equipped for extended operations hosting four shock mitigating seats, a workstation, galley, dinette and cuddy cabin with a single berth. The M2's bow is equipped with a heavy-duty push knee and the foredeck is configured with handrails to assist Game Wardens with boarding other vessels for inspection purposes. The large jet guard/swim grid is equipped with a custom integrated flush mounting dive ladder, crew safety rails and an electric pot-hauler.

With federal grant funding opportunities holding individual project value caps under $1M, most agencies seeking new vessels pursue a multi-mission platform. In essence, when a grant for a new vessel is awarded, the recipient agency is motivated to equip the boat to perform as many duties as are foreseeable during its service life. The challenge for the agency, and the vessel builder, lies in ensuring that the craft to be delivered addresses all of the criteria without considerable operational compromise or exceeding the budget. A single M2 catamaran can be configured for a host of duties including patrol, search and rescue, personnel transport, firefighting, CBRN detection, side scan sonar monitoring, patient care, dive and multi-day command operations while still remaining under the $1M cap, and without detriment to its core role as a response craft.

Jensen Maritime Designs New Tier IV Tractor Tug

Jensen Maritime this year designed a new high performance tractor tug for Vessel Chartering LLC that features some of the first Tier IV engines meeting higher federal air emissions standards among U.S. tugboats. The multipurpose tractor tug, which is being built by JT Marine of Vancouver, Wash., was jointly developed by Vessel Chartering LLC and Jensen. The 110-foot long vessel will feature the ship assist and escort capabilities of smaller harbor tugs, while delivering the improved towing performance and increased range of larger ocean-going tugs. The escort capability was enhanced to provide support for assisting large,

BLOUNT BOATS


ELLICOTT

18,000 TEU containerships due to an increased future demand in West Coast ports of call. The engines are designed to meet the federal Tier IV standard, which incorporate the emissions-reducing performance requirements by the U.S. Environmental Protection Agency (EPA). To meet the requirements, the two engines on this vessel use systems that clean exhaust gases after they have left the engines. The tug is planned for delivery in the second quarter of 2017 to Vessel Chartering.


USACE

image: Richard Dollison

Blount Boats' US Flag Wind Farm Supply Vessel

Serving notice that U.S. yards can and do build workboats for the nascent North American offshore wind farm industry, Blount Boats this year delivered the Atlantic Pioneer, America's first U.S. Flagged Crew Transfer Vessel (CTV) for Atlantic Wind Transfers. It began service for Deep Water Wind Block Island at the end of May. The 21 meter aluminum vessel was designed by South Boats IOW, a pioneer in designing and manufacturing crew transfer vessels. South Boats IOW has designed and built approximately 81 crew transfer vessels for the European Offshore Wind Sector servicing wind farms throughout Europe. The South Boats' 21m is a twin hulled, all aluminum catamaran, dual certified to USCG Subchapter T (Small Passenger) to carry up to 47 passengers and subchapter L (Offshore Supply Vessel) to carry up to 16 offshore workers. The vessel was specifically designed to carry up to 12 tons of cargo in the bow and 3 tons of cargo in the stern. The forward and after decks are outfitted with cargo lashing and container sockets.


TIDEWATER

USACE M/V Dan Reeves

The M/V Dan Reeves was commissioned in January of 2016 for the U.S. Army Corps of Engineers (USACE) Little Rock District. Built by Horizon Shipbuilding and overseen by the USACE Marine Design Center, the vessel is designed to comply with proposed USCG Subchapter M Requirements. Power and propulsion is provided by two

BRUNSWICK

Cat C32 WOSR "C" Rated main engines, giving 1,300 HP Each at 1,800 to 2,100 rpm. But, it is the two Thrustmaster Z-Drives (model TH1500MZ with a 5.74:1 Reduction Gear Ratio) that make this vessel special. Thrustmaster builds a complete line of Z-Drive azimuthing thrusters from 500 HP to 4,000 HP for the inland towboat industry, specifically designed to endure the demanding conditions when operating in brown water. Beyond this, each Thrustmaster package is specifically customized for the individual hull being fitted. Using Z-Drives on towboats results in substantially improved fuel efficiency, shorter trip times, decreased maintenance downtime and higher customer satisfaction when compared to traditional shaft and rudder installations. At the same time, Thrustmaster believes that designing hull forms to optimize flow into the Z-Drives further increases performance and provide a competitive advantage to the operator. Thrustmaster struck a perfect balance between providing the ability to customize a Z-Drive to a customer's specifications while maintaining the ability to deliver a standardized product that is competitively priced and stocked with spare parts to support the vessel. Unique to this Z-Drive installation is a customized flaring of the Z-Drive inner well mount to perfectly match the curvature of the hull bottom. The depth of the inner well, which constitutes the distance between the horizontal input shaft and the propeller shaft, was also specially designed to fit the hull depth per specifications. Beyond this, the complete driveline was built to Ice Class specifications.

Ellicott's Completely New Series 2070 Dragon Dredge

Ellicott introduced a completely new design 20 inch (500 mm) cutter suction dredge, the Series 2070 Dragon dredge. The new dredger takes advantage of modern, up-to-date technology and advanced design techniques. This unit will replace the renowned Series 1870 Dragon as Ellicott's standard and in-stock 20 inch dredge. Like the 1870, the 2070 Dragon supplies ample power to the pump using a dedicated engine rated at 1300 HP (970 kW) and has a separate 440 HP (328 kW) engine dedicated to the hydraulic system. This dual-engine system allows for full hydraulic power to the cutter and winches, even when reduced RPMs on the pump are called for – something single-engine dredges cannot do. All engines are from Caterpillar and meet all current air quality standards. The entirely new hull was designed to meet BV Rules for Sheltered Waters. The new design criteria allows for increased portability and easier construction in the field. Ellicott accomplished these goals by reducing the number of side pontoons from four to two. In addition, the dredge uses a new, simplified bow gantry design. Another major improvement is the hydraulic system, which is now based on highly efficient variable displacement pumps. This approach allows for lower HP input and thus less fuel usage to get the same hydraulic power to the devices. The 2070 is also equipped with a modern electric over hydraulic control system using Parker IQAN controllers for increased reliability. Options such as anchor booms, or spud carriage, or swivel elbow discharge can be easily added. The Series 2070 Dragon is suitable for a variety of projects; including harbor, river and waterway dredging, land reclamation projects, sand mining, and mining and tailing pond assignments.

Towboats for Tidewater Transportation & Terminals Towboats

Granite Point and Ryan Point are the newest inland river towboats in Tidewater Transportation and Terminals' fleet. Three years ago, Tidewater retained the services of

naval architect CT Marine to design a towboat that can maneuver barges through the swift-moving currents, high winds, and eight navigation locks along the Columbia Snake River System. Once the plans were developed, Tidewater contracted with Vigor's Portland shipyard to construct the series of vessels, returning propulsion-construction to Swan Island, and partnered with Umpqua Bank's Equipment Leasing and Finance Division to finance the two tugs. The first vessel in the series, Crown Point, was christened in June of 2015 and has been in operation for over a year. All three vessels are built to the same specifications – 104 (length) by 38 feet (beam), with a depth at full load of 11 feet, and a hexagonal wheelhouse with floor-to-ceiling windows on all six sides. An enhanced steering system utilizing four main steering and four flanking rudders, coupled with two Caterpillar 3516C Tier 3 engines, allowed the design team to increase the margins of safety and efficiency. With crew endurance being a priority, Tidewater employed Noise Control Engineers (NCE) to develop a sound and vibration control package. By incorporating Christie and Grey vibration control mounts and comprehensive acoustic insulation, noise levels register at less than 60 decibels in the accommodations during vessel operation – which is equivalent to an air conditioner.

Brunswick's Groundbreaking IMPACT RHIB's

In late November, Brunswick Commercial & Government Products (BCGP) introduced an 8.5-meter aluminum RHIB. A first of its kind for the Company, the 850 Aluminum Impact RHIB is the introductory model from a line-up that features five variants ranging in size from 7.5-meters to 12-meters. Designed for the commercial and government marketplace, BCGP will market the new line-up to domestic law enforcement agencies as well as militaries worldwide. The aluminum hull is a mill-finish welded structure designed by BCGP, fabricated by a local aluminum contractor and assembled at the Company's Florida headquarters. Notable features include dual 350 HP Mercury Marine Verado outboard engines, a hard-sided urethane-coated polyester fabric collar system by CPI, shock mitigating SHOXS Seats, a Raymarine electronics package and a Boatmaster heavy duty aluminum trailer. According to Brunswick, the new aluminum RHIBs augment the firm's existing product line-up by its ability to offer customers a one-stop shop experience. Now providing both aluminum and fiberglass solutions, Brunswick will help government agencies have more commonality in their fleets, allowing for maintenance optimization and interoperability for officers in the field." The announcement followed the firm's earlier introduction of its most exciting hull to date – one that can now be ordered with an aluminum hull. First on board to test drive the new vessel was ***MarineNews*** Editor Joe Keefe. An exhilarating 35 minute cruise revealed all of the exciting features the new vessel had to offer – whether barreling ahead at 63 KT in open waters or smartly backing down at the berth with the help of Brunswick's JPO joy stick controls. Taken from the new wide body 11 meter RHIB design, the boat has an all-new top skin with two options: the full tube IMPACT, and the D Collar style. Turning on a dime at more than 60 KT, the vessel represents a major breakthrough for municipal and military customers, both in terms of maneuverability and new features that promise to dramatically improve boat handling and navigation for small patrol craft. Brunswick will position the craft to sell into the municipal law enforcement and military, littoral patrol markets.

Marine Battery Systems Come of Age

Saft's Seanergy Marine Battery System offers a different way forward in the quest for reduced emissions in marine propulsion.

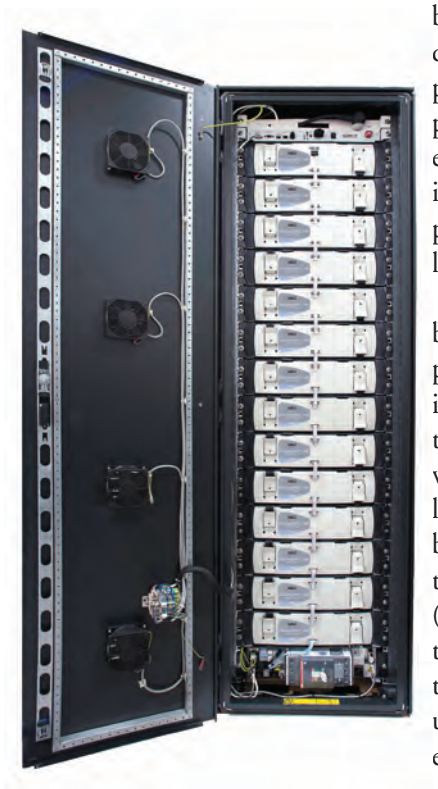
By Annie Sennet

Stricter Regulations Demand Immediate Solutions

Discovering new means to reduce emissions and improve energy efficiencies are top-of-mind for all companies in today's day and age. The Paris Climate Deal, initiated nearly a year ago, is just one example of the world coming together to combat global warming.

In the marine industry, operating with clean propulsion is a crucial goal for all parties involved, from navies, designers and shipyards to original equipment manufacturers (OEMS) and battery suppliers. With new environmental regulations implemented regularly, it is imperative for ship designers to integrate innovative technologies into the architecture that include revolutionary battery technologies to address emission reductions and cost efficiencies.

Workboat operators are increasingly looking to hybrid propulsion systems to enhance operational performance with the clean and consistent power generated from hybrid systems. This demand – driven in part by regulatory pressures being exerted on the marine industry – is also propelling rapid technological advances.



Saft, the industrial battery specialist, plays an essential role in the marine industry, partnering with various parties to deliver fully integrated battery systems, particularly lithium-ion (Li-ion) with vast technical support to the OEMS and end users. This cutting-edge technology contributes to achieving the rigorous operational targets set for reduced emissions, safety, fuel efficiency, vessel productivity and optimized total cost of ownership (TCO).

Addressing Clean Propulsion Demands

With the Li-ion battery market anticipated to increase to more than $77 billion by 2024, from $30 billion in 2015, it is clear advanced Li-ion technology is well-suited to address the needs of the marine industry. Saft's Li-ion Super-Iron Phosphate (SLFP) maintenance-free technology delivers increased safety, high efficiency, and a long calendar and cycling life. Another advantage of SLFP is its compact footprint containing full electric propulsion.

In 2014, Saft launched its Seanergy marine Li-ion modules, a fully integrated solution containing SLFP chemistry, delivering safety, performance and reliability qualities of SLFP. Seanergy is a specially designed solution for civil marine propulsion installations. Its design flexibility coupled with energy and power modules enable it to power full-electric and hybrid electric marine applications.

Sustainability and energy efficiency are among the demands of the civil marine industry powering the need for electric propulsion in order to reduce emissions and noise all the while increasing efficiency. Saft's state-of-the-art technology addresses the needs of the marine transportation industry – silent, clean and cost-effective.

Saft appreciates the critical safety needs involved in industry applications, and the numerous standards to be addressed and met. Thus, with its more than 20 year history in developing cutting-edge and customized Li-ion battery solutions for the space and satellite divisions, it was equipped to develop the essential demands of harsh marine environments. Saft provides Seanergy customers with confidence, serving as the 'end-to-end' manufacturer of the complete system, thus maintaining ownership of comprehensive quality control.

Nearly two years ago, the Independent Safety Assessor (ISA), Bureau Veritas awarded Saft's Seanergy technology with the premier certification for safety approval set forth

by marine specificities and standards. Bureau Veritas granted the certification after completing an independent design review, sample testing and verification of product controls. Beyond this, Seanergy is also DNV certified. Most recently, Saft's Seanergy energy storage systems received approval from the Norwegian Maritime Authority. With SLFP chemistry, the batteries passed every simulated thermal runaway test.

Seanergy technology … was the ideal power solution for Rolls Royce to insert into its high energy battery system for OV Bøkfjord, a hybrid multi-application workboat vessel owned by Kystverket, the Norwegian Coastal Administration (NCA).

Because batteries contain chemical substances commonly associated with inherent dangers, Saft customizes each battery system to its customers' precise requisites. With safety at the forefront, Saft ensures each system is fitted with the right combination of chemistry, technology and electronics to provide the safest and most efficient battery system.

Seanergy On Board the OV Bøkfjord

Coupled with Saft's proven track record for providing critical safety in industry applications, along with the various certifications awarded for the Seanergy technology, it was the ideal power solution for Rolls Royce to insert into its high energy battery system for OV Bøkfjord, a hybrid multi-application workboat vessel owned by Kystverket, the Norwegian Coastal Administration (NCA).

The vessel went into service in September of this year and is the third in the NCA's multifunctional fleet. It will help the NCA with numerous tasks from maintaining the infrastructure of navigation of other ships in the area, to providing onsite assistance in the middle of the ocean for emergencies. Also, it will support the completion of routine maintenance tasks required for lighthouses and fixed and floating aids.

Addressing the rigorous environmental implications for the marine industry, the battery system from Saft and Rolls Royce will help NCA address its climate and environmental goals. For this workboat's hybrid propulsion system, Saft's Li-ion technology energy storage system works in tandem with the hybrid diesel gensets and together deliver up to 25 percent in fuel savings for the OV Bøkfjord.

Peak shaving enabled by the battery system will provide the vessel with exceptional emission control, reduce the strain on the diesel engine and help reach peak power demand as needed. In fact, the battery system will provide enough power for the vessel to run, using a single diesel engine. From an overnight hotel load perspective, the battery will be able to provide power for the whole night while the engine is shut off and parked.

Whether there is shore connection or not, the battery system will take care of the power required for lighting, kitchen, and other similar functions. Saft's Seanergy technology onboard the OV Bøkfjord is additionally designed to withstand the various climate and temperature changes the vessel will experience while operating across the ocean.

Seanergy: Paving the Way for the Future

This progressive, hybrid power system multi-purpose workboat is paving the way for technological advances and demonstrating the efficiencies possible when utilizing cutting-edge technology. In today's fast-paced and digitalized world, marine operators everywhere are striving to achieve instant gratification in the most efficient ways possible. Saft's Seanergy technology has already shown what is achievable when utilizing customized technology that can optimize hybrids and other applications.

With the world releasing more than 30 billion tons of carbon dioxide in a single year, a sum expected to rise in the future, new regulations and tactics to combat these emissions will be in abundance. Saft's Seanergy solution is just one example of its commitment to protecting the environment.

***Annie Sennet** is the Executive Vice President of Saft's Space and Defense Division. She began her career with Gates batteries in Gainesville, FL which was purchased by Saft in 1994.*

Stainless Metering Valves for Marine Lubrication Systems

Corrosion-proof stainless steel offers major advantages over epoxy-encapsulated models.

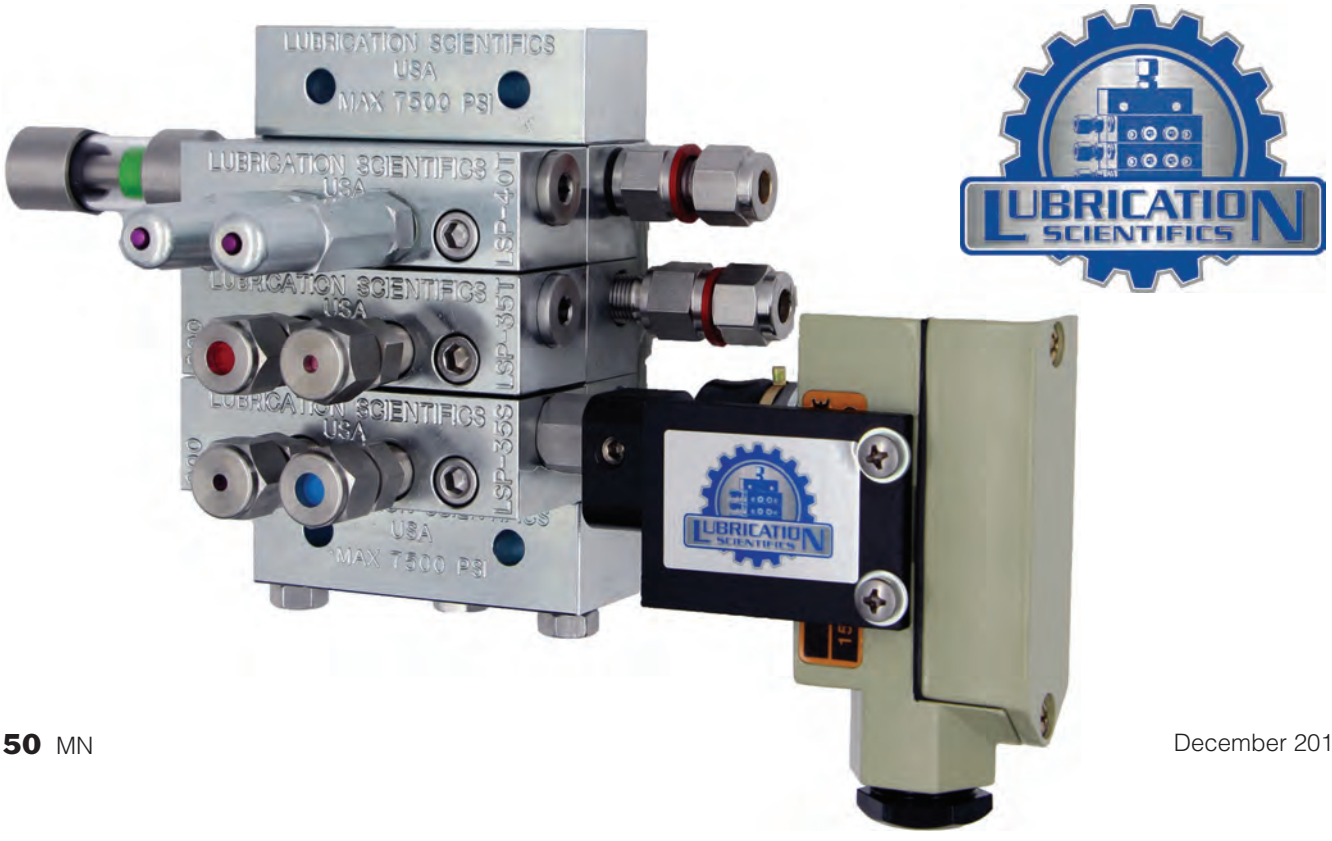
Propeller shafts and thrusters, steering gears, deck cranes, winches, and turrets – virtually any gear that is supported by bearing components such as rollers, spines, gears, ball bearings or other moving parts – are all dependent upon lubrication to fend off the destructive forces of corrosion.

Automated lubrication systems, which are the preferred solution to regulating and dispensing the necessary lubrication to bearing points, are also subject to caustic corrosion. The traditional solution to protecting against that – encapsulating lubrication system metering valves in epoxy – can result in long-term equipment servicing problems. The better solution may be to use costly, yet more economical, stainless steel.

In December of 2015, a new $300 million U.S. Navy combat ship had to be towed to port less than three weeks after it was launched. The vessel had effectively lost its propulsion system due to metal filings in its lubrication oil system, a problem that could cost over a million dollars and months of time to repair.

Because corrosion by seawater – aqueous corrosion – is an electrochemical process, most metals and alloys are subject to various degrees of destructive corrosion, pitting, erosion or cavitation – except for 316 stainless steel. Automated, state-of-the-art lubrication systems provide grease or oil to many bearing points on board a ship. These systems eliminate the cost and hazards of manually dispensing lubricants, and also ensure longer bearing wear life.

There are several different types of automated lubrication systems, but a typical system consists of controller/timer, pump with reservoir, supply line, metering valves and feed lines. Whatever the design, the heart of the automated lubrication system is the metering valve that dispenses oil or grease in controlled proportions to each con-



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nected lube point at precise intervals.

Many of today's most common marine automatic lubrication applications require large series progressive metering valves. These valves are assembled from inlet, piston, and end sections. Each piston section dispenses an engineered amount of lubricant to the bearing point(s), to which it is connected. These large series progressive metering valves are generally only available in plated carbon steel, which will not offer optimum life in high corrosion applications.

To protect these large carbon steel series progressive metering valves from aqueous corrosion, a prominent manufacturer of lubrication system components instructs its distributors to encapsulate the valve body in epoxy material, which is impervious to the corrosive effects of seawater and salt air.

Unfortunately, these epoxy-encapsulated valves are virtually impervious to maintenance as well. When a piston section of the valve ultimately fails, the complete unit is rendered unusable because it is so impossible for shipboard maintenance personnel to disassemble the epoxy encapsulated valve assembly, replace the one piston section.

The inability to service sections of epoxy-encapsulated metering valve assemblies is a costly predicament. If it is an eight-section valve, the cost to the customer is approximately $30,000. So, if a section goes bad, the user has to discard one $30,000 valve and replace it with another $30,000 valve. If the metering valve assembly were not encapsulated in epoxy, it would be a simple procedure to replace a faulty valve section for a cost of approximately $2,500.00. To avoid the high costs of replacing epoxy-encapsulated metering valves, Lubrication Scientifics recently introduced a line of marine lubrication systems that features a metering valve constructed of 316 stainless steel.

The 316 stainless advantage

Grade 316 stainless is austenitic chromium-nickel steel that contains corrosion-resistant molybdenum, which is highly resistant to pitting and crevice corrosion in seawater environments. Crevice protection is particularly significant for metering valves composed of sections that are sandwiched together so that they may be serviced individually. It is advisable to look for a company that is committed to making stainless steel metering valves for many different applications, and keeps a large supply of 316 stainless on hand for fast delivery.

Richard Hanley is President and founder of Lubrication Scientifics, LLC, which produces a full product offering of American made lubrication pumps, metering devices, electronic controls, switches, monitors, and automatic lubrication system accessories, which are available in both plated steel and stainless steel construction. www.lubricationscientifics.com

U.S. Coast Guard Mourns the Passing of
ADM Kramek

The U.S. Coast Guard is mourning the recent loss of former commandant **Adm. Robert E. Kramek**, who died Oct. 20, 2016. Kramek served as the Coast Guard's 20th commandant from 1994 through 1998, during which time he significantly expanded the Coast Guard's global reach and influence as commandant, including directing active participation in the combined service/international anti-narcotic smuggling operations Frontier Shield and Gulf Shield, along with other law enforcement operations. Kramek was a steadfast leader during national tragedies, such as the crashes of Alaska Airlines Flight 301 in February 1996 off the coast of California and TWA Flight 800 outside of New York five months later. He successfully led the Coast Guard through difficult budget issues and directed the "streamlining" plan mandated by President Bill Clinton's National Performance Review and Mandate For Change. He graduated from the U.S. Coast Guard Academy in 1961 with a Bachelor of Science degree in engineering and was both a surface operations specialist and naval engineer. Kramek additionally earned Master of Science degrees in the fields of naval architecture, marine engineering, mechanical engineering and engineering management.

Thomson

NMRA officers

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Thordon's Thomson Receives SNAME Fellowship

At the 2016 SNAME Maritime Convention in Bellevue, Washington, **George A. (Sandy)** Thomson was elected a Fellow of the Society of Naval Architects and Marine Engineers. The grade of Fellow is accorded exclusively to "individuals who have made outstanding personal contributions to naval architecture, marine or ocean engineering, or allied disciplines through significant achievements in design, research, production, operation, education or associated management." Sandy is currently owner and Chairman of the Board of Thomson-Gordon Group, the parent of Canada-based Thordon Bearings.

NMRA Elects New Officers, BoD

The National Marine Representatives Association (NMRA) has elected its officers and board of directors to govern the organization in 2016–2017. One new officer and two board members join the leadership group. **Keith LaMarr** of Macaroni Marketing was elected NMRA president and **Neal Trombley** of Gulf Atlantic Marketing is vice-president. **Clayton Smith** of Waters & David Co. is the new treasurer. The NMRA serves independent marine sales representatives and the manufacturers who sell through representatives.

GAC North America – Logistics Makes Management Changes

GAC North America - Logistics (GNAL) has made two managerial changes. **Paul Fardy** has been appointed Managing Director, based in Houston. Previously GAC Management Systems Director at the GAC Group's Corporate Headquarters, Fardy brings more than 25 years of industry experience to his new role. He takes over from **Claus Schensema**, who has now been appointed Director - General Freight to focus his knowledge of the sector throughout North America. A veteran of 25 years in shipping and logistics, Schensema has served a variety of Management roles for GAC worldwide.

Oilfield Helping Hands Appoints Rachal as President

Oilfield Helping Hands (OHH), a nonprofit charitable organization comprised of volunteers who provide financial assistance to oilfield workers in financial crisis, has appointed **Gregory Rachal** as president. Since founded in 2003, OHH has raised more than $3.3 million for more than 300 families affected by financial hardships. Rachal has extensive experience in drilling fluids, previously holding positions with M-I SWACO and Halliburton. He holds a bachelor of science degree from Northwestern State University.

Foss VP Hayman Appointed to USMMA BoV

Foss Maritime VP of HSQE & External Affairs, **Susan Hayman**, has been nominated by President Barack Obama to the United States Merchant Marine Academy's (USMMA)


Schensema


Rachal


Hayman


Bennell


Diaz

Board of Visitors. The Board of Visitors provides oversight, advice and recommendations on matters relating to the United States Merchant Marine Academy. Hayman is a 1980 graduate of USMMA and a 1986 graduate of Harvard Business School. After several years of sea-going experience, Hayman held various key management positions within the maritime industry.

Faststream Adds Two to C-Suite Roles

Specialist maritime recruiter Faststream has appointed **Martin Bennell** as Managing Director. Martin joined Faststream three years ago and steps up from Maritime Director to take full responsibility of Faststream's US and EMEA businesses. He spent over 16 years in the sector including experience in leading Oil & Gas and Maritime recruitment operations. Faststream also announced the arrival of U.S. Coast Guard and Maritime recruitment veteran **Adam Diaz** to their expanding Houston office. In 2011, Adam was selected to become a U.S. Coast Guard recruiter where he was named the Rookie Recruiter of the Year for Houston during his first year in the role and Regional Recruiter of the Year in 2013 and 2015.

Moore & Company Hires Martin

Moore & Company announced the hiring of attorney **Anny Martin**. She graduated from the University of Florida Levin College of Law. Martin also has earned a Masters in Business

Mourning the Loss of MPT's
Amy Beavers

Amy Beavers, USCG Licensed Master, Academic Principal and VP of Regulatory Compliance at Maritime Professional Training, passed away on November 5. A longtime maritime training expert and provider, Amy was widely regarded as one of the most knowledgeable stakeholders in the industry when it came to regulatory matters, especially where it intersected the U.S. Coast Guard's credentialing department. Notably, she served as Vice Chair of the Merchant Marine Personnel Advisory Committee (MERPAC), but to most of the mariners who came through MPT for training, she was simply regarded as the "go-to" person for answers. Beavers was also a tireless advocate for American mariners who made the long trip "up the hawsepipe." To say that many owe their credentials to her today would not be overstating the case. MPT released the following statement on her passing: It is with the heaviest and saddest of hearts that we share with all of you that our beloved principal Amy Morley-Beavers has passed away. To everyone who knew her, she will be remembered as the bravest, smartest, passionate, most wonderful person. Her smile will be with us always and she will be missed forever … by all of us at MPT, by MERPAC, by Coast Guard agencies around the world, by the countless mariners and friends whose lives she touched. She was an inspiration to us all. She left this world Saturday, November 5, 2016 surrounded by her family and love.

Martin

Vorih

Sullivan

Corrigan

Administration from Universidad Católica Boliviana in La Paz, Bolivia. Prior to receiving her MBA, she graduated from UCLA with a BA in Political Science.

OMEGA Engineering Appoints Vorih as President

Joe Vorih has been named President of OMEGA Engineering. As President of CLARCOR Engine Mobile Solutions, he transformed the organization with a focused effort to serve the needs of original equipment manufacturers, launched several breakthrough programs, and opened a new manufacturing and sales presence in India. He holds Bachelor's and Master's degrees in Mechanical Engineering from MIT and an MBA from Rensselaer Polytechnic Institute.

Viega Names Sullivan as CFO

Viega LLC announced John Sullivan as its new chief financial officer. Sullivan has more than 25 years of experience in executive leadership in a variety of roles. He also has seven years of experience working in the commercial and industrial water application sectors. Sullivan earned a bachelor's degree in finance from Northeastern University and a master's of business administration from Bentley University.

BC Ferries' Corrigan Named Interferry CEO

Interferry chairman Mike Grainger announced that the global trade association's new CEO is to be **Mike Corrigan**, currently president and CEO of Canada's BC Ferries, who will leave this role on March 31 next year and immediately take up his new post. The announcement came at the AGM held during Interferry's 41st annual conference. Corrigan said he plans to ensure that the industry's voice is well represented to international regulators and that members maximize the opportunities to network and share best practices.

Dan-Bunkering (America) adds Two to Houston Team

Dan-Bunkering (America) announced that **Andrew Parker** has been named as a Bunker Trader. Andrew is in possession of a degree in Mechanical Engineering and is joining Dan-Bunkering after holding a position with an oil major. **Michelle Guerra** also joined the firm as Operations/Administration Assistant. Michelle comes with a Bachelor of Science in Business Administration.

Pettit Adds to Sales Team

Pettit Marine Paint announced the addition of Scott Trimble as Technical Sales Representative. Trimble will be responsible for bolstering customer retention efforts and developing new relationships in the vital Gulf Coast and Caribbean markets. He brings 13 years of industry experience to the position. A NACE International Institute-certified level 2 Coating Inspector, Trimble has received comprehensive training and has significant experience in topside paints and antifouling coatings.


Parker


Guerra


Trimble


Ayotte


Allegretti


Watts

AMP Names Senator Ayotte 'Champion of Maritime'

The American Maritime Partnership (AMP), the voice of the domestic maritime industry, recognized U.S. Senator **Kelly Ayotte** (R-NH) in October with the 2016 Champion of Maritime Award. AMP honored Sen. Ayotte due to her extraordinary support and dedication to the American maritime industry. "Sen. Ayotte has been a tremendous and valued champion for the domestic American maritime industry, serving as a principled leader who truly understands our industry's critical role to the vitality and security of our nation," AMP Chairman Tom Allegretti said.

Port of Greater Baton Rouge Commission Elects 2017 Officers

The board of commissioners for the Port of Greater Baton Rouge recently elected officers for 2017. Officers elected include Bobby Watts, East Baton Rouge Parish, President; Brenda Hurst, West Baton Rouge Parish, vice president; Angela Machen, PhD., East Baton Rouge Parish, secretary; and Kevin Stevens, East Baton Rouge, treasurer. Bobby Watts, president, is retired from the East Baton Rouge Tax Assessor's Office and resides in Central. Angela Machen, PhD, secretary, is a principal in Machen Management Group. Kevin Stevens, treasurer, is co-owner of Blanchard's Building Materials in Plaquemine, as well as co-owner of State Lumber and Hardware


Wiernicki


McAndrews


LaGrange


Jaenichen


Benzie


Watson

located on Highland Road in Baton Rouge. The port governance body is a 15-member commission appointed by Governor John Bel Edwards to establish policy and provide oversight into the port's development.

Wiernicki Honored with AOTOS Award

Christopher J. Wiernicki, Chairman, President and CEO of ABS, was honored for his outstanding contributions to the maritime industry by the United Seamen's Service (USS) as a recipient of the Admiral of the Ocean Seas Award. This award is conferred on those who have made noteworthy contributions to the maritime industry. Wiernicki joined industry leaders Arthur E. Imperatore, Founder and President of New York Waterways, and Donald Marcus, President of IOMM&P, Mates & Pilots, who also were recognized at the USS event.

AAPA Names 2016-17 Chair & Honors LaGrange

Mark McAndrews, port director of the Port of Pascagoula, MS, was formally installed as the 2016-17 chairman of the board for the American Association of Port Authorities (AAPA) – the voice of seaports in the Americas. He succeeds Jim Quinn, President and CEO of Port Saint John in New Brunswick, Canada. McAndrews also chairs the association's U.S. delegation, whose other officers include Chairman-Elect Steven Cernak of Port Everglades, and Vice-Chairman William D. Friedman of the Cleveland-Cuyahoga County Port Authority. Also during their recent convention, AAPA honored **Gary LaGrange**, President & Chief Executive Officer of the Port of New Orleans, with its Distinguished Service Award.

Marad Awards $4.85 Million for Marine Highway Projects

The U.S. DOT has awarded $4.85 million in grants to six Marine Highway projects along the waterways of 17 states and the District of Columbia. The grants will help expand existing marine highway operations across New York Harbor, along the Mississippi River between New Orleans, La., Baton Rouge, La., and Memphis, Tenn., and on the East Coast between Richmond and Hampton Roads in Virginia. Funding is also provided to support a demonstration project between St. Louis, Mo., and Chicago, Ill., as well as planning efforts to determine the feasibility of commuter ferry services between Virginia and the District of Columbia, and a Container-on-Barge service along the Mississippi River between New Orleans, La., Minneapolis, Minn., and Chicago, Ill. "It is essential that we invest in integrated, multi-modal transportation systems that support the efficient movement of freight and people throughout this country," said Maritime Administrator **Paul "Chip" Jaenichen.**

IMCA Publishes 2015 DP Station Keeping Report

The predominant main cause for dynamic positioning (DP) station keeping events and incidents for 2015 was thruster/ propulsion, according to the recently published International Marine Contractors Association (IMCA) 'Dynamic Positioning Station Keeping Review: Incidents and events reported for 2015' (M 233). This repeats the 2012, 2013 and 2014 findings. "We would urge all DP operators to submit reports, as it is only by doing so that others benefit from lessons learnt," explains IMCA's Technical Director, **Richard Benzie**. There were 20 DP incidents, 49 DP undesired events, and 11 DP downtime reports submitted in 2015.

ABS Earns Auditor Status in AWO RCP

ABS has been approved by the American Waterways Operators (AWO) to carry out audits of its Responsible Carrier Program (RCP). The RCP, a safety management system for tugboat, towboat and barge companies, requires AWO member companies to undergo periodic management and vessel audits conducted by an independent third party. "As we meet with towing vessel owners, we hear repeated requests for help in identifying compliance options that best fit their fleet needs," says ABS Americas Division President **James Watson.**

Northern Lights, HUG Engineering Partner on Diesel Exhaust Solutions

Northern Lights and HUG Engineering have partnered to provide clean air power generation solutions. Northern Lights' marine generator sets and HUG's selective catalytic NOx reduction (SCR) systems or particle filter (DPF) systems come as one completely integrated solution. IMO III Certified and meeting performance and packaging requirements of the maritime industry, the SCR/DPF is available for Northern Lights units above 115kWe on vessels over 500 GRT.

www.northern-lights.com

Safety with Harken's Tight Radius System (TR31)

Harken Industrial's TR31 Tight Radius rail and trolley system prevents the binding that bothers deck crew most about safety tethers. Inside the compact aluminum trolley, four anti-friction rollers engage both sides of the rail, smoothly and securely following elevation changes and rail radius contours as tight as 200 mm. Crew never have to unhook, but always remain safely tethered.

www.harkenindustrial.com

MOB System for SubM Compliance

Tugboat companies complying with Subchapter M regulations are required to have man overboard (MOB) procedures in place, including a way of retrieving crew who have fallen overboard. C-HERO's MOB Total Solution includes the C-HERO Lift Portable MOB Davit, C-HERO Reach Attachment Pole, and Emerald Marine Products' ALERT2 Man-Overboard Alarm System. The pioneering ALERT2 system consists of a water-activated transmitter and receiver. When the unit is immersed in water, a piercing wheelhouse alarm alerts crew to the fall.

www.c-hero.com

Enginei Fuel Management and Monitoring

Enginei fuel monitoring systems provide fuel data analysis and reporting options to provide vessel operators with engine performance information. Enginei records fuel consumption data by individual engines, presented on board via touchscreen monitors installed on the bridge and in engine control rooms. The system remotely sends information to shore where it is accessed through a web dashboard to show an operational profile of a vessel.

www.enginei.co.uk

McMurdo SmartFind M5 AIS Class A Transponder

Compliant with the US Coast Guard Mandate, the McMurdo SmartFind M5 is a flexible, low-cost, easy to install, user-friendly AIS Class A transponder, incorporating a fully comprehensive AIS MOB and AIS SART alarm to aid in MOB recovery. The M5 offers view-at-a-glance the AIS status of vessels in the vicinity and access to a host of detailed navigation information.

www.McMurdogroup.com

Improve Process Performance, Reduce Total Life Cycle Costs

Convenient remote access of automated valves is possible with the Axiom AN with AS-Interface featuring Bluetooth technology. The new patent pending StoneL Wireless Link app allows operators to easily access hard-to-reach valves using an iPhone or iPad. Wireless access to valve controllers will lower costs associated with commissioning, installation and maintenance while increasing safety – reducing downtime, increasing vessel reliability and increasing profitability.

www.stonel.com

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Altra's complement of products for the marine market such as clutches, brakes, couplings, gearing, geared motors, and linear actuators have supported many prominent marine customers for years by providing decades of marine market expertise in a variety of marine applications such as deck machinery (various winches and crane/hoist systems), propulsion systems and auxiliary drives (such as dredge pumps, jet pumps, cutter heads and generator drives).

www.altramotion.com

Larson Electronics Portable LED Work Light

Larson Electronics' 150 watt portable LED work light is mounted to an adjustable aluminum frame and is a versatile, explosion proof work light that produces 17,500 lumens of light while drawing only 150 watts of power and provides 10,000 square feet of work area coverage. This explosion proof LED work light is fabricated from lightweight aluminum with a convenient carrying handle built into the top of the frame.

www.Larsonelectronics.com

Bison's System For Weighing Containers on Chassis

Bison's portable container weighing solution is tailored for weighing containers on trailer chassis. The system is a timely innovation, with recent amendments to the SOLAS convention forcing shippers to verify the weight of every export container. Targeted at exporters and logistics companies needing to weigh containers outside of ports and other high volume container hubs, BISON C-Legs provide a flexible solution for SOLAS VGM compliance.

www.bison-jacks.com

Victaulic's STYLE 99 Roust-A-Bout Coupling

Designed for plain and beveled-end carbon steel and stainless steel pipe, Victaulic's IACS type-and USCG approved Style 99 Roust-A-Bout couplings are the ideal solution for retrofits and repairs, offering effective pipe-joining alternatives to welding/flanging by removing the need for hot works and associated costs while eliminating safety issues. Couplings can be installed quickly and repairs can be made while the vessel is in service.

www.victaulic.com

Energy Storage System from Corvus Energy

The Corvus Energy ESS was recently installed on a tall ship, combined with an electric propulsion system. When not under sail, the ship will be propelled by electric motors directly connected to the propeller shafts and drawing energy from the Corvus ESS, instead of diesel engines. Under sail, the energy of the passing water will cause the propellers to rotate, which will re-charge the Corvus ESS.

www.corvusenergy.com

Krill System's LNG Regasification Monitoring System

Krill Systems' Regasification Monitoring System captures both liquid and gas flow data from more than 200 onboard data sensors, fitted at critical points, via direct interface into the vessel's computer control systems (IAS). The data is both displayed onboard and relayed to shore to replicate the onboard data display monitor, and deliver onshore managers with a complete overview of system status.

www.krillsystems.com

Twin Disc's Product Expansion Benefits Workboats

Twin Disc products and enhancements benefit commercial mariners worldwide. For example, E-STEER is Twin Disc's ground-breaking new approach to marine steering. Instead of countless yards of labor-intensive, leak-prone and expensive hydraulic lines, it connects the helm and hydraulic-powered rudder(s) electronically. Speed Sensing technology provides adaptive resistance. At full throttle, the helm is firm; at slow maneuvering speeds, it's light and highly responsive.

www.twindisc.com

Harrington Hoists and a New Corporate Logo

Harrington Hoists has unveiled their new corporate logo, unifying branding within the KITO Group Companies. Their new logo incorporates Harrington's original brand with that of their parent company, KITO CORPORATION, providing consistency in communications to their end-users, partners, investors and media. Harrington Hoists is a manufacturer of electric and air powered chain hoists and other related equipment.

www.harringtonhoists.com

APEM's Single Axis Hall Effect Paddle

APEM's joystick BH series paddle controller offers non-contact Hall effect technology in a compact size. Developed for use in mild to extreme environments, the BH series provides a smooth and responsive movement at your fingertips. The BH series is ideal in applications such as remote control boxes, vehicles and in material handling environments where precision and reliable operation is crucial.

www.apem.com

Cam Latch from Southco Prevents Accidental Opening

Southco has expanded its E5 Cam Latch series with a new latch designed to prevent accidental opening. The drop bushing feature of the E5 Shutter Cam Latch adds additional security by preventing the cam from rotating open in high vibration applications. The E5 Shutter Cam Latch meets NEMA 4 and IP65 standards for water and dust protection, as well as EN61373, the shock and vibration standard for transport applications.

www.southco.com

Specops Group Protects Assets and Secures Working Areas

The M5 Flashcam is a complete night vision system. It can switch automatically to covert night vision mode and document all night time activities. A perfect tool for security personnel for transport companies, container terminals, harbors and ports, the M5 Flaschcam features a 1-½ inch color monitor and the 16 Gigabyte ram allows for 15 hours of high quality A/V or 27 000 high resolution snapshots.

www.specopsgroup.com

3M Personal Safety Division Launches Safety Blog

Worker health & safety information is everywhere, but it's often very confusing. To help customers cut through the clutter, 3M's Safety Now & Next blog provides relevant and easier-to-understand information from different PPE offerings, such as Active Safety, Detection Solutions, Fall Protection, Head and Face Protection, Hearing Protection, Industrial Ergonomic Devices, Protective Apparel, Protective Communications, Protective Eyewear, Reflective Material, Respiratory Protection and Welding Safety.

www.3m.com

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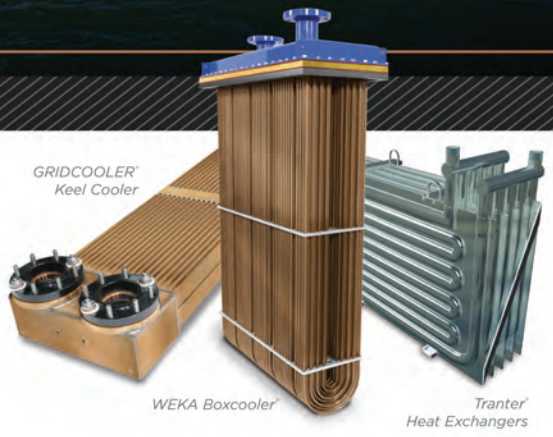

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