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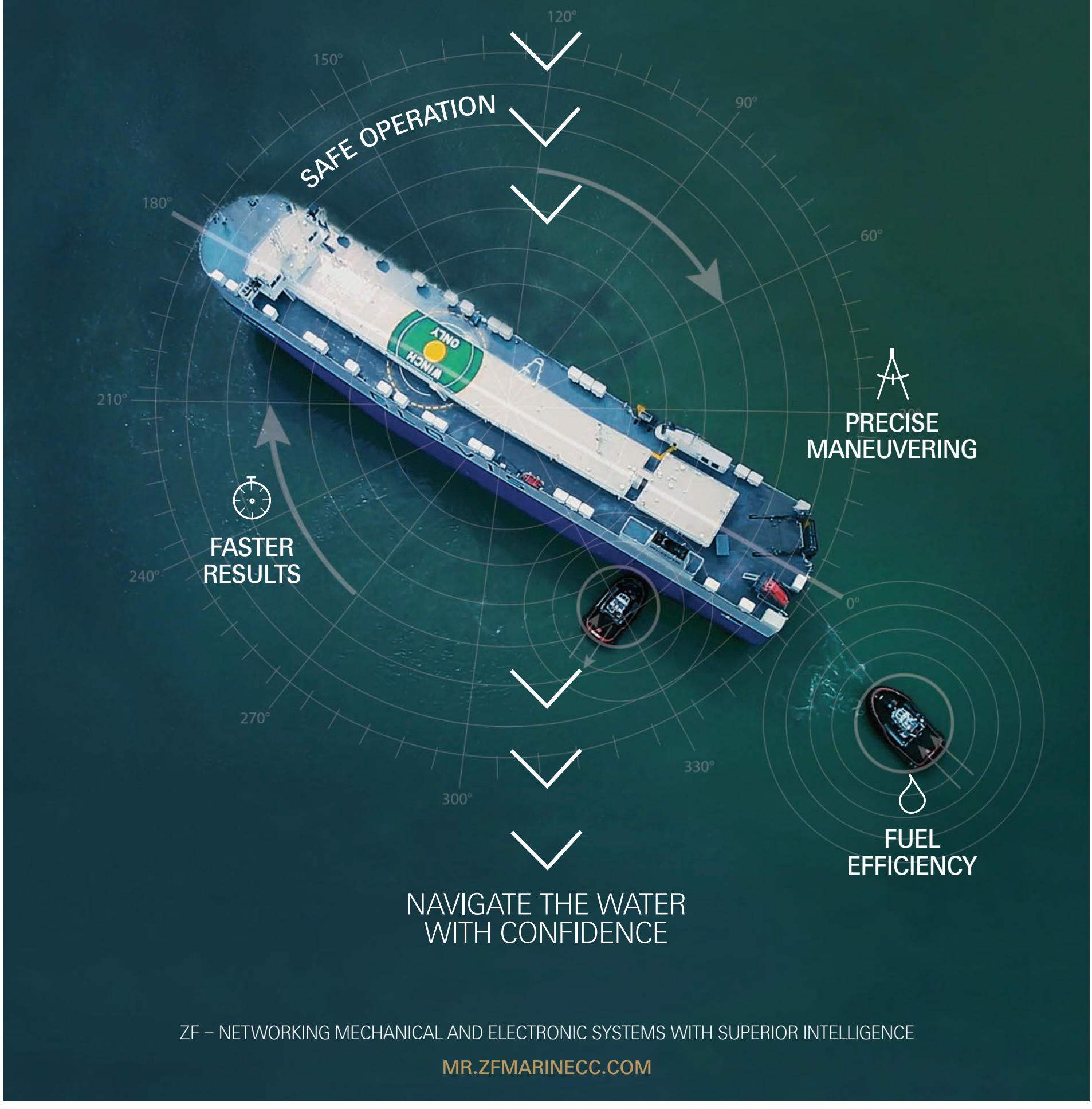

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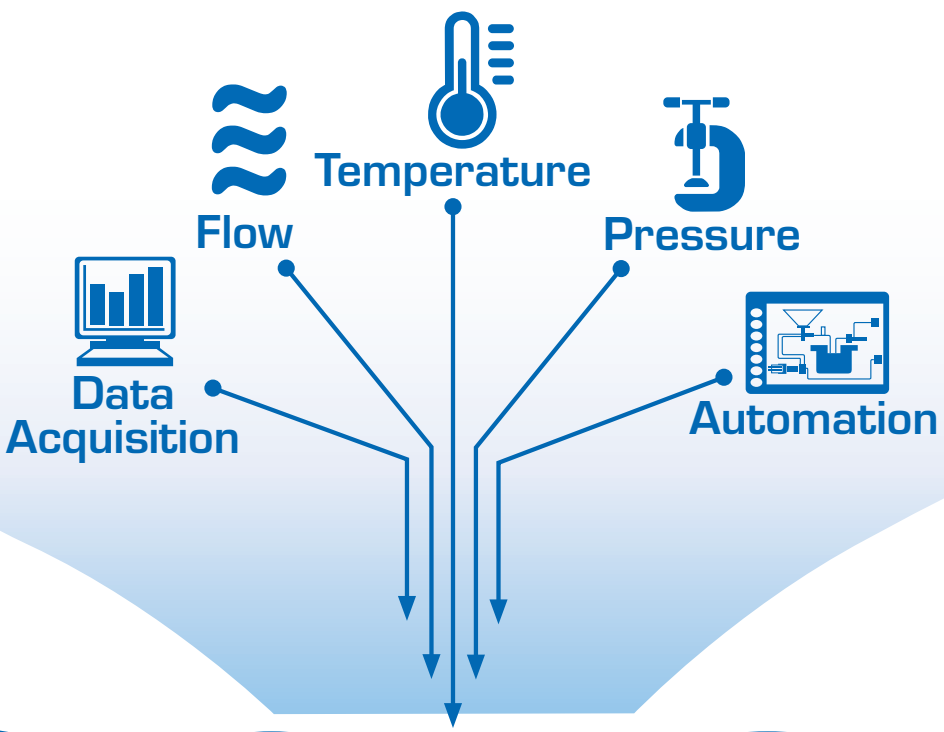

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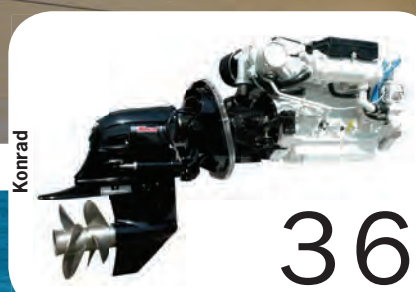

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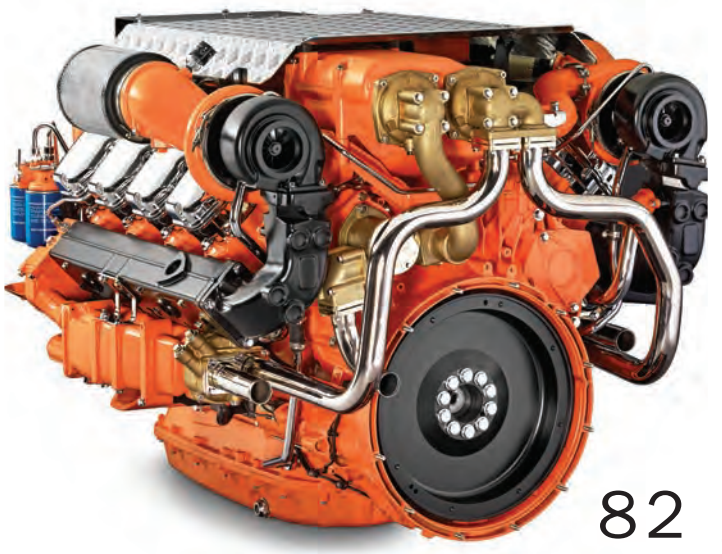

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THE COVER

Bouchard
Pictured on this month's cover is the Morton S. Bouchard Jr. Bouchard Transportation Co., Inc. is the country's largest independently owned oceangoing petroleum barge company, and this month Morton S. Bouchard III weighs in on many matters maritime – including calling the clean water ballast sytem issue a 'disaster.' The story starts on page 61.

(Photo Courtesy Bouchard)

Photo: Fincantieri Bay Shipbuilding

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'Best Kept Secret' in Shipbuilding

In Sturgeon Bay, Wis., Fincantieri Bay Shipbuilding is firing on all cylinders.

By Greg Trauthwein

Photo: Rolls-Royce

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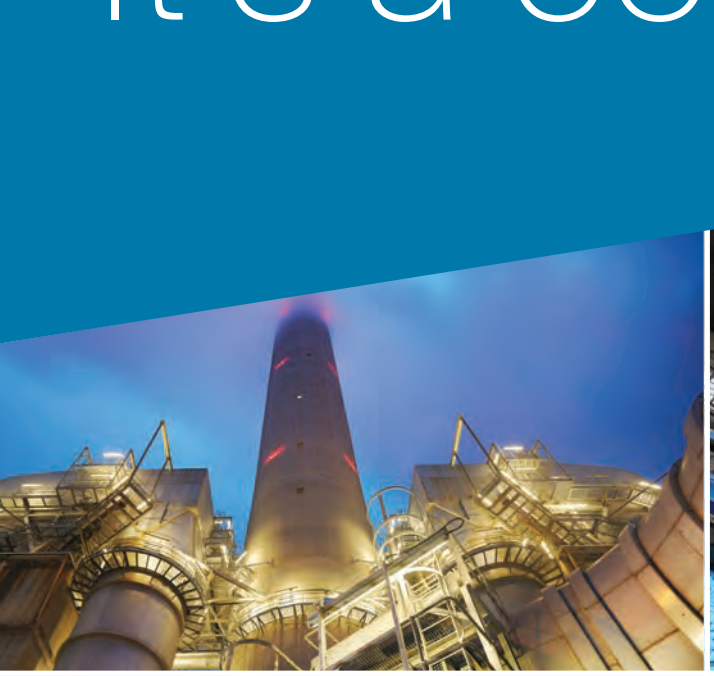




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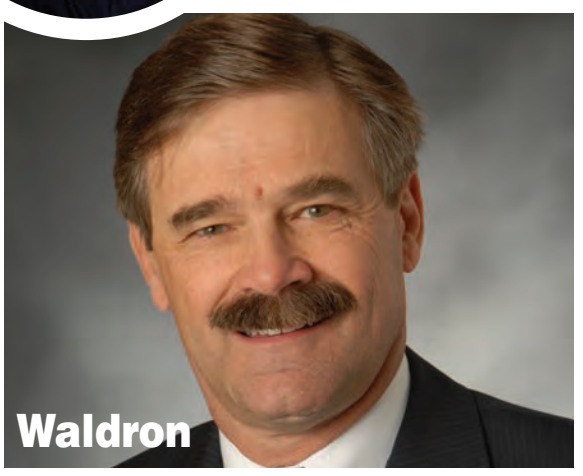
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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

While this is the 'Workboat Annual,' I would be remiss to not kick-off this edition with information on a landmark decision from the International Maritime Organization that set January 1, 2020 as the implementation date for a significant reduction in the sulfur content of the fuel oil used by ships.

The decision was approved late last month to implement a global sulfur cap of 0.50%, a mammoth reduction from the current 3.5% global limit. While the industry is certainly not surprised by the new limits, many were surprised by the deadline of January 1, 2020, particularly when you take into consideration that the fuel does not exist today. This topic will be regular fodder for cover in our pages, starting in the December 2016 edition, as the move to 0.5% comes with a number of ramifications regarding logistics and technical support on board.

Sticking with fuel, I invite you to turn to page 44 for William Stoichevski's report on the uptake of LNG in the maritime sector, a report that comes in stark contrast to much of the coverage given to the fuel in the general maritime press.

While the environmental advantages of LNG are undeniable, Stoichevski met with a trio of prominent Norwegian vessel owners that have labeled the switch to LNG "a disaster," and in fact one is investigating the technical possibility of switching back to diesel.

This edition is packed with interviews and overviews, but here I would like to highlight two that I found particularly compelling.

Starting on page 24 in our "Voices" section is a one-on-one with Forrest Lucas, entitled "The Every Man Tycoon." Lucas is a literal 'rags-to-riches' tale of hard work and opportunity, and while his main focus to date has been road transport for his oil products, Lucas Oil is present and growing in the maritime sector.

If you open up to the center of the publication on page 64 you will see one of my favorite shipyard shots of all time, and this from someone who is not particularly simpatico with the winter months.

Last month I had the opportunity to spend a day in Sturgeon Bay, Wis., at Fincantieri Bay Shipbuilding with Todd Thayse, Vice President and General Manager. The shipyard is bustling with both new construction and ship repair business, and growing stronger with its recent acquisition of the Palmer Johnson yard which is literally adjacent to its facility. As the winter weather arrives in the coming months, so too will the shipyard's "Winter Fleet," a collection of 16 to 18 Great Lakes carriers that arrive in the shipyard for maintenance and dry docking throughout the winter. Read the story, and I'm certain you will agree that in Sturgeon Bay is 'The Best Kept Secret in Shipbuilding.'

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America Needs Icebreakers

Russia has more polar icebreakers than the rest of the world combined. America has one polar icebreaker and that one is well past its prime. There has been talk of sharing icebreakers. Sharing may work with allies, who are generally on the same page. Sharing will not work with Russia, which views the world as a zero-sum game.

In June 2016, Russia announced the launching of Arktika, the world's largest polar icebreaker. With a full load displacement of 33,540 tons, a length of 173.3 meters and a breadth of 34 meters, it will be capable of breaking ice up to 2.9 meters. Sea trials are scheduled for 2017. It is planned as the first of a series, with the keel of the first of the sister ships already laid. Russia also announced that it is developing a design for an even more powerful class of icebreakers, capable of navigating through ice four to five meters thick and able to transit the Northern Sea Route year-round.

For several years, the National Science Foundation (NSF), administrators of the U.S. Antarctic Program, chartered a Russian icebreaker each Antarctic summer to support its annual resupply voyages to McMurdo Station, called Operation Deep Freeze. Support is now provided by the one USCG polar icebreaker.

The Chinese government has an ice-capable research vessel – Xue Long (Snow Dragon). The vessel conducts research and mission support in both the Antarctic and the Arctic. It is able to run at 1.5 knots in ice up to three feet thick. A second, more capable vessel is under construction. Other nations, such as Argentina, Australia, Chile, France, South Africa, and the U.K. have ice-capable vessels that operate in Antarctic waters.

The U.S. Coast Guard has a strong working relationship with its northern counterpart – the Canadian Coast Guard. In fact, the two entities not infrequently conduct joint operations in the Arctic. The Canadian Coast Guard has one operational polar icebreaker. CCG Louis St. Laurent was commissioned 49 years ago. It is expected to provide an effective presence over an area of the Arctic much greater than that of the U.S. Arctic waters. As with the U.S. situation, the Canadian government has committed to construction of a replacement icebreaker, but funding has yet to be identified.

The time is long overdue for the Administration and Congress to work toward the common goal of reasserting the U.S. in the polar regions. At the end of World War II, the U.S. had the largest fleet of icebreakers in the world. Those icebreakers were not nearly as capable as modern technology now allows, but they got the job done. They facilitated the exploration of the Antarctic and the building of the Dew Line, among other things.

Not long after the polar icebreakers USCGC Polar Star and USCG Polar Sea entered active service in 1976 and 1977 respectively, the last of the Wind class icebreakers, as well as the USS/USCG Glacier, were decommissioned. The Polar Sea was taken out of service in 2010 due to major engineering problems. The medium icebreaker USCGC Healy entered service in 1999, but its ability to operate in heavy ice is limited, as evidenced by the difficulty experienced in escorting the tanker bringing emergency fuel to Nome in January 2012.

The current situation did not occur overnight. Many have warned of the problem, but few have listened and none have acted. The various Administrations have not, until now, budgeted for construction of a new icebreaker. Congress has conducted several hearings, but never, until now, shown interest in appropriating funds. It is doubtful if this Administration and this Congress, both in their last few months, will actually appropriate the monies needed to do any more than kick the can down the road.

The US Coast Guard has drawn up a basic plan for construction of a new polar icebreaker, but this is the most that it can do without Congressional approval. President Obama recently announced steps to accelerate the acquisition of additional icebreakers and there has been increasing support for this initiative in Congress, but Mister Green has yet to make a meaningful appearance.

The Coast Guard believes that six icebreakers are needed to satisfy the strategic needs of the U.S. in the polar regions. For now, though, it will settle for one new polar icebreaker. Its 'needs list' provides for a vessel that can move at a continuous speed of three knots through six-feet-thick ice and, by backing and ramming, break through a 21-foot-thick ice ridge. It must be able to operate in air temperatures from -72° F to 114° F and in water temperatures from 28.8° F to 87° F. With a crew of approximately 100, plus scientific personnel, it must be capable of deployment for at least 80 days. It must be able to launch, land, and support helicopters and to tow ocean-going vessels in the ice. It must also be capable of supporting a wide range of scientific activity.

The Coast Guard envisions its icebreakers to be equipped with .50 caliber machine guns. I advocate that they be designed so that heavier weapons can installed quickly, should the need arise.

Nuclear power would provide a number of advantages, but is impractical for U.S. icebreakers for a number of reasons.

While the Administration has limited its request to funding for one new icebreaker, Representative Duncan Hunter (R-CA), chair of the House Subcommittee on Coast Guard and Maritime Transportation, has called for funding for multiple icebreakers. I recommend that the U.S. commit itself to the construction of one new polar icebreaker every five years for the foreseeable future. Thus, as one of the fleet of six icebreakers reaches the end of its service life, there will be a new replacement coming down the ways. Since building of a new icebreaker is projected to take five years, this suggested construction program could hit a sweet spot. This program would also encourage US shipyards to take the project seriously and plan for the long term rather than as a one-off effort. Congress recently appropriated $7 million for preliminary design work on a new polar icebreaker.

Climate change has allowed increased maritime traffic through the Northern Sea Route north of Russia and through the Northwest Passage north of Alaska and the Canadian mainland. The recent transit of the cruise ship Crystal Serenity through the Northwest Passage has highlighted the dire status of Arctic infrastructure. Charts of those waters are inadequate. Search and rescue capability is sparse. Pollution response and salvage capability is virtually nonexistent.

The U.S. Navy has no ice-capable surface vessels. It relies wholly on the U.S. Coast Guard for surface vessel force projection in the polar regions, except when those waters are relatively ice-free. Given the current state of the USCG icebreaker fleet, American national security and homeland security in the polar regions is at risk.

America needs icebreakers, not more talk.

The Author

DENNIS BRYANT

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Hanjin's Collapse

Calculating the Human Cost

JOSEPH KEEFE

The policy of U.S. immigration officials, who have barred Hanjin sailors from coming ashore, is merely the most overt part of the pain being experienced by these mariners – and others, all over the globe.

A long time ago – way before there was something called MLC 2006 – I was a cargo surveyor and loss control man working out of Houston, Texas. That job took me to a lot of places, but much of that involved being sent 75 miles offshore into the U.S. Gulf to the various lightering zones where VLCCs would arrive with far too much cargo (and associated draft) to enter U.S. ports. There, my principals would ask me to attend as many as three, four and even five crude oil STS lighterings. That crude oil, once transferred to smaller 500,000 barrel capacity vessels, eventually would discharge at Gulf Coast refineries.

One such assignment took place off of Southwest Pass, Louisiana. The independent inspector and I were transported as usual via helicopter to meet the mother ship. Coincidentally, it was a Korean-manned tanker that had lifted its entire cargo of Nigerian crude oil more than two weeks prior. Upon disembarking the helicopter on board, we met with the Master who advised us that the first lightering vessel was still more than two days away.

With that bit disappointing news out of the way (after all, there's nothing like an extra two days offshore camped in the cadet's cabin), we headed to the conference room of the non-air conditioned vessel to sift through the consignee's documents.

Once seated in the conference room, the Master asked us if we wanted some refreshments – a beer, perhaps? – while we went through the documents. The inspector and I looked at each other and shrugged. With two days to kill and not much else to do, it sounded like as good an idea as any other. Sure, we'll take a beer, we said.

A few minutes later, the ice cold beverages appeared and as we cracked the seals, we found ourselves being stared at by what seemed like at least half of the ship's complement. I turned to my inspector and said quietly, "I'll bet you five bucks that these are the last two beers on the boat." I was right.

They also didn't have much of anything else. By day two on board, we were reduced to consuming some sort of thin gruel at each meal. By the third lightering operation, I finally asked the old man if they were planning on getting stores any time in the next decade. He apologized (profusely) and said that he had requested a full re-provisioning several times but that it had not yet come and probably wouldn't until the full lightering operation had completed and they could move closer to Southwest Pass for bunkers and other logistics.

I was none too happy and I'm guessing the inspector – who was anything but a small man – joined me in that sentiment. He later confided in me that he had lost 10 pounds during that week from hell. Our discomfort, however unpleasant, was temporary. Unlike the VLCC's crew, we could sneak a sandwich or a bite now and then on the lightering vessels as we crossed back and forth to do custody transfer surveys. Meanwhile, you had to feel for the crew, and we did.

You could see the impact of the reduced diet on these guys; both in terms of performance and general attitude. As we lifted off in the helicopter more than one week after arriving offshore, I was thankful that I had options that they did not.

That sort of thing, they tell me, happens a lot less often these days. We can thank the Maritime Labor Convention, which entered into force in August 2013, for much of that progress. But, clearly there is more to be done.

Fast Forward to 2016

A prolonged downturn in many seagoing trades – offshore support vessels for energy, the bulk trades and container shipping, just to name a few – is still ongoing. You didn't need me to tell you that, but the long term impact of low freight rates for the bulk and boxship trades is cumulatively taking its toll, here and globally.

For the offshore support sector, this typically has translated into outright vessel layups. For those crews, the pain of unemployment is punishment enough. For those still employed at sea on marginally profitable or breakeven vessels, the fallout is less evident. Nonetheless, it is there, and it is significant. The downturn affects what operators can spend on amenities, safety and everything else in between.

Perhaps the most egregious example of this situation has played out in the collapse of one of the world's largest shipping companies. As Hanjin Shipping struggles to right the ship and satisfy its many creditors and customers, lost in the mix is the human cost of the disaster. Recently it was being reported that crews aboard Hanjin vessels in American ports were being prevented by U.S. authorities from coming ashore. Adding insult to injury, the policy further punishes crews who, through no fault of their own, are toiling for a principal that no longer has the means to pay for bunkers, never mind trivial things like fresh water, food and other basic necessities.

Soon after the announcement of Hanjin's financial collapse, position reports of the 97 vessels under Hanjin's control were widely broadcast. And, as the legal wheels churned in preparation of any Hanjin vessel that might try to reach berth, plans were made from the other side for the arrest of the vessels. The operator, in return, pondered its next move and knowing what was likely to come next, hesitated in berthing its vessels as scheduled.

For all that planning, I'm guessing very little thought was put into mitigating the impact that the situation might have on the thousands of mariners that found themselves stranded on board Hanjin tonnage.

Preventing those who did get to the berth from disembarking for a few hours of respite at U.S. ports (under the misguided premise that they might be flight risks) was a prime example of that metric in play.

Also lost on the many analysts, stakeholders and the Wall Street MBA's who prognosticated on what might come next was the fact that a shipping company that can't afford to pay its bills also lacked the wherewithal to feed its mariners and buy fuel to ensure that the hotel functions of the vessels remained viable. And, many of these vessels spent weeks at sea awaiting some sort of resolution that might allow the company to dock and discharge the vessels. During that time, of course, reprovisioning and refueling of these ships simply wasn't possible. I've got a pretty good idea, based on previous experience, as to what they are eating now.

In one case just recently reported, four Scottish cadets were finally repatriated from a Hanjin boxship in the Far East after spending weeks at sea as the operator schemed to avoid the vessel's arrest international waters.

Now reportedly back in the U.K., the cadets are among the lucky ones. Another estimated 2,500 seafarers haven't been as fortunate. As the situation plays out, we have to hope that all will eventually be returned home, paid in full for their services and given assurances that this will never happen again. That said, and in a time when we need to be attracting the best and the brightest for the future, forecasted mariner shortage, many just won't be coming back. Those four U.K.-based cadets are probably having second thoughts, as well.

The Tip of the Iceberg

The Hanjin crisis is no doubt the most visible manifestation of a difficult shipping climate for some sectors.

For my part, I wonder how many operators in a time of repressed freight rates, and facing tough decisions, have already cut back on many of the basic necessities that mariners rely upon, every day at sea and in port.

I'll double down on my earlier five dollar bet that it is far more prevalent than you might otherwise think.

We've come a long way in the quest to make sure that today's mariners are properly trained, safely billeted, adequately compensated and treated with dignity.

We've also got a long way to go.

That said, until the accountants and lawyers begin to factor in the human cost of shipping, the effort to recruit and retain competent mariners will be about as successful as Hanjin's efforts to stay solvent. It is easy math, actually.

The Author

Joseph Keefe is the lead commentator of MaritimeProfessional.com. Additionally, he is Editor of both Maritime Professional and MarineNews print magazines. He can be reached at jkeefe@maritimeprofessional.com or at Keefe@marinelink.com. MaritimeProfessional.com is the largest business networking site devoted to the marine industry. Each day thousands of industry professionals around the world log on to network, connect and communicate.

The Top 5 Risks Facing Workboats

Staying Afloat

DAMON VAUGHAN

According to the Bureau of Transportation Statistics, commercial vessel-related fatalities and injuries have been trending downward in recent years. This is likely due to heightened awareness of the risks aboard these vessels, as well as a focus on hiring more seasoned crew members. Forty-one vessel-related fatalities were reported on commercial ships in 2010 – down significantly from the 85 reported 10 years earlier. At the same time, 139 vessel-related injuries were recorded, compared to 175. An experienced crew can help reduce risk exposure – if they know where to look. Typically, five major risks threaten commercial vessels.

1 Collision

As mentioned above, collisions – whether involving swimmers, kayakers, recreational boaters, commercial vessel operators, bridges or ports/marinas – can present a variety of dangers to vessel operators, crew and bystanders. In a well-known 1993 incident, barges being pushed by a tow boat collided with the Big Bayou Canot railroad bridge outside Mobile, Ala. The accident led to the deaths of 47 people on an Amtrak train that attempted to cross the damaged railroad bridge. An additional 103 people were injured, according to the National Transportation Safety Board. This tragic event helped to shed light on what can be done to prevent future accidents of this nature. In this particular incidence, dense fog was reported in the area, and the vessel might have taken additional precautions in light of the reduced visibility. Other tips to avoid collisions include ensuring:

- *The pilot and crew are not fatigued.*
- *The vessel has proper lighting.*
- *The pilot is properly trained and experienced in navigating busy waterways, as well as tighter shipping channels.*
- *The pilot is aware of weather and traffic conditions and has proper, working equipment onboard to assist with this task.*
- *Pilots and crew are trained to respond to and report an accident.*

2 Fire

Another major risk to workboat owners, operators and their crew is fire. Aboard a vessel, fires can be started by something as small as a lit cigarette or something as significant as an explosion in the engine room. Fortunately, crew can take steps to keep fire risk at a minimum, ensuring:

- *Electrical systems are installed and maintained by a certified marine electrician.*
- *Electrical connections and wiring are connected properly and not exhibiting signs of corrosion or wear and tear.*
- *Clear signage is posted.*
- *Fire extinguishers are inspected and accessible.*
- *Debris is cleared and flammable materials are kept in only necessary and limited quantities.*
- *Fuel sources are kept separate from ignitions and openings are covered.*

3 Equipment

Equipment can also create onboard hazards for workboats. Older equipment,inadequately maintained equipment, and untrained operators can spark dangerous accidents. Tips to mitigate that risk exposure include:

- *Servicing and inspecting machinery before use.*
- *Checking cable lines regularly.*
- *Allowing only trained crewmen to operate machinery.*
- *Adding rails to equipment where necessary.*
- *Wearing protective gear for head, eyes and hands.*
- *Avoiding standing on or over lines connected to winches under tension.*
- *Turning off the power source before making repairs to machinery.*

4 Slips & Falls

Slips, trips, and falls are common injuries for many businesses and for workboats in particular, which have wet, slippery decks. Besides slipping on the wet deck, crewmembers can trip over an obstacle, fall from a ladder, or fall through an uncovered hatch in the deck. Several factors can play a part in these unfortunate accidents, such as improper shoes, fatigue, poor visibility, the transporting of heavy items and simply changing walking speed. To keep these accidents at a minimum, owners, operators and crew should ensure:

- *Decks are clean and spills are cleaned immediately.*
- *Leaks are repaired.*
- *Gear is stowed and secure when out of use.*
- *Decks and walkways are painted with non-slip paint.*
- *Ramps are secured.*
- *De-icing procedures are implemented when necessary.*
- *Crew is aware of conditions of poor visibility.*
- *Proper lighting is used for night work.*
- *Non-slip safety shoes or boots are worn.*
- *Deck hatches and holes are covered or closed.*

5 Man Overboard

Unfortunately, falling overboard remains a leading risk for workboat operators and crew. Slips and falls can contribute to these accidents, as well as fatigue. To prevent these accidents from occurring, all crew working on the deck must wear a U.S. Coast Guard-approved personal flotation device (PFD) or life jacket. Other tips to prevent crew from falling off the vessel include:

- *Maintaining PFDs and keeping them easily accessible.*
- *Training crew to use lifesaving equipment.*
- *Ensuring vessels over 26 feet have a life buoy ring accessible.*
- *Keeping all lifesaving equipment aboard easily accessible and in good condition.*
- *Marking the perimeter of the deck with paint and installing rails where appropriate.*
- *Conducting a job hazard analysis and crew safety training regularly.*
- *Monitoring crew fatigue and lack of concentration.*

Know Your Risks

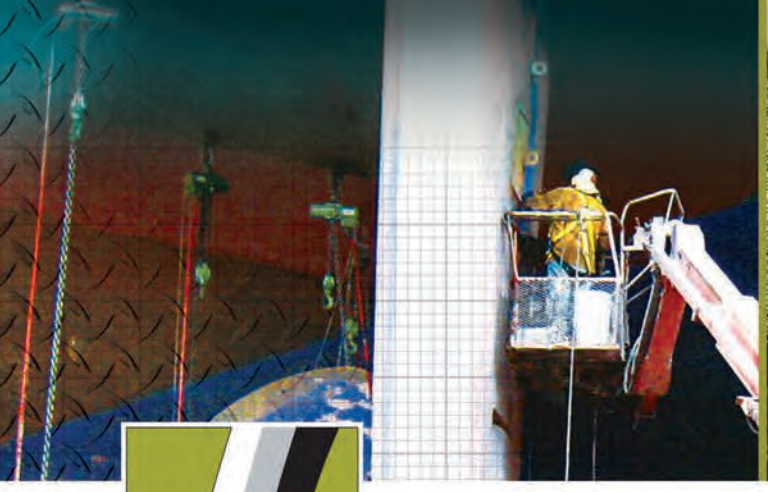
Being mindful of safety practices is key for preventing and reducing crew injuries and fatalities—and it's also good for business. In fact, new safety standards for towing vessels are required under new regulations. Subchapter M, finalized by the U.S. Coast Guard in June, describes comprehensive safety guidance and sets compliance rules, standards and oversight for towing vessels.

Vessel owners can also contact risk control experts and safety engineers to assist them in evaluating the risk exposure of individual vessels or simply talk to their insurance agents. These professionals can make recommendations and risk mitigation plans to help crew operate their vessels in the safest manner possible.

Workboats will always be an essential part of America's waterways, helping to transport goods and services from shore to shore. Let's be sure our crews are fit for the task by keeping them safe and sound.

The Author

Damon Vaughan is senior vice president at Tidal Marine, a commercial marine insurance program administered by Venture Insurance Programs. He has specialized in marine business, both primary and reinsurance for 20 years, working in London, Bermuda and New York. Tidal covers a wide variety of commercial marine vessels including supply, utility and crew boats, to tugs and barges.



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Offshore Crewing Requirements

Could it make things worse?

JONATHAN K. WALDRON

It has been years (2009) since I last wrote an article discussing the availability of U.S. citizens to work offshore in support of oil and gas projects during a downturn in the economy. And now, it is even worse. With the price of oil and gas remaining depressed for many months now, and the many new developments related to drilling ashore, and domestic vessels remaining stacked in the Gulf of Mexico (GOM), companies are working hard to find work in any market around the world. This downturn in activity also means less jobs for U.S. citizen seafarers.

This of course all means that everyone is now looking for "workarounds" or novel ideas to find work, which is, of course, expected and the right thing to do under the circumstances. One interesting idea that is getting some attention is a recent legislative proposal to change the way manning exemptions are granted by the U.S. Coast Guard under existing law that has been in existence for almost 40 years under amendments made to the Outer Continental Shelf Lands Act (OCSLA) in 1978. By way of background, we provide the following before discussing this proposal.

Current Requirements

Through these OCSLA amendments, Congress announced that the U.S. Constitution laws and civil and political jurisdiction of the U.S. are extended to the subsoil and seabed of the Outer Continental Shelf (OCS), all artificial islands, and all installations and other devices permanently or temporarily attached to the seabed. What this means in simple terms is that, in general, all vessels and non-vessels (such as platforms) conducting operations on the OCS must be manned or crewed by citizens of the U.S. or resident aliens.

However, there is an exemption that allows foreign-flag vessels that are over 50 percent foreign-owned or foreign-controlled (i.e., bareboat charter) to engage in U.S. OCS activities using foreign citizen crewmembers. U.S. law also gives the Coast Guard authority to deny an exemption request where the foreign country of the owner or party with effective control has implemented national manning requirements preventing U.S. citizens from working in that country's OCS. The intent of this exemption was to protect U.S. citizens working on a U.S.-flag OCS unit on a foreign continental shelf from being forced to be replaced with a foreign citizen by the coastal nation of that foreign country.

Procedurally, the Coast Guard issues a letter of exemption upon request authorizing the employment of foreign citizens aboard foreign flag units engaged in OCS activities once the owner/operator certifies foreign ownership or control. This is typically the procedure that many foreign-flag vessel owners and operators follow in order to continue to use their normal foreign citizen crew complement when engaged in OCS activities for safety purposes to maintain their crews with the special skills and experience necessary to operate these specialty vessels. This does not take away jobs from U.S. citizens because they are generally not trained to perform the specific specialized operations on these offshore foreign vessels.

New Crewing Proposal

As we understand it, one proposal under consideration would require that any exemption granted to a foreign flag ves-

(Photo Credit: Joaquin Andres Bosqued)

sel that is more than 50 percent foreign-owned should limit the foreign citizen crew members to the nationality of the flag state of the vessel and would limit the number of foreign citizens that could be exempted. Such a provision would be in direct conflict with longstanding international law. The U.S. does not have the authority to dictate citizenship requirements for foreign nationals working aboard a foreign-flag vessel if U.S. citizens are not required. Specifically, the flag state alone has the authority to establish citizenship requirements for its vessels, and the citizenship of the foreign-flag vessel's crew under international law, are not required to be the same as the flag state unless that specific flag state mandates such a requirement. Even though the U.S. has generally made this a requirement for U.S. flag vessels, other countries have not. And, this proposal would do little or nothing to increase jobs for U.S. citizens on the OCS because the work performed by these foreign flag vessels cannot be replaced by U.S. flag vessels.

Implications of the Proposal

The intent of this crewing exemption regime appears to be to ensure that U.S. flag vessels are given equal opportunity to perform OCS services worldwide, as they have been doing for the past half century. However, should the U.S. implement further restrictions on crewing, the likelihood is that other countries could reciprocate by restricting offshore opportunities for U.S. citizens serving aboard U.S. flag vessels worldwide, even further reducing the work available to U.S. citizens.

Most concerning, however, is the fact that the implementation of such a proposal would appear to have the practical effect of potentially shutting down the entire offshore industry. This is because foreign-flag vessels engaged in various types of specialized OCS activities such as seismic, construction, installation,and other OCS support activities often employ crew members from maritime nations with particular skill sets that cannot be replaced easily. In this regard, many flag states simply do not have the maritime labor force to crew its vessels. Consistent with international law, it is common practice to permit an owner or operator to crew a vessel under a particular flag with crew members from any country as long as the crewmember is trained and has the experience to meet international safe manning requirements.

In conclusion, should this proposal be put in place, then the owners and operators of foreign-flag vessels currently engaged in OCS activities would simply stop working in the U.S. OCS because they could not find enough trained and experienced crew to operate their vessels. This would mean that work in the GOM, including the supporting jobs provided by U.S. citizens, would be further depressed and result in more severe layoffs. Accordingly, we recommend GOM stakeholders consult with counsel to ensure they are fully informed of the potential negative impacts that this proposal would have on the GOM and the U.S. economy in general, should there be interest on Capitol Hill to move such legislation.

The Author

Jonathan Waldron is a partner and chair of the maritime and international trade practice at Blank Rome LLP. Waldron concentrates his practice in maritime, international, and environmental law, including maritime security. He served in the U.S. Coast Guard for 20 years, attaining the rank of commander, and was senior counsel to the Marine Spill Response Corporation.

The Training Implications of Subchapter M

MURRAY GOLDBERG

It's a major understatement to say that Subchapter M is top of mind for workboat operators. While most would agree that the new regulations will raise the level of safety and operational sophistication, most would also likely agree that with change comes uncertainty, cost and effort. Thus it was no surprise that at October's national meeting of the American Waterways Operators, discussions were dominated by Subchapter M and its implications for operators.

As a former faculty member at a large research university and someone very focused on training in the maritime industry, I noted that there was a limited amount of discussion of the training implications of Subchapter M. This is not a big surprise. The regulations themselves, which are roughly 45 pages long, appear superficially to devote only about one page to explicit training requirements. And the remaining 44 (roughly) are full of regulations that require the full attention of operators – from the potential implementation of a TSMS to vessel compliance, construction and equipment requirements, documentation systems, operational changes and more. There are decisions to be made and systems to be implemented, all of which are rightly receiving the full attention of operators.

So given the comparatively limited focus on training and the abundance of other issues that require understanding and near-term attention, training may not be front and center for most operators. While this is understandable and possibly even unavoidable, it is not unusual. Training excellence is sometimes one of the last thoughts, coming to the front of mind only when lack of training quality creates an event that cannot be ignored.

Putting Training in Perspective

Subchapter M is about safety. But it is, in many ways, just a start because the focus on training is limited, and training is easily one of the greatest drivers of safety. I have written in the past about the example of British Columbia Ferry Services Inc. (BC Ferries) and their safety culture and training transformation that began in 2007. BC Ferries undertook a comprehensive effort to instill a strong safety culture and improve training outcomes through blended learning practices (combining online and in-person training) throughout the organization. This effort was massively successful, yielding improved on-time performance, a reduction in the accident rate of approximately 60%, and a reduction in annual insurance premiums of roughly 75%. All this by addressing the human element head on.

BC Ferries, while certainly a pioneer in training and safety culture, is not the only proof of the importance of training. There have been many studies on the subject.

In one extensively researched study, Capt. Stephen Cross of the Maritime Institute Willem Barentsz in The Netherlands determined that the human element can be attributed to approximately 80% of maritime accidents. Of those accidents, approximately 81% can be attributed to a lack of sufficient training. Thus, multiplying those numbers together, approximately 65% of all maritime accidents can be attributed to a lack of sufficient training. Other estimates provide an equally strong or even stronger link between insufficient training and accidents.

It is compelling to think that such a tremendous reduction in the financial and human costs of accidents might be available to workboat operators by focusing on one aspect of operations: training. And the best part is that there is already a great deal of precedent to help guide workboat operators on the path to improving training outcomes. With this perspective, let's start down this path by looking at the training implications of Subchapter M.

Subchapter M and Training

Subchapter M provides some training direction by indicating which aspects of operations need to be trained and when. However, it does not discuss how training is to occur and does not directly say how training is to be evaluated. This is common practice in maritime regulations – mostly because there is a large degree of variability in operations from one operator to another. Mandating one specific form of training that fits-all would be difficult at best, and arguably impossible. This fact is alluded to in the discussion of comments and changes provided by the Coast Guard. In a perfect world, however, there would be common requirements that detail training and assessment methods. The difference in outcomes between good and bad training is vast. That fact is impossible to overstate. So regardless of the lack of direction on training and assessment methods in the regulations, it is critical to keep in mind that methods are easily as important as what needs to be taught. Having said that, what does need to be taught, according to Subchapter M?

When reviewing the Subchapter M document for training implications, most of the reader's attention can be focused on section 140 – operations. There are a few short sections which cover training requirements at a high level. Additionally, there are implicit requirements sprinkled throughout the rest of section 140. Anybody responsible for training at a workboat operator will need to read the regulations thoroughly in order to embrace them fully, but an overview is provided below.

The most explicit section of Subchapter M dealing with training is Section 140.515 of the regulations. This section is only approximately ⅓ of a page, and thus provides only high-level direction. But minimally, these need to be covered by your training programs. There are 5 subsections of coverage.

The first, subsection (a), covers the need to train general health and safety information. It includes the need to train

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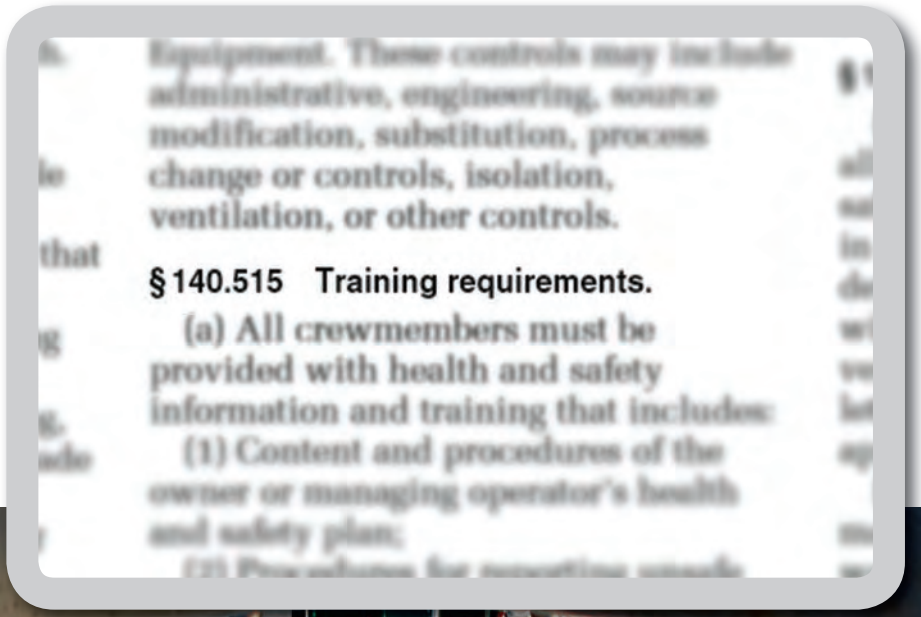
knowledge of the health and safety plan, procedures for reporting unsafe conditions, PPE, safe use of equipment, hazard communication and so on.

Subsection (b) covers the need to understand hazards relevant to each trainee's potential exposure on or around the vessel. Subsections (c) and (d) speak to when training must occur and how frequently refresher training must be provided. Subsection (e) speaks to training for non-crewmembers and (f) covers the requirement to document all training.

In addition to 140.515, there are other sections which speak directly to training requirements - even though they do not use the word "training" in their descriptions. For example, section 140.410 documents the need for safety orientations prior to getting underway. The orientation covers the expected areas of required duties, lifesaving equipment, PPE, egress, and so on. It also covers the requirement to document the training. As another example, section 140.420 covers the requirement to conduct drills. It covers the types of drills, the nature of drills and the frequency of drills. Section 140.645 covers navigation safety training to ensure that every crew member understands their duties as a lookout, watch keeping terms, reporting procedures and so on. All of this needs to become part of a structured training program.

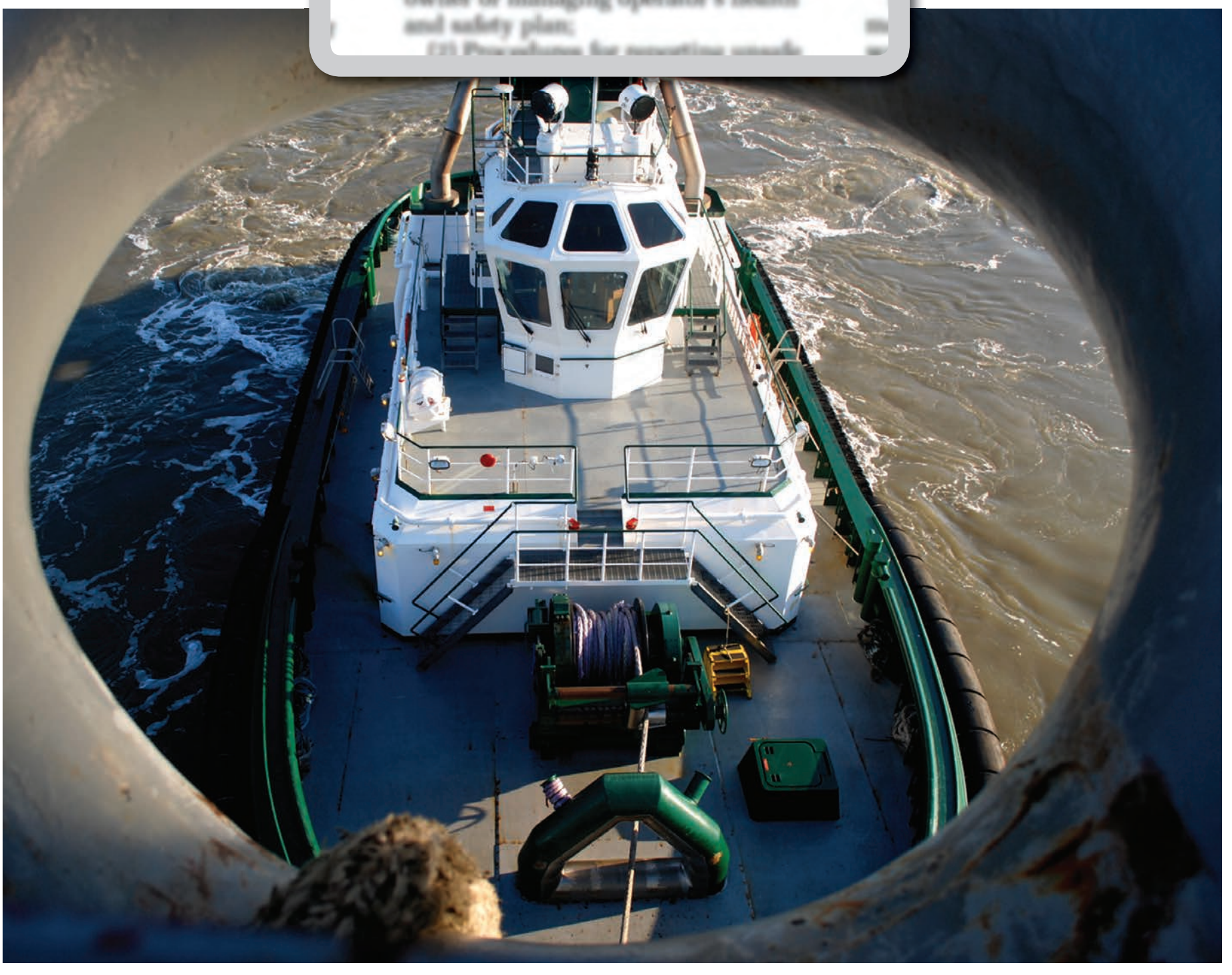

Equipment. These controls may include administrative, engineering, source modification, substitution, process change or controls, isolation, ventilation, or other controls.

§ 140.515 Training requirements.

(a) All crewmembers must be provided with health and safety information and training that includes:

(1) Content and procedures of the owner or managing operator's health and safety plan;

In addition to the page or so of high level explicit requirements for training, a careful reading of the operations section of Subchapter M reveals a broad range of other training requirements sprinkled throughout the operations section 140. Some of these are specific examples of the general requirements of 140.515, and others are items that simply require training without explicitly saying so. Thus it would be a good exercise for every operator to examine every paragraph of section 140, making a list of items which should be added to training and



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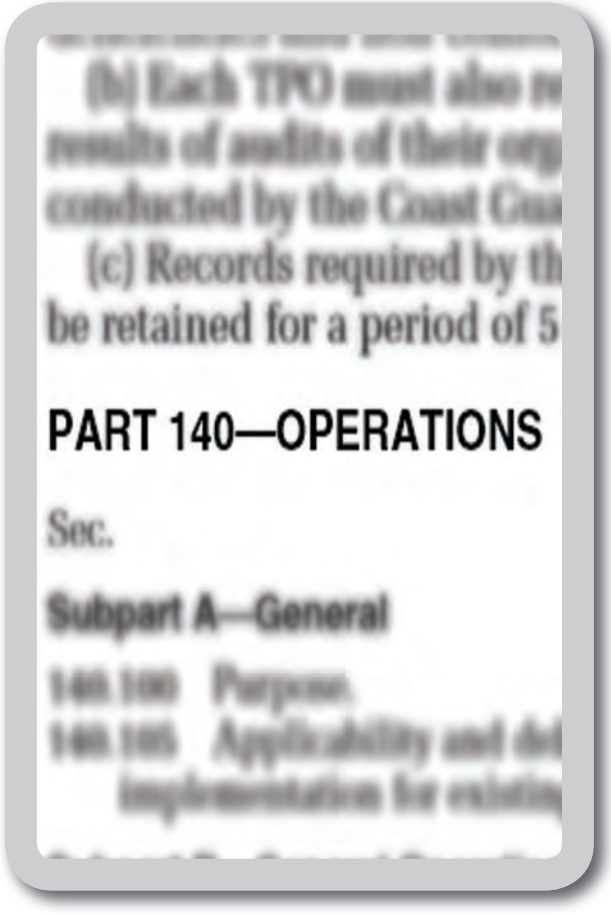
(b) Each TPO must also re
results of audits of their org
conducted by the Coast Gua
(c) Records required by th
be retained for a period of 5

PART 140—OPERATIONS

Sec.

Subpart A—General

140.100 Purpose.
140.105 Applicability and del
implementation for existing

orientation programs. As a general guideline, if there is an rule regulating some aspect of operations, there is a training requirement in there somewhere. An operator which trains only to the explicit requirements is setting itself and, more importantly, its employees up for failure.

There is Training, and Then There is Training!

Possibly more important than the training requirements of subchapter M is how we choose to teach them. As an example, let's look at the requirement to train "procedures for reporting unsafe conditions".

On the surface, this provision works together with 140.210 to ensure that all unsafe conditions are be reported to the master, and is therefore simple and logical. But examined a little more thoughtfully, it empowers all crew members and reinforces the reality that everyone on board holds both individual and collective responsibility for safe operations. It is a principle of Bridge Resource Management (BRM) that all employees need to voice their concerns loudly and clearly – a standard that is credited for great advances in safety. The same principle applies on the deck or anywhere aboard.

Thus, in training crewmembers on how to report unsafe conditions, we have a golden opportunity to address the foundations of why it is important, and to stress the rights and obligations of shared responsibility for safety held by every member of the crew. Do we train only the knowledge and skill? Or do we ensure that our officers and crew understand the critical role and important contribution that is required of each of them so that the team can effectively achieve safe and performant operations? Every item being trained represents an opportunity to understand not just the what, but more importantly the why of the need to "get it right". In this way, every training requirement in Subchapter M can be looked at as an opportunity to build a positive culture, not just to convey information.

Blended Learning

Of particular note, section 140.420 contains a very short statement specifically allowing alternative forms of instruction. This is noteworthy because it is one of the few statements in the regulations which speak to the how of training as opposed to only the what.

More importantly, it is noteworthy because the alternative form of instruction specifically mentioned (though not by name) is blended learning. Earlier in

this article we spoke of the implementation of blended learning at BC Ferries and how it was at least partly responsible for a huge decrease in accidents and insurance claims costs. In fact, blended learning has been shown over and over again through experience and research to provide significantly improved training outcomes and retention.

So much so that it is now rapidly being adopted by vessel operators to improve in-house training outcomes. So it is particularly interesting that the Coast Guard makes a point of indicating that it is an acceptable alternative form of training when it comes to drills. This is very positive.

Having said that, it is also interesting to note that alternative forms of training are not mentioned in any of the other training sections of this document, and that the Coast Guard chose to mention it only in the section on drills. Regardless, where allowed by regulation, operators should be strongly encouraged to investigate and consider the implementation of a blended learning approach to their training to achieve improved outcomes. The only cautionary note is that blended learning is new to many operators, and like any form of training, it is just as easy to do it poorly as it is to do it well. So seek advice when you embark on that path.

The maritime industry is moving this way, so there are excellent experiences that operators can learn from.

Ultimately, it's up to You!

Subchapter M provides tremendous latitude for operators in terms of training and assessment methodology. While perhaps this is a necessary compromise, it does means that to some degree operators are free to implement effective or ineffective practices. Creating a training program which adheres to the letter of the requirements but not the spirit of training excellence will adversely affect performance and safety. Subchapter M is not a document on training excellence and it should not be viewed as such. But it does describe a paradigm for safety which ultimately should be applied to training as well.

Arguably the real goal of Subchapter M is to raise the bar of operational sophistication in the workboat industry. This means culture change, and there is no stronger driver of positive safety culture than employee empowerment supported by training excellence. The difference between an operator that trains because it is obligated to and one that views training as a critical part of its desire to implement a strong safety culture can be felt the moment you step on to their respective vessels. It can be seen in the way the crew interacts, in the way they perform their duties, in the condition and cleanliness of the vessels. It can also be seen in the improved safety and financial performance of the operator. So in order to achieve the true goals of Subchapter M, let us be sure to carefully consider and address the training implications and opportunities.

The Author

Murray Goldberg is CEO of Marine Learninf Systems, maker of MarineLMS. A researcher and developer of learning management systems, his software has been used by millions of people and companies worldwide.

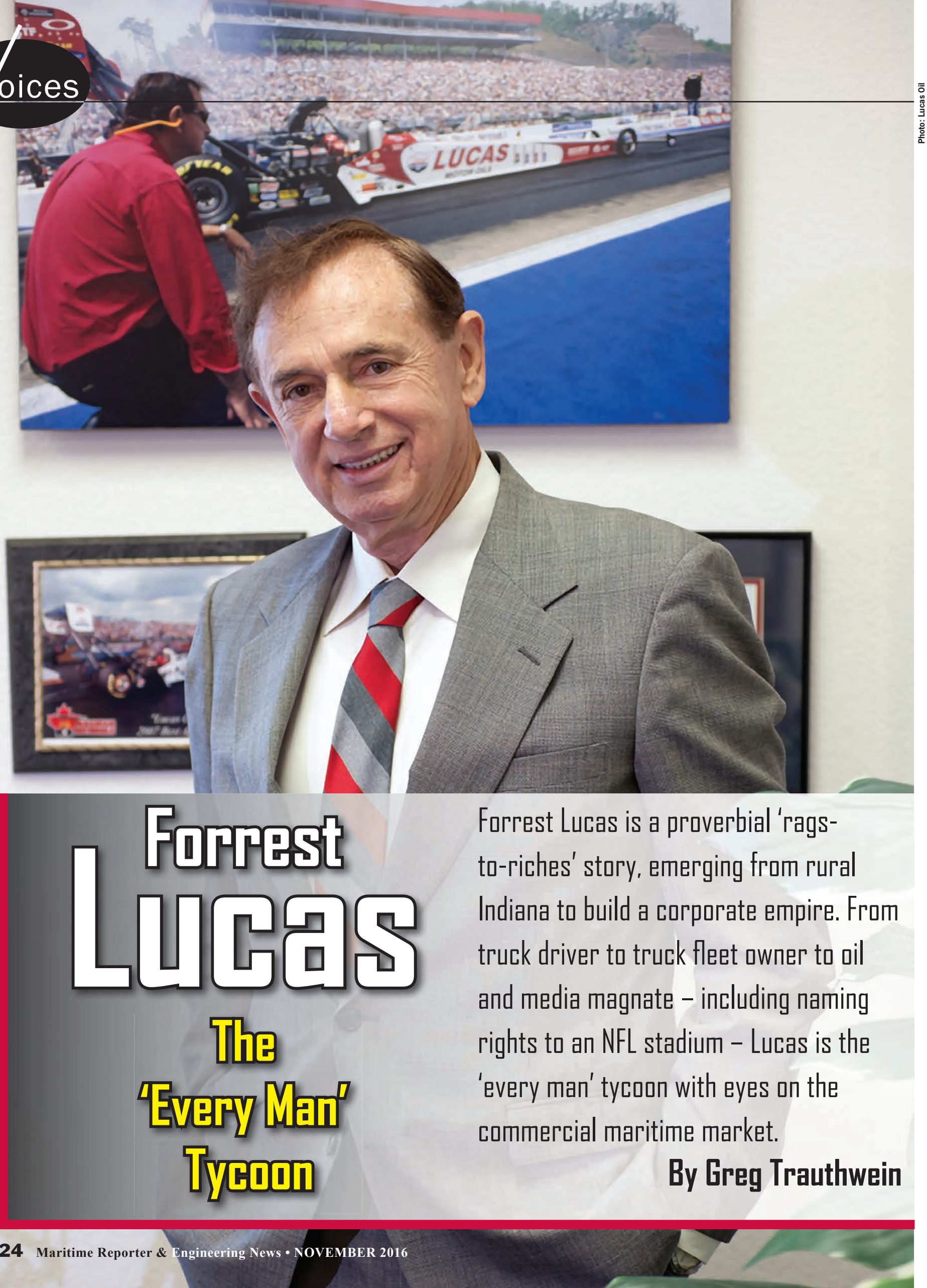

Photo: Lucas Oil

Forrest Lucas

The 'Every Man' Tycoon

Forrest Lucas is a proverbial 'rags-to-riches' story, emerging from rural Indiana to build a corporate empire. From truck driver to truck fleet owner to oil and media magnate – including naming rights to an NFL stadium – Lucas is the 'every man' tycoon with eyes on the commercial maritime market.

By Greg Trauthwein

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"We got into the entertainment business to sell oil ... **and nothing is more entertaining than fast cars, trucks, planes and boats."**

Talk to Forrest Lucas for five minutes and it is easy to see that his claims to be a 'regular guy' – placing honesty and integrity at the forefront of all dealings – is earnest. Rising from modest means, early on Lucas combined an entrepreneurial spirit, a hard work ethic and an inventive mind. He readily admits that his path has been neither straight nor easy, insisting that lessons learned during the tough times are in part responsible for catapulting his business fortunes forward faster.

He had a tough early life, but collected great selling experience along the way. Importantly, he discovered early on that he had a talent for marketing, specifically appealing to the 'every man.'

Lucas Oil Products, Inc., is a privately held lubricant and additive company with factories in California and Indiana, producing and marketing 270 unique lubricants and additive formulations in more than 40 countries. And while the Lucas Oil nameplate is the main feature of the Forrest Lucas story, it is but one chapter in the cumulative business portfolio, as he and his company have launched or revived major series of grassroots motorsports series, built a state-of-the art race track and drag boat lake, bought and expanded a television network, rescued a railroad, bought a corporate retreat, put his name on the NFL stadium which is home to the Indianapolis Colts, as well as returned to his roots breeding cattle, masterminded an agricultural initiative and launched a web app that revolutionizes motorsports television.

And he's far from done.

From the Beginning

"You can't build something like this without putting in a lot of hard work and making a lot of sacrifices," said Lucas in a recent interview with *Maritime Reporter & Engineering News.* "Honesty and integrity are a huge part of my success."

Born in 1941, Lucas had a modest and common goal: get a good job to make enough money to support a family. Fueled by a boyhood dream of being a truck driver, at the age of 18 Lucas had saved enough money to buy a 1948 Ford dump truck powered by a '55 Thunderbird engine to haul dirt and gravel. Three years later he bought a new 1963 Chevrolet, C-60 series with a 327-cubic-inch gas engine and signed on with Mayflower Moving and Storage, serving as the youngest owner-operator in the fleet.

By the age of 40 he was done driving and was managing his small fleet. "I had about 14 trucks at that time, and I was brokering freight on the side. I was the first guy in the country to get full 48-state authority, to haul anything, anywhere and I never looked back." But his fleet increasingly encountered maintenance problems, mainly due the extreme high temperatures of the Arizona, Nevada and California deserts. Through adversity a solution, and eventually an empire, were born.

Founding Lucas Oil Products, Inc.

Forrest Lucas' formal education ended with high school, but an inventive mind and curious spirit led him to teach himself how to make better oils than he could buy off the shelf. He converted part of his small warehouse and parking lot in Chino, Calif., and set himself up as a home chemist. In his spare-time he hunted through chemical junk yards taking a little of this and a little of that and began mixing and matching his own lubricant formulas.

Forrest says that on one of his expeditions, the proprietor of one of these junk yards called his attention to a particular rusted up barrel, which he found to be a very pure form of synthetic oil. He took the barrel home and began mixing the contents and trying differing formulas in his trucks. It would be easy to say that success was assured, but what actually happened was that within a few months his wife and business partner Charlotte, who also acted as the company's bookkeeper, reported that maintenance costs were down. Way down.

With that the Lucas's began to market their 'Heavy Duty Oil Stabilizer' for engines and gearboxes, initially by supplying it to their trucking friends. Word of mouth coupled with a mini-recession in the trucking industry drove Forrest to the conclusion that his family's future was in oil, so Lucas Oil Products, Inc. was born.

"I think getting started was the hardest part. We were winging everything! We had to do without. It was a struggle, and we had to look everywhere for business."

Turning the Page

Once Lucas Oil Products passed a critical mark of profitability, the rest, as they say, is history. Lucas took a shine to promoting his burgeoning

Forrest Lucas on:

Promoting from within:
"A lot of people have the talent and the brains; they just haven't had the chance."

His company & change:
"I have not changed, my wife has not changed, my son has not changed. I'm still a regular guy. I live in a fancy house, but I don't 'put on the dog.' I'm honest with everyone, and I expect all of my employees to be honest too."

His greatest business challenge"
"I think getting started was the hardest part. We were winging everything! We had to do without. It was a struggle, and we had to look everywhere for business."

What makes him most proud:
"The naming rights to the stadium (a reported $121.5m over 20 years) was a pretty big deal, but I'm most proud of my employees. Our employees don't look at Lucas Oil as a job, they look at it as a career."

His management philosophy:
"I run the company as a team: everyone has an open door, I give everyone the opportunity to learn, and I encourage emerging leaders to train their lieutenant. I try to promote people from the ranks, coming up from the bottom. Instead of hiring someone who walks in the front door with a suit and tie on, I try to find talent in our ranks. It's hard to come in from the top and really know a business."

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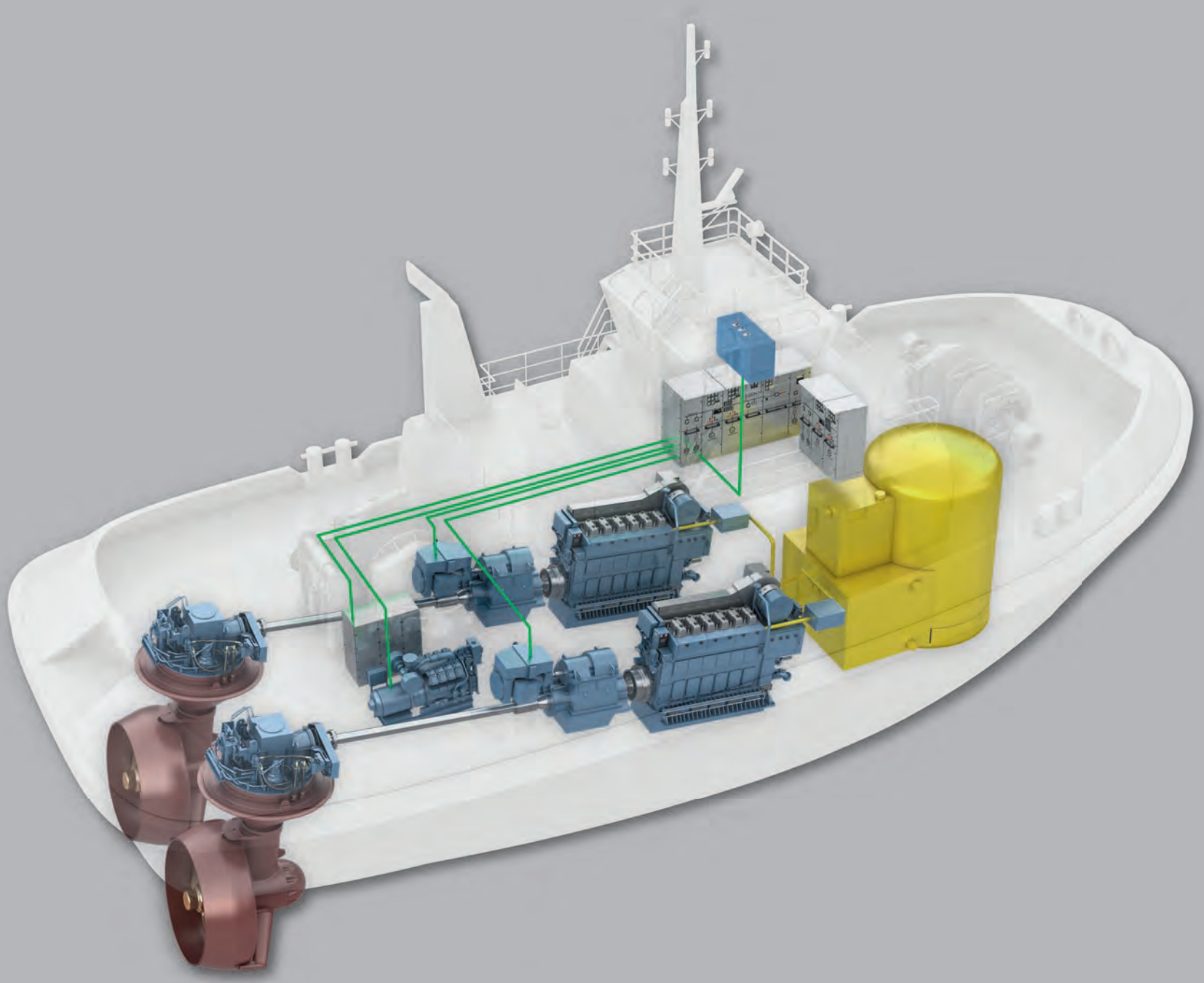

MT_Natural gas_tug_1_1_022016

brand via motorsports, and that combination led him to accumulate and consolidate a number of racing series and media properties under his banner, all the better to ensure that his company had top billing. Motor racing was a pivotal choice: “We got into the entertainment business to sell oil” said Forrest, “and nothing is more entertaining than fast cars, trucks, planes and boats.” Another pinnacle was his $121.5m, 20-year deal in February 2006 for the naming rights to Lucas Oil Stadium.

“I couldn’t have imagined the things we’ve done,” said Lucas. “We have a television station and television series, we’re making movies and I have a 16,000 acre cattle ranch; all of these things are above and beyond making oil products.”

While his business success is well-documented, so too is his adherence to his modest roots. His ‘everyman’ philosophy extends in-house to his penchant for promoting from within. “I run the company as a team: Everyone has an open door, and I give everyone the opportunity to learn, and encourage emerging leaders to train their lieutenant,” said Lucas.” I try to promote people from the ranks, coming up from the bottom. Instead of hiring someone who walks in the front door with a suit and tie on, I try to find talent in our ranks. It’s hard to come in from the top and really know a business. A lot of people have the talent and the brains; they just haven’t had the chance.”

Forrest Lucas’ inventive mind and curious spirit led him to teach himself how to make better oils than he could buy off the shelf.

Lucas Marine & Harbor Breeze Cruises Partner

Forrest Lucas said that early on in the company’s history he knew he had fuel stabilizers and oil treatment that the maritime industry could use, but the main reason that the company got into the industry was because of ethanol in the fuel. “We received many calls from people asking us to make a methanol treatment for boats” said Lucas.

“We continued to get calls asking us to create other fuel and oil products, and before you knew it we had a full line,” that helped to cut emissions and improve performance.

One testament to the line is Harbor Breeze Corp., which manages an eight-boat fleet with vessels ranging from 30 years to five months, with the latest addition being the new La Espada, a $4.5m vessel delivered in May 2016.

Lucas Marine partnered with Harbor Breeze to help reduce the yacht charter and the cruise company’s fuel costs, maintenance and environmental impact in Los Angeles and Long Beach Harbors.

“We have been searching for ways to increase fuel economy in our entire fleet, add speed and reduce maintenance costs,” said Dan Salas, CEO, Harbor Breeze.

“We operate in a sensitive environment with large and small cruise ships hosting charters along the West Coast including Catalina, harbor tours and whale watching, and we invest heavily in improving our performance.”

(Photo courtesy of Harbor Breeze Cruises)

“Since January of 2016 we have used Lucas Marine Products exclusively throughout our fleet and our tests have shown that Lucas Oil SAE 15W40 Magnum Diesel oil significantly reduces engine noise, wear and tear in our crankcases and allows for more operating hours before needing to be changed,” said Salas. “Also, Lucas Marine Upper Cylinder Fuel Treatment lubricant is giving us a substantial, often as much as 8% increase in fuel economy overall, and this is huge.”

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Photo: Damen

Talking Dutch Designs with Damen's Peter Robert

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Voices

Despite the numerous challenges facing today's maritime sector, there are still opportunities to be found. After all, the world is constantly changing and it is those companies who are able to adapt and move with the markets that will experience long-term success. Damen Shipyards Group is an example of a company that does just that. Using examples from some of the newest maritime sectors, Damen's Head of Business Development & Market Intelligence Peter Robert talks about the importance of understanding, and reacting to, market developments.

A look at Damen's key figures – 32 shipbuilding and repair yards, employing 9,000 people worldwide – will show that this is primarily a shipbuilding group. A key aspect of the Dutch company's success is its focus on standardization, modular construction and keeping vessels in stock. "There are several important advantages of standardization," said Robert. "As well as guaranteeing short delivery times, we can provide our customers with proven and tested technologies. This reliable performance ultimately results in reduced total cost of ownership, and then potentially a high resale value." Whether you consider Damen's tugs, workboats, naval vessels, high speed craft, cargo vessels, dredgers, offshore support vessels, ferries, pontoons or super yachts, you find similar principles of standardization running through the whole portfolio. Damen is well known for providing 'the full package," said Robert. "We offer a broad range of services to complement our vessels. Maintenance, spare parts delivery, training and transfer of shipbuilding know-how, for instance."

In addition to new builds, the company also provides ship repair services. "There are 16 Damen Shiprepair & Conversion yards around the world with facilities for vessels up to 420 meters long." Handling 1,500 repair and maintenance jobs on a yearly basis, the experience that this part of the business has at its fingertips is considerable.

Finding Opportunities

Damen's scope of interest in the maritime market is broad – delivering some 180 vessels annually is no mean feat. Keeping a close eye on the changing dynamics of the entire sector is the company's business development team, headed by Robert. "The core essence of this department is to look into new markets; to which Damen can bring the same values and the same business model of series production and standardization," he said.

Illustrating just how 'future-thinking' Damen is are the examples of two up-and-coming maritime markets: aquaculture and decommissioning. "Aquaculture is a globally very interesting," he said. "Looking specifically at the salmon farming industry – and the issues they are facing with regard to disease – we are seeing operators moving their operations further and further offshore. This increases the parameters that a vessel has to address: "Think about offshore seakeeping, crane capacity and crew accommodation. Aquaculture is one of the sectors where our range of utility vessels can be mobilized."

The decommissioning market also holds great potential for the international maritime sector; the effects of which will be felt throughout the supply chain. With lifting capacities of up to 1,600 metric tons, Damen's recently introduced Decommissioning Series of vessels will specialize in three core areas of the oil and gas decommissioning sector: topside decommissioning and maintenance, offshore platform removal, and subsea cleaning and removal. The decom market is much more than heavy lift vessels though, said Robert: "There will be a need for accommodation vessels, pontoons and support vessels too."

Expedition Cruise

With the remit of looking into and developing vessels for new markets, the business development team at Damen has also been paying attention to the expedition cruise market. "This is fast-growing and very exciting market. Expedition cruise passengers will literally be able to sail anywhere on the planet – in full safety and comfort."

Damen is currently working on an expedition cruise vessel design with capacity for approximately 110 passengers. For this relatively young industry, there are several factors to consider when designing an expedition cruise vessel. Regulations concerning safety and environmental issues – wrapped up in the Polar Code – will play a major role in vessel design.

Decommissioning is Hot

Damen's recently introduced Decommissioning Series of vessels will specialize in three core areas of the oil and gas decommissioning sector: topside decommissioning and maintenance, offshore platform removal, and subsea cleaning and removal.

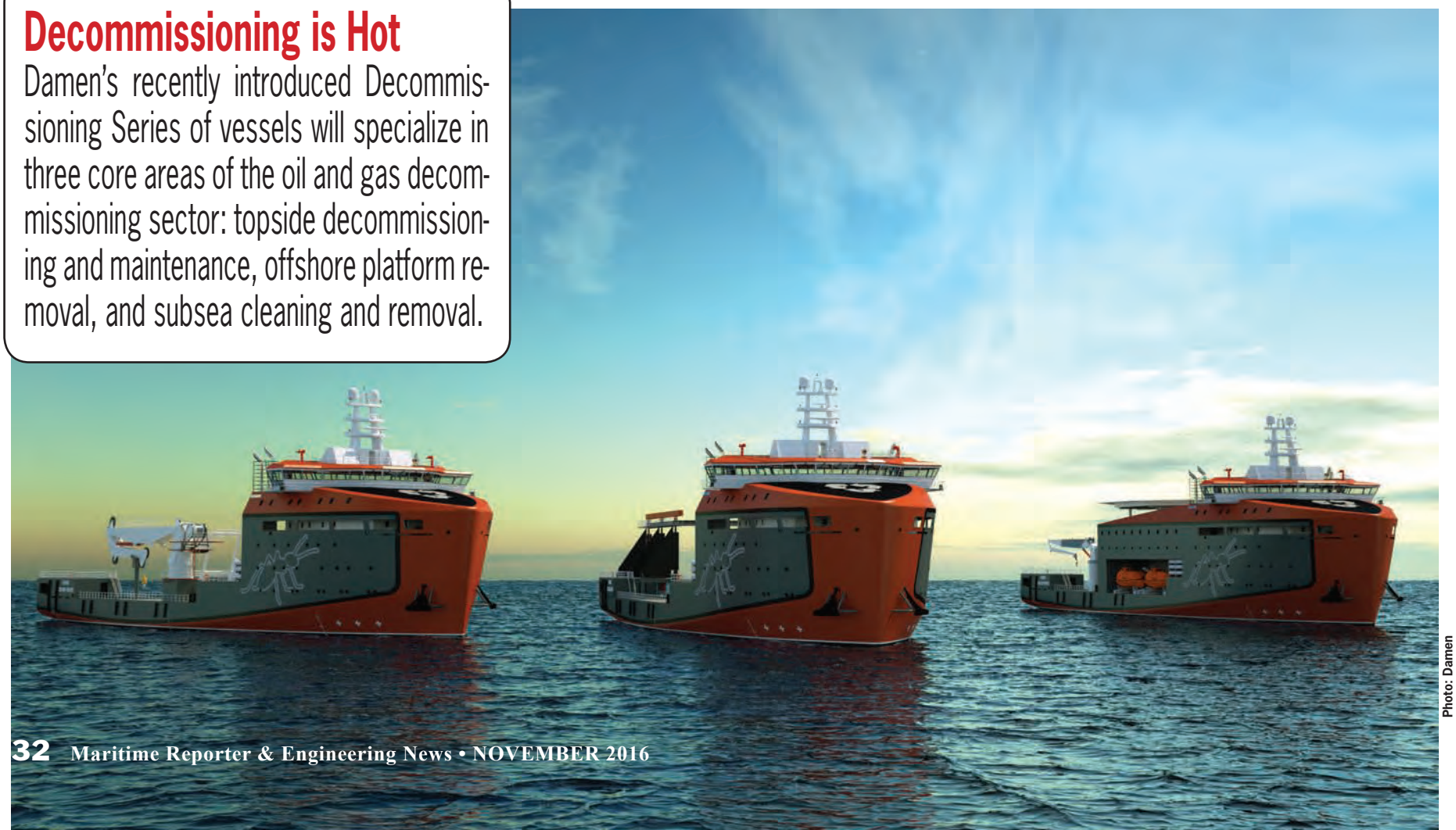

Photo: Damen

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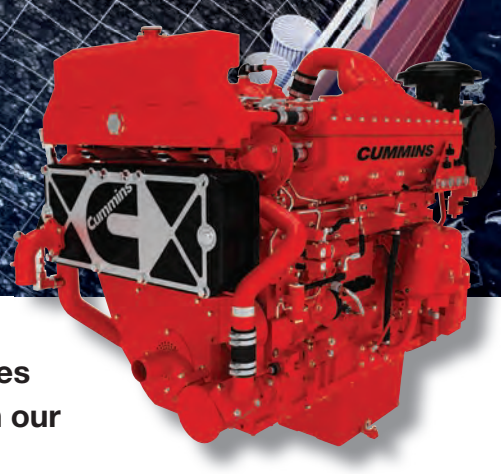

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"Aquaculture is a globally very interesting ... we are seeing operators moving their operations further offshore. This increases the parameters that a vessel has to address: Think about offshore seakeeping, crane capacity and crew accommodation.

Peter Robert,
Damen's Head of Business Development & Market Intelligence

From a passenger's point of view, such a cruise will be all about the 'experience.' Guests will visit the most remote regions, including polar areas. To this end, Damen is drawing on the knowledge of an established name in the expedition cruise industry to develop the final vessel design. "We are working together with Expedition Voyage Consultants to develop this vessel. In view of their wealth of experience in organizing cruises to worldwide destinations, I think that we have the best people available giving their input into the design."

Modern Markets

Other maritime sectors also show potential for future growth. The offshore wind industry, for example, which is considerably more advanced in Europe than it is in North America. A notable fact for a shipbuilder is that the various phases of an offshore wind farm demand a variety of vessels. Damen has the bases covered: it has designed, and is currently building, a Service Operations Vessel (SOV) for dedicated O&M duties and its 26-meter Fast Crew Supplier (FCS) has virtually become the 'vessel of choice' for crew transfer operations.

Following a number of European and Middle Eastern sales, the FCS 2610, is also beginning to find its way in the oil and gas industry. "This development shows an interesting parallel: the oil and gas industry is looking closely at what offshore wind is doing. It is adapting their cost principles and using different tools, like vessels, to meet their goals. This is the reason why marine access is a strategic niche that Damen wants to develop."

Dedicated O&M Duties

When considering the potential of the North American offshore wind market, the SOV is perhaps one design that could be called a 'game changer'. Using walk-to-work access technology, the SOV is the first ship that is purpose-built for the transfer and accommodation of offshore personnel for the O&M phase of the offshore wind.

Rather than developing an existing design, Damen started from scratch, creating a vessel that meets the specific needs of the industry. The result? Seakeeping, fuel efficiency, comfortable accommodation and effective transfer of personnel – all of these elements have been designed to reach optimum levels. "This is much more than just a vessel – it is a total access and accommodation solution. This design has been tested to 'worst case scenario' conditions," said Robert while referring to the SOV's model testing results. These showed that the vessel exhibited minimal roll even when exposed to 8 foot waves approaching from the side.

"The design guarantees fast and safe access to turbines. In fact, we are able to provide 80% operability." Facilitating such high levels of productivity are a number of factors. The onboard work flow, for instance, has been designed for optimum efficiency; areas are divided into clean zones and dirty zones. Safety was also a crucial issue to address; resulting in a 'no steps, no stairs' design. The smooth flow of personnel to and from an offshore platform or turbine will be achieved by means of an Ampelmann motion compensated 'Walk-to-Work' gangway. In terms of comfort, vertical accelerations, sound and vibrations will all be reduced to a minimum, accomplished in part by the mid-ships location of the accommodation. "The most pertinent issue facing the offshore wind industry at the moment is the challenge to keep costs down. The Damen SOV will go a long way to helping the sector reach the goal of cost-effective operations."

Looking across the Atlantic and to a time when the North American offshore

wind market gains momentum, Robert is looking forward to sharing Damen's experiences. "Indeed, this is going to be an interesting time. We do not have a yard in the U.S., therefore we will continue selling licenses to American yards. This has proved to be a successful business model for us in the past with tugs and patrol vessels. Our newly opened Houston office will be able to handle the offshore wind sector too."

The specialty **expedition vessel** market continues to draw interest and orders.

Photo: Damen

Photo: Konrad

Ken Konrad and his wife Kathy decided to diversify from their steel mill operations in the early 1990s and Konrad Marine was born.

Ken Konrad

A Driven Innovator

At his core Ken Konrad is an innovator and engineer, looking at problems and seeing solutions. We spent a day at Konrad's headquarters in Hudson, Wis., for insights on what makes the "Stern Drive Specialist."

By Greg Trauthwein

Walk around Konrad's manufacturing and testing facility for even a short time and it is easy to see that Ken Konrad, owner and president, possesses a sharp intellect and an engineer's mind, as he clearly revels in sharing insight on business and manufacturing practice that goes in each of his company's rugged stern drive units. While Konrad has quickly established itself as a quality name in the commercial stern drive sector, it is still a newer business line within the company's overall scope.

In the 1960s, following high school Konrad became a tool and die maker before joining the U.S. Navy and serving for a few years working on Swift boats and patrol craft in Vietnam. Upon returning he worked in his father's machine shop, but he knew he wanted more. "I wanted to be more in charge of things, so I went back to college under the GI Bill and earned a Mechanical Engineering degree from the University of Minnesota. When he graduated he earned a "9 to 5" job with a larger company, but even so his entrepreneurial spirit was starting to come out, as he would visit steel mills on his own time to line up small jobs for his own company, which at the time was simply a side business. "Then one day I received a substantial order, so I quit my job and went from wearing a suit and tie everyday to running my own one-man shop," said Konrad. Starting as a solo act in 1967 serving the steel industry, Konrad has grown his company to 50 employees today and has evolved to manufacture a rugged line of stern drives for commercial and military maritime markets around the globe.

Entering Maritime

Konrad's initial business – which is still a significant part of the current company, focused on steel mills; specifically he developed a method to rebuild parts of the rolling mills. The company grew steadily, but in the late 1980s Ken sensed a looming market downturn in the perpetually cyclical steel market, and he gathered his team for ideas on

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Voices

Stern Drive
The Konrad 660-B.

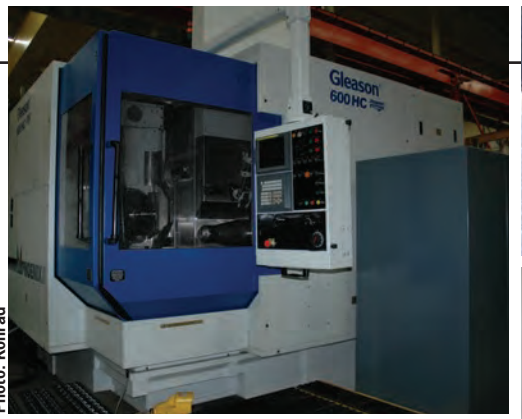

Photo: Konrad

Above:
Konrad starting manufacturing its own gears following quality control problems with a gear supplier.

Photo: Konrad

Photo: Taylor Shellfish

Right:
The Konrad stern drive is applicable for a wide range of boats, from fast craft to an oyster dredge to passenger ferries.

Photo: Konrad

new business ventures.

One of his inside salesmen had experience in the maritime market, and suggested that the company get into the business of rebuilding stern drives from existing manufacturers. In working with various manufacturers for parts, Konrad came to the conclusion that he could design and manufacture parts that were better. So he did just that.

"One thing led to another, and before you know it we started manufacturing our own stern drives," said Konrad.

In 1997, after several years of development, Konrad brought to market the 500 series, its first stern drive, which was specifically designed for hard-working continuously run applications with diesel engines. It was designed to operate for up to 2,000 hours between major overhauls, and to handle diesel engine torque up to 600 lb./ft. As word of the units started to spread, sales grew quickly, averaging 26% growth per year between 1991 and 2001. Following the bombing of the USS Cole in Yemen in 2000, the U.S. Navy took liking to the Konrad solution, and with the Hudson, Wis., factory running at capacity sales leapt 200% between 2001-2002. While the units were designed to deliver 2,000 hours between major overhauls, the company reports that some navy vessels logged more than 10,000 hours on a single unit before an overhaul. In total more than 300 Konrad 520s were installed on 24 ft. RIBS, and more than 200 were installed on the Navy's PB34 vessels.

With solid footing in the market, Konrad has continued to improve the performance and power intake capabilities of its sterndrive units, including the introduction of the Konrad 560 stern drive with a dual prop, and the introduction of its own in-house gear manufacturing when third party gears started to inexplicably fail. Most recently the company introduced the 600-B Series stern drives as the demand for additional marine power continues to grow, and similar to the smaller 500-Series, there are several versions available in the 600-Series to accommodate differing needs:

- The Konrad 620-B is a single prop workhorse
- The Konrad 660-B is a dual prop designed for speed
- The Konrad 680-B offers a combination of strength and speed with dual prop, able to handle diesel engine power up to 580 hp. (Note: the Konrad 680-B is promoted at 550 hp, it has been successfully tested at 580 hp. Also, it has a carrying capacity of 18,500 lbs. per drive).

While Ken Konrad is remiss to name one project as a favorite over another, he exudes a particular sense of pride in discussing a contract to provide propulsion on a series of five triple engine Hong Kong police boats, built by Damen and powered to chase and catch vehicle smugglers in the region.

Maintaining Identity

In companies large and small rapid growth can sometimes cloud the original mandate, principles and missions that started the company. This is clearly not the case in Konrad, as Ken Konrad to this day is still the engineer, the entrepreneur and the problem solver.

"This company is in some ways the same as when I started it because it is personal," said Konrad. "I'm here every day and the employees see me, and I have some people who have worked here more than 35 years. I walk the floor every day and look forward to seeing everyone."

He said that his number one challenge as a manufacturer is simply finding good, qualified talent.

"Getting skilled personnel, getting machinists, is very tough these days. If you get that person, you have to train them and you have to keep them," said Konrad. Last year he took 14 employees – or 30% of his company – to the International Machine Tool Show in Chicago. "I offer it so they get to see what is new," said Konrad. "I depend on our employees to be on the lookout for tools and technologies that will improve our business, and I expect them (at the show in Chicago) to come to me daily with new ideas for me to see."

That continued investment in technology is quickly evident when walking the manufacturing floor with Ken and totaling the manufacturing automation which has cost millions of investment in new equipment. According to Julie Heifner, Konrad's Global Business Development Manager, the company's investment approach is not exclusive to equipment alone, and includes engineering, machining, assembly and sales, the latter an investment in Konrad's global dealers and distributors. "We know that it is not possible to serve the world with 50 people from Hudson, Wis., so we have built a network of partners that are committed, hungry, capable and experienced," said Heifner. "We currently have four premier partners that also serve as spares depots for the company: one in the U.K., one in the Netherlands, one in Panama and one in Seattle. When all is said and written, the Konrad story really starts and ends with quality, which Ken Konrad said comes back full circle to his employees. "If you have good, happy employees, you're going to get good quality," said Konrad. "I can buy the best equipment in the world, but if the employee does not care, they you're not going to get good quality. We can manufacture the best parts in the world, but if the assembly team is careless, you might get a breakdown. Good quality starts and ends with the employees."

Konrad's Total Gear Cutting System

Ken Konrad is an engineer and innovator to the core. With all of the parts and technology built into his series of stern drives, he considers the gears to be the heart and soul. Following a number of gear failures in its stern drive unit – gears supplied by a third-party – Konrad proved that its mantra of quality control and self-sufficient operation was more than words with a $1.2m investment in its own gear-cutting technology.

In 2012 Konrad Marine announced the implementation of its Total Gear Cutting System, based on the modern bevel gear cutting machine Gleason Phoenix II, 600HC. Highly specialized, integrated programming makes it one of only three in the world with its unique capabilities.

"Our primary objective is to have the toughest stern drive on the market," said Ken Konrad. "To achieve this, we need the strongest, most powerful and capable stern drive gears in the marine industry. We started with a phenomenal new gear cutting machine. By adding our proprietary processes, specialized programs, design and tooling based on decades of successful experience, we created the Total Gear Cutting System."

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Voices

Sergio Guedes, Director of Ops @ Wilson Sons Towage

Southern Exposure

By Claudio Paschoa

Photo: Wilson Sons Towage

The influx of ships and rigs sailing into and out of Brazilian ports since the discovery of large pre-salt plays off Brazil in 2007, and the opening of new ports and shipyards during the past decade, has led to a sharp increase in towing operations in Brazil. *MR* spoke to **Sergio Guedes**, Director of Operations at Wilson Sons Towage, about the towage and salvage markets in Brazil.

Photo: Wilson Sons Towage

Wilson Sons Group is one of the largest integrated operators in port and maritime logistics in Brazil. The company has more than a century of experience and is also present in shipbuilding and offshore support services. Its towage fleet is present in ports all along Brazil's lengthy coast. In Rio, the group has a number of tugboats servicing local ports and shipyards, along with its offshore logistics base, named Brasco, which stores and delivers goods and equipment to offshore rigs and FPSOs with its fleet of PSVs and through third party support vessels.

"Wilson Sons Towage is the market leader in port support in the towage segment in Brazil. The company operates in the main ports along Brazil's coast and also in three river ports in the northern state of Pará. In 2015 alone, our fleet of tug boats was responsible for 58,000 maneuvers," said Guedes.

Wilson Sons employs various sizes of modern tugs, many of which use azimuth thrusters for propulsion, allowing them to be more flexible and efficient during port maneuvers and while towing ships offshore. Its operations center works 24/7/365.

"Around 80% of our fleet is composed of tugs with azimuth propulsion. Due to the great variety of operations, the fleet is composed of different types of tugs with bollard pulls, varying from 45 to 85 tons," said Guedes.

The company's towage fleet was mostly built at the Wilson Sons shipyard in the state of São Paulo. "Having a shipbuilding unit in the same group is an important competitive differential for Wilson Sons Towage, in that it guarantees us deliveries on time and with excellent product quality."

Having its own shipyard also permits retrofits, repairs and maintenance to be done in-house, with its inherent advantages. With Brazilian ports at a hectic pace, and with available berths not keeping up to the demands of ship traffic, efficient towage operations are very important to help clear the bottlenecks in some ports, where tankers, container and cargo ships are forced to anchor offshore for a number of days before being allowed to tie-up and offload their cargos.

"Wilson Sons Towage works mainly with port support – during docking and departure of ships in Brazilian ports. On top of that, the tugs will sometime undertake special operations, such as platform movement, FPSO towage, along with offshore towage of different sized ships, and also offshore and inshore salvage operations. Some of our boats are also fitted out with Fire Fighting 1 systems, which permits the company to help combat fires aboard ships and in port installations, when necessary," said Guedes.

A Towage Operations Center is a relatively new concept in Brazilian ports. Many of the older local ports and towage services were operated in obsolete and inefficient manners, some still are. It is significant to note that Brazilian ports moved 316.7 million tons of merchandise in the first quarter of 2016, a volume 2.52% higher than during the same period in 2015, even with the ongoing Petrobras crisis and government woes.

WS Procyon is a powerful 32 meter azimuth Escort tug.

Photo: Wilson Sons Towage

"The Towage Operations Center, or 'Centro de Operações de Rebocadores' (COR), in Portuguese, is an important tool towards the success of these operations. The COR remotely monitors all of the company's azimuth tugs, along with other tugs in the same ports, allowing for better planning of each maneuver. The company also maps the operational areas, identifying the best routes and areas that present risks to towing operations and to the boats, therefore increasing operational safety. The COR is located in Santos, São Paulo, where Brazil's largest port is located and where operators work 24 hours per day in support of tug captains," said Guedes.

Wilson Sons Towage has a fleet of 76 tugboats (74 of which are wholly owned and two are leased). Most of their modern models have a length of 24m and a width of 11m. The company recently started operating two modern escort tugs with a length of 32m and a width of 12m, which use two Caterpillar motors and Schottel azimuth propulsion.

"The cost of building a new tugboat varies according to the project demands and the tug's power output, in general it varies between $10 and $17 million per unit. We see the market dimensioned quantitatively and qualitatively to port demands, but this same segment is watchful of changes and/or tendencies of the ships that dock in Brazilian ports, looking to keep up to date and able to adequate itself in a quick and efficient way in order to fulfill the ship's demands," said Guedes.

Salvage is also an integral part of Wilson Sons Towage's operations, salvage projects may appear at any time in any port or any location along Brazil's coastline, which is over 7,000 km long, demanding that salvage specialists be present throughout the coast and ready for deployment with little notice. According to Guedes, "There is no formal salvage market in Brazil, we deploy our salvage assets on demand, working reactively when we are contacted for salvage operations, as we have an ample fleet distributed along the whole coast, we are able to deliver a rapid response when we are contacted for salvage job."

Both the towage and salvage markets are growing at a steady pace in Brazil, with the continued increase in ship-bound imports and exports, and with the slow rebirth of coastal trade navigation or "cabotage," foreign specialists are entering the market.

"The competitive differentials we have in the markets were we are present are: an ample offering of tug boats along the whole Brazilian coast, modern and high quality boats, along with crews composed of highly qualified seafarers, committed to operating efficiently and safely. The COR and the William Salomon Center for Maritime Improvement (CAMWS) are fundamental to out work. These are tools, which highlight the company in such a competitive market. The CAMWS in Guarujá, São Paulo, is a training center for tugboat commanders and engine room chiefs. The courses ministered, address themes that are vital to the crews, such as navigation, operation of the varied equipment on board, health, safety and environment, and quality management." Wilson Sons is present in 22 Brazilian ports.

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Norway Notebook

Fuel Talk: Greener Ships "Abandoned"

In the immortal words of one Kermit the Frog, "it's not easy being green." Nor inexpensive. Offshore ship owners managing the demand "fallout" of the past year and navigating myriad environmental strictures say their leap of faith toward greener fuels has taken its toll. The idealism of a decade ago has eroded, they say, in the face of lost offshore business, especially long-term contracts. Oil company clients that once insisted on high-spec, "green" vessels haven't renewed contracts for those ships. Still, ship owners love the new green tech for those fuels, even if the fuels themselves offer limited range.

By William Stoichevski

(Photo: William Stoichevski)

Push Back: Leaders citing limited returns for "green-fuels" investments include (from left): Håvard Ulstein, MD, Island Offshore; Karsten Sævik, CEO, Remøy Shipping; and Ståle Kyrkjedelen, Norway's Operations Manager, Bourbon Offshore.

For all the financial strains of recent months, offshore ship owners gathered for "hard talk" in a hotel meeting room say they're impressed with the performance of new tech they've taken on to conserve fuel and emit less: hydrogen fuel cells, batteries and liquefied natural gas (LNG). Ship conversions for these energy sources, especially LNG, have done "nothing" to ease the task of cutting costs heaped on them by their oil company clients, especially national champion Statoil.

Behind closed doors, senior representatives from Island Offshore, Remoy Shipping and Bourbon Offshore Norway gave voice to their frustration amid mounting costs. Asked if LNG has offered any help in any way during the current demand drought, the answer was a blunt "No. No." Three ship managers nodded in agreeance: "It's a bloody disaster," says Island managing director, Haavard Ulstein, his peers nodding in agreement. "The amount of environmental effect these (LNG) vessels offer and also the amount of pluses saved by the clients and that converted into day rates for the owners is a disaster, and personally I have asked (Rolls-Royce business) Bergen Engines (AS) for technical proposals to convert those LNG engines into diesel. LNG is a big, big … a huge disappointment," Ulstein adds.

The arguments for LNG as a ship fuel — less sulfur particulate, 15 to 20 percent les CO2, 90 percent less NOx — pale when you're forced to sell, say, a modern $12 million platform supply vessel for $2.5 to keep your company afloat.

Gas Reckoning

Most of Norway's LNG-fueled fleet sails near-shore, and offshore ship owners operate anywhere from one to two of these types, in the case of Bourbon, Remoy and Island, to half the PSV fleet in the case of gas and hydrogen pioneer, Eidesvik Offshore. About three dozen Norwegian-owned vessels are LNG-only, duel diesel-LNG or LNG-hydrogen. Another 40 or so are on order, as per numbers from The Norwegian Shipping Association.

Until now, it has been argued that the biggest deterrent to investments in LNG engines has been the shortage of harbors, tankers and barges offering LNG bunker and too little diversity among LNG bunker shuttles for remote operations. The ship owners' withering critique, however, suggests the lack of interest from clients who demanded the green specs; the technology's expense in tough times and unstable pricing for LNG are causing the most grief.

"The problem is that they cost a lot of money to build in the first place. Certainly, we have received a refund from the (national NOx fund), but it doesn't make up for the big change. These vessels are still very expensive vessels and we do not get any premium for chartering them. That is the big issue. We have two LNG vessels, and the next vessel that will go into lay up in our fleet will be an LNG vessel," Ulstein asserts.

Client LNG

His frustration is echoed by Karsten Sævik, CEO of Remoy Shipping: "We have one such vessel, and she's still on contract with Statoil. From a technical

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point of view she's working just perfectly with duel fuel engines. You can convert and burn whatever. What happens when she's finished her three-year contract we're quite excited to see," he says, subduing his sarcasm. "Will we have a need from the client to have her continue sailing? No, there's no premium for this installation (of an LNG-capable engine)."

Ulstein also seems to suggest that a vital potential income stream for some of his offshore vessels, well-stimulation or STIM, is negated because he can't convert his LNG vessels for the work, apparently due to the space requirements of LNG plant. STIM and other well operations in remote areas — potentially future lifeblood for high-spec fleets — might also be cut prohibitively short due to the lack of oceangoing LNG-bunker supply ships, generally only available in IMO-recognized Emissions Control Areas (ECA).

The "H" in Hurrah

It isn't just LNG-fueled vessel owners feeling the pinch. The world's first LNG-hydrogen hybrid, the PSV Viking Lady, will be out of work by the end of 2016, 10 years after her charterer trumpeted her hire. The ship's hydrogen fuel cells produce electricity by consuming the hydrogen in LNG, allowing a hybrid to use about half as much LNG fuel while offshore. The Viking Lady's owner, Eidesvik Offshore, has had its revenues halved and is looking at a 25 million kroner loss a year after a 145-million-kroner Q2 profit in 2015. Eidesvik, with more LNG vessels in her fleet that the others, has three of five in its LNG-fired fleet needing work in 2017.

> "... I have asked Bergen Engines for technical proposals to convert those LNG engines into diesel. **LNG is a big, big ... a huge disappointment."**
>
> **Haavard Ulstein, MD, Island Offshore**

One of Eidesvik's vessels is an LNG-battery hybrid and part of a burgeoning battery-hybridization wave in Norway and Europe, as suppliers begin offering ship owners an energy-conversion package (or "patch") to gain some of the benefits of energy storage. Yet, the effects of battery power in hard times isn't being felt yet: "The interest in batteries is primarily good for the oil company to save fuel costs," says Saevik. "For us it's just an extra installation, an extra investment. The only advantage (would be) to have a long contract (with a battery conversion written in)," he says.

Long-term contracts, as with Eidesvik's LNG-hydrogen hybrids, had previously helped justify the ship owners' adoption of climate tech. They and their charterers had answered calls to curb global warming, something many have their doubts about. In the past, financial help has also come from Norway's innovative NOx fund; Oslo's arm's length national tech-incubator companies (of foreign talent in Norway), and a raft of research and special-project money aimed mostly at creating "a major contributor to Europe's emerging hydrogen industry as a supplier of both hydrogen and hydrogen technology".

LNG's lower carbon and higher hydrogen count makes it an ideal way to curb carbon and grow a new hydrogen industry. It's been less than ideal for ship owners in need of relief.

In an oft-quoted, 300-page Danish Maritime Authority LNG feasibility study from 2012 which was sponsored by the European Union, concerns were raised that methane emissions from LNG engines were still an issue. Methane has as much as 10-times the greenhouse gas effects as carbon-dioxide. Still, this engine problem has been solved, "in theory", according to authoritative shipping voices in Norway.

Battery Power

Ulstein says he's had a Rolls-Royce frequency converter and battery pack on at least one of his vessels for six months and has saved on fuel for the generator and propeller peak loads absorbed by the energy storage unit. With engines running "more balanced", it opens the way for installing a small electric power plant next to the frequency converters on each propeller and thruster.

"That would be for future vessels," he says. "They (the supplier) were looking at (newbuilds) from 2025 and onwards. Battery technology for the massive power demand that you have on a big offshore supply vessel (or a cargo ship) won't help you one bit, because it would only be for the DP vessels. That's where it could have an effect."

Anda

One local supplier, Anda (meaning

(Photo: William Stoichevski)

Hard Times: LNG as a fuel has been good for charterers, not ship owners.

"the duck", part of the MMC Technology Group) offers a battery hybridization "patch" for high-power, peak-shaving hydraulic crane operations and a ship's power system hybridization conversion to connect batteries to a ship's grid, whether AC or DC. All here agree, battery fuel savings are great, and so easy conversion is needed.

This type of hybridization is likely as much as these ship owners are likely to be willing to afford for the next year. They're weary of pricy conversions. They're also concerned about LNG bunker price stability and having to also watch oil and natural gas prices. This writer long ago wrote of LNG markets' increased regionalization. Ulstein sees "a lot of disinformation out there" on oil prices that affect demand for shipping and, potentially, the cost of LNG bunkering.

The authorities, meanwhile, are influenced by that EU-funded Danish study on LNG infrastructure projects in Northern Europe. A key tenant of the study is that LNG-filling station survival will depend on how local LNG bunker pricing becomes. "Many spot charters don't even cover crew costs," one ship owner complains, and they can't take those specialized vessels out of their European LNG-bunkering station comfort zones. In the great beyond, it's up to bunker-delivery ships, and they're still servicing the major shipping lanes.

Resistance

The IMO, the EU and national planners simply exacerbate the confusion for ship owners who have paid the expense of an LNG engine: "LNG can be replaced by bio-LNG or LBG (Liquefied Bio Gas) without any impact on maintenance. Diesel can be replaced by biodiesel, hydrotreated vegetable oil, pure plant oil or possibly pyrolysis liquid, but these fuels may require engine adaptations and increase maintenance," another part of those studies say.

In the Danish report, offshore owners "resistance" (actual word used) to LNG was measured in percentages — offshore and workboats, "5 percent"; yachts, "10 percent" — and blamed on "uncertain fuel availability"; infrastructure for bunkering and the cost of new technology. They might have added "income uncertainty" and "returns on investment".

LNG Transfer Technology

Innovation in Offshore Transfer of LNG

By Gianni Sicuro, Global Director, Trelleborg Oil & Marine

The marine and offshore industries are becoming increasingly concerned with questions over the future fuel market, especially given ongoing uncertainty around future emissions regulations and the dates in which they will come into force. Marine owners and operators need to identify viable solutions now to ensure cost effective compliance with regulations and efficient operations in the future.

Liquefied Natural Gas (LNG) will play a key role in the future fuel mix. While it is still in the relatively early stages of development, new technologies are emerging which will support the LNG industry's transition into a flexible and economically viable alternative to traditional fossil fuels.

These new technologies have the capacity to quietly revolutionize the industry by accelerating growth, while delivering safe and efficient solutions that greatly reduce cost, infrastructure requirements and downtime. It goes without saying that safety remains of paramount importance, with manufacturers committed to improving operational efficiency while always maintaining the highest safety standards.

LNG transfer in the offshore environment presents an opportunity for energy companies to move away from congested ports, thereby streamlining the supply chain process to deliver optimum efficiency benefits and cost savings. During these operations, it is vital that the highest safety standards are upheld amid the effects of wind, waves and currents in the open seas. To achieve this, it becomes necessary to re-think traditional 'transfer zone' solutions, where ship-to-ship and ship-to-shore loading and unloading oc-

curs. To be able to go ahead with safe offshore transfer operations, technology solutions must be able to withstand demanding conditions. Conventional marine loading arms are not able to operate in more extreme weather conditions or sea states, and as a result can lead to a shutdown of transfer operations, effecting both cost and schedule. However, tandem loading and offloading allows vessels to maintain a safe distance during operations, enabling them to mitigate the risk of collision between two vessels, thereby enhancing safety.

Trelleborg is the first company to receive EN1474-2 accreditation for its 20" Cryoline LNG hoses, designed for fatigue resistance in even the most hazardous conditions. During the development of the Cryoline hose-in-hose technology, several full scale hose prototypes were successfully tested in both static and dynamic conditions – with most tests taking place in cryogenic conditions at -196 °C/ -321 °F - demonstrating their ability to withstand fatigue resistance in even the most perilous conditions. The hoses can also operate in any and virtually all sea states – dramatically improving safety and allowing for faster transfer times which, in turn, cuts operating costs.

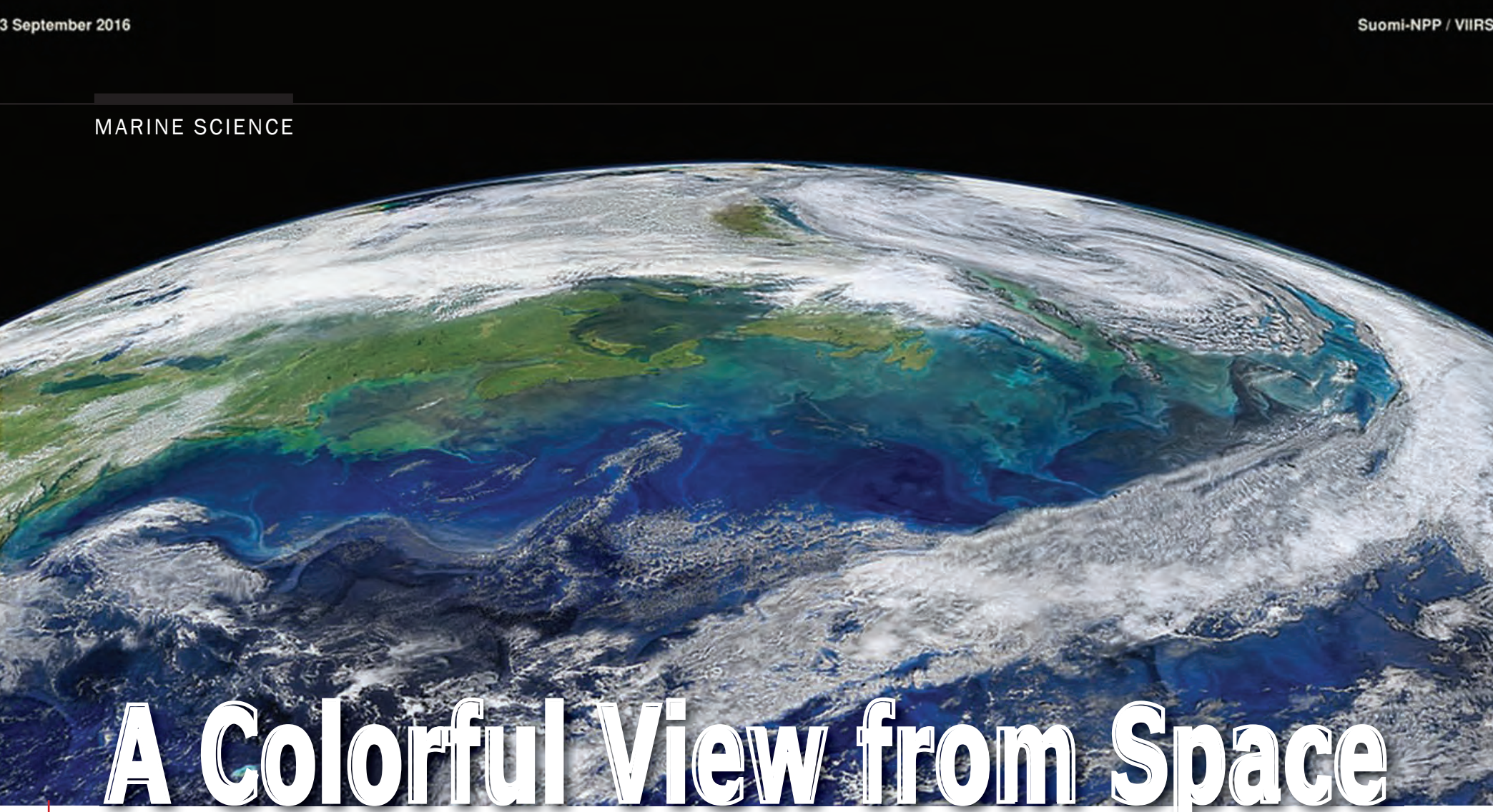
For ship-to-ship floating configurations, Cryoline hoses are available with large inner diameters ranging from 16 to 20 inches. This will provide operators with a greater choice of configurations, offering more flexibility, and a more operationally efficient replacement to conventional ship-to-ship systems. For example, ship-to-ship aerial transfer operations require only three 16-inch Cryoline hoses as opposed to ten 8-inch hoses; reducing handling operations by as much as 60 percent.

Able to extend to up to 600 meters away from floating receiving and distribution terminals and coastal gas carriers, Cryoline hoses ensure optimum standards in safety. Whereas traditional transfer is conducted with numerous 8" or 10" standard hoses, Cryoline technology utlizes 12-inch to 16-inch hoses – enabling them to cope with an LNG flowrate of up to 10,000 m3/h.

With no use of "Y-piece" joints required, Cryoline technology ensures less handling, fewer potential leak points, and less likelihood of pressure outage, while loading and offloading lead time is greatly reduced.

Boil-off generation during transfer presents another challenge for operators in offshore conditions, often causing a significant loss of energy during the transfer process. Therefore the Trelleborg team focused on developing game-changing technology with insulated hoses that can reduce boil-off by as much as 60 percent. This equates to a saving of 10 billion BTU's of energy saved over the course of 500 transfers, and in addition, all Cryoline technology handling solutions are supplied with built in leak monitoring systems as standard, to ensure maximum operational efficiency.

Advances in technology such as Cryoline hoses have the potential to shape the future LNG market, supporting the development of LNG from its infancy into a mature and viable clean energy source. LNG's true potential as a clean energy source is still being discovered. But with stringent regulations continually coming into force, it is increasingly considered a realistic alternative to other more traditional energy sources. This rapid growth can only come from the success of innovations which can facilitate this transition to compliant and efficient operations, and the industry must look to adopt these technologies to ensure commercial success.



A Colorful View from Space

Connecting Color to Phytoplankton with Novel Field Technology

By Kira Coley

An ever-changing patchwork of blues and greens, the sea is a colorful blend of suspended particles and the pigments of phytoplankton. While microscopic in size, these tiny ocean-dwelling plants influence climate and the atmosphere and form the base of the marine food web. Satellite-based ocean color imagery captures the vibrant world of phytoplankton and their relationship with the marine environment. As we enter the human-influenced age, our footprint on the variegated ocean can be seen from land and space as shifting climates, pollution and excess nutrients cause changes within planktonic communities and impact the surrounding ecosystem. The arrival of new high-resolution field technology opens the door to the next generation of satellite-based sensors which help scientists understand how these organisms are responding to the changing climate and what this means for the health of our oceans.

The color of light that is scattered back out of the sea can be used to derive information about what is in the water column, including the type and abundance of phytoplankton. The detection and tracking of Harmful Algal Blooms (HAB), as well as mapping of ecological boundaries for implementing management approaches for sustainable fisheries, are just two of the many benefits of ocean color imagery. Due to the vast expanse of water covering 70% of the Earth's surface, scientist's efforts to collect data are limited in both time and space. For this reason, satellite-based observations are important in providing a global view of biological activity and monitoring how the hues of the ocean change over time.

As part of the NASA Goddard Space Flight Center, the Ocean Ecology Laboratory Field Group uses information collected at sea to validate data gathered from satellites. Research cruises obtain accurate optical, biological and biogeochemical data. In situ radiometers measure ocean color and allow scientists to compare the results to images from space.

Aimee Neeley, a lead research scientist at NASA's Ocean Ecology Laboratory Field Group explains, "Out in the field, oceanographers typically sample from specific, pre-planned locations called 'Stations.' At these stations, we send instruments into the water column to measure various parameters such as salinity, temperature, and optical signatures at multiple depths sometimes up to thousands of meters. Because we are limited by ship time, man power and money, we cannot sample every single meter of the ocean. So, we rely on the satellites to give us an accurate global picture and use the data collected out in the field to make sure the satellite data matches the field data as much as possible. We call this ground-truthing."

Prof. Joaquim Goes, a biological oceanographer from Columbia University Earth Observatory, researches the effects of climate change on ocean ecosystems. His work extends across the world's ocean basins from the Pacific to the Atlantic and the Indian Ocean. For most of his research, he relies on ocean color images to understand how climate change influences the structure and functioning of plankton ecosystems, driving local- and basin-scale biological oceanographic processes.

In 2005, Goes began studying the effects of the monsoons on phytoplankton within the Arabian Sea, "We noticed that through these ocean color images, that chlorophyll had increased by three-fold. We went back to try to find out what caused this and connected it to the melting snow caps in the Himalayas region. The snow caps were getting thinner, and their extent was shrinking because of which, the intensity of the monsoons had increased, causing increased upwelling of nutrients required by phytoplankton. From these ocean color images, we predicted that the Arabian Sea would slowly become hypoxic over time, and that's what we have been observing now. It was here that working with the FlowCam started to interest me."

Goes and his team needed technology to assist with onboard analysis to make quick and easy measurements of water samples. During one of the cruises to the Arabian Sea, the team operated FlowCam – a particle analysis instrument from Fluid Imaging Technologies using digital imaging to measure particle size and shape of plankton cells – taking discreet samples at each survey location. Measuring some 40 parameters within each image, the plankton community of a sample can be quickly assessed.

The team was able to identify the organism causing the blooms and, within

ABOVE: Phytoplankton color the waters off of Atlantic Canada and New England on September 13, 2016. (Credit: NASA Ocean Biology Processing Group (OBPG))

(Credit: NASA Ocean Biology Processing Group (OBPG))

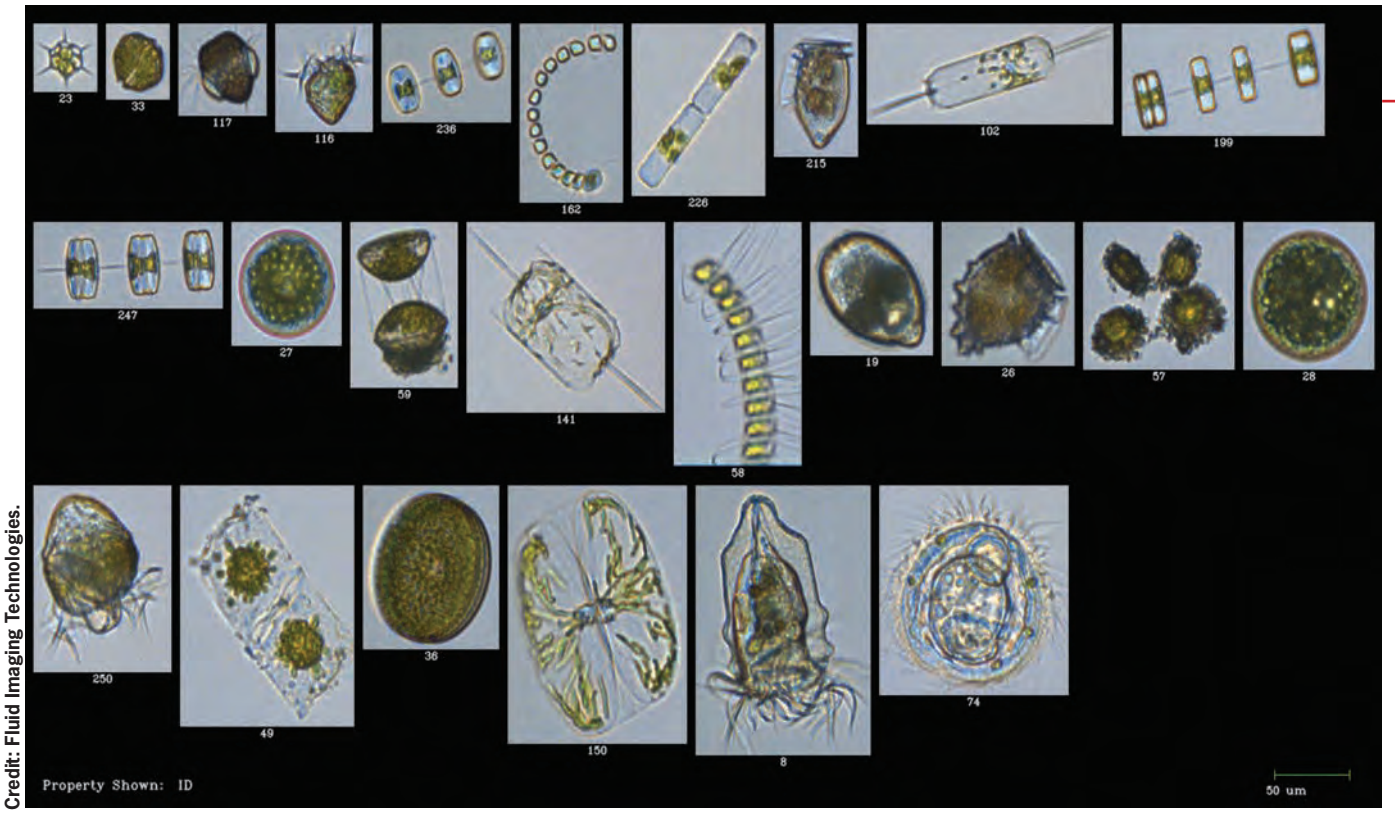
The Bering and Chukchi seas was captured by VIIRS on August 30, 2016.

minutes, could see its total contribution to the overall plankton population. "The uses of traditional microscopes would have taken a lot more time – you would have had to get the samples back to the ships laboratory and examine them under the microscope. Microscopy in itself is a time-consuming process and trying to build information of this community structure requires additional effort. Having a FlowCam onboard made it so much easier to tell in almost near-real time, what is in the water and what oceanographic features this community is associated with."

"About two years ago, after one of these Arabian Sea cruises, I was invited on a cruise organized by NOAA. I told Fluid Imaging Technologies that if their FlowCam instrument was operating in a flow-through mode, we wouldn't have to take discrete samples [which misses huge volumes of data between stations] but instead have the FlowCam take samples continuously at very high resolution. I used this new system on a recent cruise off the coast of South Carolina and North Carolina."

This region of the North Atlantic comes under the influence of the Gulf Stream which interacts with the coastal waters of the South and North Carolina, leading to upwelling of deeper, nutrient-rich water. The area is of particular interest to researchers because it is populated with complex physical oceanographic features, such as the formation of meanders, shingles, and filamentous structures, which formed due to the interaction of the saltier Gulf Stream with fresher coastal waters. During the cruise, Goes was able to transect across these complex physical features using the new system and observe changes in the color based on optical instrumentation. For the first time, they could see how changes in the optical properties of seawater were influenced, to a great degree, by the kind of phytoplankton in the water.

"It wouldn't have been possible to describe these high resolution changes, if it wasn't for the FlowCam operating in this flow-through mode. If we came across some unusual communities of phytoplankton, we could immediately examine whether it was related to a feature in the satellite sea surface temperature or



Credit: Fluid Imaging Technologies.

Images obtained from FlowCam of plankton during a cruise in the Gulf of Maine.

Harry Nelson of Fluid Imaging Technologies and Dr. Jeffrey Runge from the Gulf of Maine Institute, using a FlowCam system during the GOMCES 2016 Cruise. Credit: Dr. Rosana Di Mauro

the ocean color images. This also made it easier to infer how different communities influenced the color of the sea. And so, regarding ocean color research, it is really a big step forward. The problem in the past has been that, although you have high-resolution ocean color images, you didn't have enough datasets of phytoplankton to understand how they influenced ocean color properties in the water column. The FlowCam opens that avenue for looking at phytoplankton functional types using ocean color data. And this is one of NASA's biggest goals in the next strategic plan."

Scientists strive to increase observations across both time and space beyond what is currently possible. In order to link environmental drivers to plankton species composition and ecosystem function, efforts are being made to understand spectral variations in the light field to develop algorithms which identify phytoplankton groups using ocean color.

As part of this endeavor, NASA is looking to launch the next generation of hyperspectral ocean color sensors for satellites. Hyperspectral imaging can capture the spectrum for each pixel in an image, with the purpose of finding objects, identifying materials or detecting processes. The next NASA satellite mission, PACE (Plankton, Aerosols, Cloud, ocean Ecosystems), aims to deliver the most comprehensive look at global ocean color measurements in NASA's history. Unlike its predecessors, this satellite will be able to make hyperspectral measurements beyond which the human eye could naturally see.

Neeley explains, "PACE is a mission that will include the first satellite ocean color instrument to combine high-resolution global coverage with an extended spectral range to the ultraviolet wavelengths. The ocean color instrument is also being designed at hyperspectral resolution, making the PACE mission truly unique. The advantage of this finer spectral resolution will be large amounts of information in the visible spectrum from which we'll be able to detect different phytoplankton groups that were not previously distinguishable in ocean color imagery. Many applications are expected from PACE, such as the improvement of HAB detection and forecasting as well

On September 20, 1997 SeaWiFS collected its first complete day's worth of ocean color data. Ten years later it continues to collect the data that have greatly enhanced our knowledge of the ecology of Earth's oceans.

(Credit: NASA Ocean Biology Processing Group (OBPG))

as mapping of ecological boundaries, such as upwelling regions and eddies that can influence the entire food chain from the phytoplankton, the base of the food chain, up to the fish and whales."

Another NASA satellite, the GEOstationary Coastal and Air Pollution Events (GEO-CAPE), will be launched after PACE in 2020. GEO-CAPE is a dual stationary satellite which will be able to make repeated daily measurements off the east and west coast of the U.S., covering the coastal waters of Canada as well as down south to the Amazon River, north of Brazil. When a phenomenon occurs in the ocean, such as an algal bloom, scientists can target the satellite to observe that particular location. This is one of the advantages of a dual stationary satellite over polar orbiting satellites which can be exceptionally useful when monitoring the health of coastal ecosystems. Korea is the only other country which currently has this system for ocean color.

The satellite, Geostationary Ocean Color Imager (GOCI), has been in operation for just over five years monitoring sediments, water types and blooms. It is also used for fisheries and building structures along the coast which are influenced by sediment. Goes has recently returned from a cruise off the coast of Korea, "We wanted to look at their satellite data for ocean color and mapping phytoplankton groups. Korea's GOCI satellite does not have the hyperspectral capability, but we wanted to see if the specifications of the satellite meet with those of the GEO-CAPE satellite that NASA is planning to launch. Working in those waters are particularly complex: they have a lot of water coming via the Taiwan current and the Yellow Sea. The Yangtze River also influences the entire area. When you see something as complex as that, you also see changes in the optical properties and variations in the phytoplankton types, so that's why I decided to take the FlowCam. I can't tell you how useful it was."

Using the new system, Goes was able to construct a high-resolution picture of phytoplankton on the fly while another FlowCam took discreet samples. During the time and distance it took to travel between stations, the team was able to observe previously unseen features, aggregations of HABs and different phytoplankton groups that was not possible in the discrete mode traditionally used by the researchers.

"We managed to collect a lot of optical data on this cruise, along with other scientists from NASA, obtaining measurements continuously. For the first time, FlowCam technology allows us to achieve high-resolution maps of phytoplankton that can be related to satellite data in more meaningful ways than possible before. Advancing this ground-truthing technology is vital to the advancement of satellite technology. With this capability that NASA is trying to put up on one of its satellites, the important thing is to have the right amount of data to make the transition from ocean color to phytoplankton functional types. FlowCam has tremendous potential, and that is why I think in the near future, we will see the role of FlowCam and other automated imaging systems expanding significantly." concludes Goes.

Acknowledgements

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Photo: RW Fernstrum

R.W. Fernstrum

Keeping Things Cool for 67 Years

Founded by Robert W. Fernstrum 67 years ago, R.W. Fernstrum & Company is currently run by its third generation of Fernstrum. This long-tenured maritime staple has seen its fair share of maritime cycles, and in today's challenging market it is not standing still. The company is digging for, and finding, business in all four corners of the world, above water and below, as Sean Fernstrum (pictured above), President & owner, and his team explain.

By Greg Trauthwein

"Diversify, diversify, diversify … always," is the way that Sean Fernstrum neatly summarizes the challenge of running an efficient business to and through the many up and down cycles common in the maritime market. "You have to be in different markets. You try to ride an even line (with diversification). We rode the oil wave for a number of years, but you always have to have other pieces in place for when a market drops off."

Despite the paucity of new business in the oil and gas sector, there are always emerging and niche markets, such as the tidal power generation market, that hold strong potential. "You've got to be opportunistic and able to jump on it when it presents itself," said Sean. "Don't be overly concerned on where that opportunity is located; there's always a way to get that done."

Looking Back

Understanding a company's history, particularly when it is a tightly held family run company, is often a good window into its future. In the case of R.W. Fernstrum that would entail engineering acumen and a dogged pursuit of new opportunities.

"My grandfather Robert Fernstrum started the business in 1949 when he moved back to his home town of Menominee, Mich., and started selling Gridcooler Keel Coolers," said Sean. "The origins of our product lines have been a foundation for our success. The Gridcooler Keel Cooler was developed to solve a cooling problem for landing craft during WWII. My grandfather was the chief engineer at Gray Marine and Continental Motors during the war. Gray Marine built landing craft and needed to devise a compact closed-circuit

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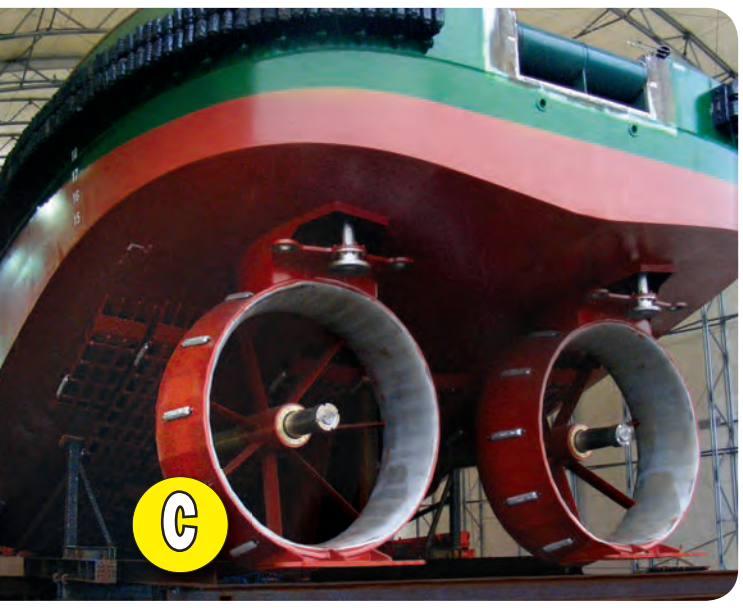
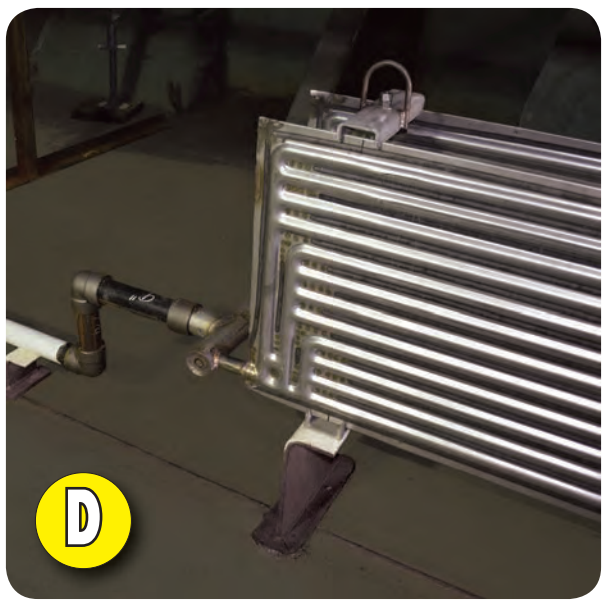
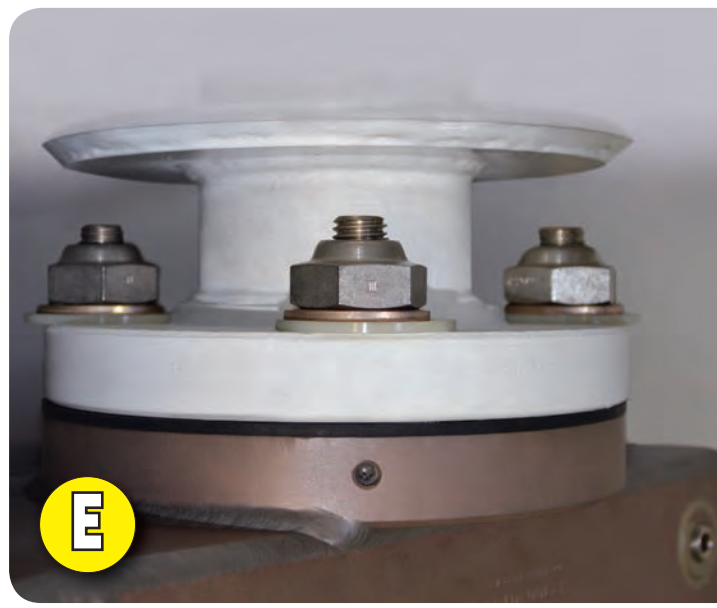
*According to Dale Gusick **(A)** and Frank Bjorkman **(B)**, R.W. Fernstrum continues to see positive business signs in its traditional maritime work **(C)** globally, while exploring new 'packaged' solution deals courtesy of the inclusion of its Tranter Plate Coil **(D)** as an efficient and cost-effective heating solution for barges, particularly ATBs. The flanged connection fitting **(E)** on its grid coolers is testament to its mantra to partner with customers to continually evolve and improve the product line.*

Photos: RW Fernstrum







cooling system to meet the needs of a wide range of operating conditions. Existing cooling systems were far too large for landing craft, so Robert developed a solution on his own. His compact keel cooler was the prototype for what would become our Gridcooler Keel Cooler line."

More than 60 years later, Sean understands that both his business and the maritime business have changed dramatically. "The business has changed with the markets shifting, and it's a matter of us changing gears and getting ready for that next high (cycle)," said Sean.

Central to its future is continued investment in the company. According to Sean Fernstrum, investment in the business is the umbrella for what he sees as four big areas of continual investment: facilities, equipment, products and people, "but not necessarily in that order," he adds. "This has been our strategy for years. The investment in facilities and equipment are obvious, the investment in product and people perhaps not so obvious." A tour of the Fernstrum facilities in Menominee, Mich., and Sean's words bear true, as the company has recently expanded its headquarters with modern front office facilities, and the main workshop includes a number of new machines to keep manufacturing efficient.

This investment has manifested itself also in a broadening of the traditional Gridcooler Keel Cooler line to include, among others, the Weka Boxcooler, which was a development of Cees de Kwant in the Netherlands, as well as Tranter's line of heat exchangers that go back to Ransom Olds and his development of chilled plates used in milk wagons 100 years ago. Today those plates are providing efficient heating of cargo in applications like petroleum and sulfur barges. "Platecoil is proving to be an efficient, cost effective heating solution for barges and bulk cargo vessels," said Sean Fernstrum. According to R.W. Fernstrums domestic sales lead Frank Bjorkman, the ATB market is particularly interesting for the company, for example, as it may have a grid or box cooler on the boat, and the Tranter Plate Coil application for heating the heavy oil in the cargo holds of the barge unit gives his company the opportunity to offer a complete package. "We don't manufacture (the Tranter unit) here, but we do engineer and sell it," said Bjorkman. "Typically those tankers have a lot of two-inch serpentine pipe, and the cost of putting a Tranter plate coil unit is a huge savings."

With the additional products, Bjorkman said "we find ourselves getting more into cooling solutions where we're providing multiple solutions. It has opened up many opportunities."

Serving Markets Globally

When it comes to serving global markets, Sean Fernstrum is first to admit that his company and its 36 employees are not centrally located in Menominee, Mich. He stresses the importance of travel, long-standing relationships and the creation and maintenance of a solid network of dealers and distributors as essential to global success.

In this spirit, every few years Fernstrum invites its world of representatives to Michigan for 'Rep Days,' Bjorkman said, which entails several days of meetings, time in the shop and social functions so that manufacturer and representatives are on the same page. Ample time is provided also for the representatives to network, as Fernstrum believes that a stronger bond between these organizations goes a long way in creating resolutions if and when a conflict of territory may arise. Visiting the company in Menominee makes RW Fernstrum's global push all the more impressive, particularly when looking at the roster of

business in hand, as Dale Gusick, head of international sales, summarizes:

• There are a number of interesting wave and tidal energy projects, with Fernstrum involved with four separate trials in four countries. “Some of these have been out for 2.5 to 3 years, and we’re starting to get to the point where they are discussing production runs,” said Gusick. Fernstrum’s role is to keep all of the subsea power generation and computing components cool.

• In South America the inland waterway market remains vibrant. “The market is not as strong as it was five years ago, but the big players continue with activitiy,” said Gusick. In particular, he sses the major players using this lull to position themselves for the inevitable rebound. The big operators are starting to open more terminals on the rivers, terminals for moving soy and corn. “Every terminal they set up is going to require push boats, it’s going to require barge fleets,” Busick said.

• RW Fernstrum is also seeing a “nice run of small tugboats coming out of Indonesia and Malaysia” Gusick said, as well as a number of small boats and landing craft used as ferries coming out of Bangladesh

• Closer to home, while Bjorkman said offshore is obviously down, North America holds opportunity, including push boats for inland market, tug business, ferry business, including the series of ferries building for the City of New York at Horizon Shipbuilding and Metal Shark, as well as the aforementioned Alternative Energy Systems.

A Tier Change

The biggest driver for its business is not region, rather regulation. According to Sean Fernstrum, the continued move toward emissions reduction across the maritime world has put engine cooling solutions front and center, as cooling is essential in the process to pull out particulate matter and help cut back on greenhouse gasses. “For us,we are seeing less water but we have to reject more heat … a real double whammy.”

When comparing comparable engines built in the 1990s versus today, that ‘same’ engine will require significantly more heat exchange, essentially resulting in bigger cooling units. “This is an area of change for use where we are investing in the product to innovate so that we are still cost effective,” said Sean Fernstrum. As the coolers are getting larger, one option is to stack them. “Whereas 20 years ago we did a few ‘stacked’ units per year, today it seems like every order is going to the stack tube to get them to fit on the vessel,” said Gusick. Whether the cooling challenge is WWII landing craft or an EPA Tier 4 engine, Sean Fernstrum keeps his company focused on the mission at hand: “Our strength is heat exchange. “Whether it’s cooling or heating, it is heat exchange. That’s our core strength. We’re serving that with a number of different product lines now, and we can bring those together and provide a packaged solution.”

Morton S. Bouchard III

has served as President of Bouchard Transportation Co., Inc., the nation's largest independently-owned oceangoing petroleum barge company, since 1996 and CEO since 1999, the fourth generation of the Bouchard family to helm the company since its incorporation in 1918. The Bouchard name is iconic in North American maritime circles, and Mr. Bouchard was elected into the Maritime Hall of Fame in 2013, most recently last month he was honored in New York City at the Coast Guard Foundation 36th Annual Salute to the United States Coast Guard – The National Awards Dinner.

By Greg Trauthwein

Please give an overview of your company.

Bouchard Transportation Co., Inc. is the nation's largest independently-owned oceangoing petroleum barge company. Our fleet consists of 26 barges and 25 tugs, with services operating throughout the United States, Canada, and the Caribbean. All barges are double-hulled, and all vessels include top-line equipment and fuel-efficient technologies that exceed industry standards. Bouchard's fleet is faster, larger and better equipped than ever before, and the recent investment made to expand in ATBs has increased fuel-efficiency, capacity and speed. The measures Bouchard has taken to construct vessels with state-of-the art equipment and fuel-efficient technologies not only exceeds industry standards, but acts as an efficient transporter for their customers, as well as a comfortable, reliable and safe fleet for their crew.

Your company is closing in on 100 years; has the business philosophy stayed the same?

Since Bouchard's incorporation in 1918, progressive thinking and a strong commitment to service and safety has fostered the company's continued growth and greater recognition. Expansion continues to be driven by our founding fathers and five generations of Bouchard's philosophy of investing profits in new, modern equipment to service customers in the most efficient and environmentally safe manner possible.

Today, Bouchard looks toward the future with further progress and adaptation in mind. However, three things will always remain constant: commitment to customers; safety; and a strong corporate identity founded on a rich heritage of barging experience and family pride.

Bouchard has a well recorded history investing in new boats and barges. Can you put in perspective for our readers your investment in new equipment over the last five years? What have been the driving factors in this development?

During the past five years, Bouchard has invested close to $300 million dollars into new equipment. This investment included two 260,000 bbl ATBS (M/V Kim M. Bouchard & B. No. 270 and M/V Donna J. Bouchard & B. No. 272), two 4,000 hp Intercon Tugs (M/V Morton S. Bouchard Jr. & M/V Frederick E. Bouchard), and the conversion of the B. No. 210 and B. No. 220 to Intercon.

We made the decision to make these investments well before the contracts were signed. The investment decision was based on how we felt we could improve and position our fleet to better serve our existing customers, as well as new customers.

In your career, can you point to the one technology that has helped to make your operations more safe and efficient?

The one technology that has benefitted not only our operations, but the entire industry and the environment is without a doubt, double hulls. I think back to when legislation was passed to mandate double hulls, and about their initial discussions and fear that they would be unsafe because vapors could accumulate between the

Photos: Coast Guard Foundation & Bouchard

"The biggest challenge I find today is managing the new regulations, which seem to be endless, not only in our industry but in every industry. As a country, we need to take a step back and take a harder look at how over-regulating effects businesses and jobs. I support regulations that make us safer, but some of these regulations today are costly in a market that is weak, which is not a good formula."

– Morton S. Bouchard III

hulls. Bouchard's fleet is 100% flat deck double hulls, no trunk tanks, which we do not believe meet the double hull requirements, but I will leave that up to th

How do you see your fleet and your company evolving over the next five years?

The investments we have made over the past five years have already paid off in marketing and advancing our fleet, and I see no reason for it to change. These advancements have increased fuel-efficiency, capacity and speed, and has expanded our ATB tug fleet to 20. With that said, we must remain efficient, safe and competitive.

In your position, what do you consider your number one challenge to operating an efficient, profitable fleet, and why?

The biggest challenge I find today is managing the new regulations, which seem to be endless, not only in our industry but in every industry. As a country, we need to take a step back and take a harder look at how over-regulating effects businesses and jobs. I support regulations that make us safer, but some of these regulations today are costly in a market that is weak, which is not a good formula. For example, we have been forced to make investments in new equipment on vessels, which for some; will be hard to keep up with. Bouchard will make these investments in a smart calculated manner; however, many smaller companies may have a difficult time.

New rules and regulation demand investment. What do you see on the horizon that you see as the most troublesome, from a financial standpoint, for your company or for the industry as a whole?

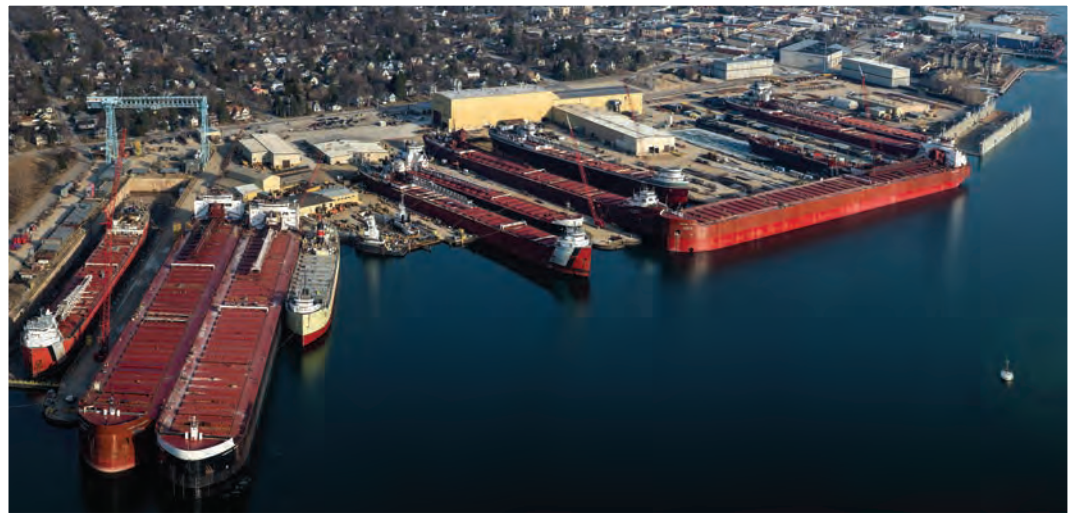
The clean water ballast system has been a disaster. Bouchard and others went out and built new equipment with clean water ballast systems installed that supposedly met the regulations, or we were told they would meet these regulations. However, after the investments were made we were then told that the system did not meet the regulations. This is just a disaster for companies like Bouchard who continuously make investments and advancements to meet regulations. However, I am told that the clean water ballast system manufacture is working hard to rectify the injustice, and I am confident that they will.

Looking in the timeframe of your career: How is running a fleet of workboats most the same, and most different?

Oh it has certainly changed, and it continues to change. The biggest change is in the equipment. Equipment today is bigger, faster and more complex which results in vessel employees requiring more training and education.

Morton S. Bouchard III Highlights

- Promoted to President of Bouchard Transportation Co., Inc. at the age of 32
- Following the passage of the Oil Pollution Act of 1990, he instituted the first double hull barge construction program in the United States.
- The company started building flat deck double hull ocean going petroleum barges in 1992 and continues to do so today. This aggressive approach has resulted in Bouchard Transportation Co., Inc. owning and operating the largest flat deck double hull petroleum barge company in the U.S.
- 2016 marked the conclusion of Bouchard's most recent expansion program, which included the delivery of two 260,000 barrel ATBs, the M/V Kim M. Bouchard & B. No. 270, and the M/V Donna J. Bouchard & B. No. 272, as well as two 6,000 hp intercon tugs, the M/V Morton S. Bouchard Jr. & M/V Frederick E. Bouchard, which are pinned up to the B. No. 210 & B. No. 220, respectively.
- The Bouchard Transportation Co., Inc. Tug & Barge Simulation Center – boasting the latest in Kongsberg Polaris Bridge simulation technology – opened its doors at SUNY Maritime College in October 2014.
- In 2011 Mr. Bouchard established the Morton S. Bouchard Jr. Scholarship Program at SUNY Maritime in memory of his father.



Caring for the Great Lakes fleet during the winter months is a core business for Bay Shipbuilding Company. Above, the 2015 Winter Fleet and to the right, the 2016 Winter Fleet.

In Sturgeon Bay, Wisconsin find

'The Best Kept Secret in Shipbuilding'

By Greg Trauthwein

In 2009, Italian shipbuilding giant Fincantieri S.p.A, purchased the assets of the Manitowoc Marine Group; which included Bay Shipbuilding Company. Located in Sturgeon Bay, Wis., Bay Shipbuilding was the "feather in the cap" with their long history in U.S. commercial shipbuilding and repair. Maritime Reporter & Engineering News recently visited the shipyard and found an enviable level of new builds and repair activity; which gave us a better understanding why the yard is dubbed the "best kept secret in shipbuilding."

Todd Thayse, Vice President & General Manager, Fincantieri Bay Shipbuilding

Can you share with us your background and area of responsibility?

I've been the Vice President and General Manager of Fincantieri Bay Shipbuilding since assuming the role in August of 2012. I've been with the company for 32 years and I've served in various capacities; starting out in the manufacturing field. From 1991 to 2012, I worked primarily in our repair/conversion division, before I took this role in leading the organization.

You call this place the "best kept secret in shipbuilding." Why?

We do the full gamut of shipbuilding and associated maritime services; from repair and conversion to new construction. We have all aspects of shipbuilding and repair disciplines onsite. I think that is one of the value propositions that we offer; we still harbor all the crafts required to build and repair vessels. We do have valued turnkey subcontractors that help to smooth out the peaks and valleys of our business, but we still have all of the disciplines of shipbuilding under our roof and in our employee base.

How many people do you employ?

We've got about 700 production employees, and 100 plus office and management staff. Our employee base will swell to more than 1,000 when we enter our busy winter repair season, which typically starts in December and generally ends by the end of March.

This obviously coincides with the severity of the ice and shipping conditions on the Great Lakes. Is it always on this exact schedule?

No, it is not. Last year was somewhat of an anomaly, we had boats here well into the spring and summer months; as we had some very large projects with scrubber installations and retrofitting coupling systems on some ATBs that took longer.

What does a typical winter repair season look like?

Every year we take an aerial photo to document the winter fleet. Depending on the geometry of the vessels in for service, we generally have 16 to 18 vessels in for service over the winter, ranging from 1,000 x 105 foot ore carriers down to 500 foot cement carriers and tugs. This is for the most part, a captive fleet to the Great Lakes; the ore carriers, the stone carriers, the cement and the coal carriers. Typically we host six to eight customers; recently we have been able to attract Canadian business as well, including work for CSL, Algoma, Lower Lakes Towing and others.

Is it generally always the same carriers and vessels?

Year on year there are a number of fleets that bring their entire group of boats here; three to four vessels in our yard. One of our strategies is to target the drydockings and to ensure that the drydock is always occupied, year round. Over the winter we will cycle four to eight boats through that graving dock.

You cycle vessels into the drydock, even when everything is iced over? How?

We set up a schedule with a two to three week window, and we cycle them in and out, which is a challenge, particularly with the ice. We have to keep the bottoms ice free. You have to have a very robust tug operation and a solid plan to keep the bottoms of the boats ice free.

How do you keep the bottoms ice free?

We put bubble tubes down there. We lay a series of air tubes below, and we pulse air through the tubes, creating bubbles, which helps keep the bottoms ice free. We'll put divers down under the boats two to three weeks before we drydock the vessel to confirm its ice free, and if necessary, to move the bubble tubes around or augment the bubble tubes with "ice eaters". We've tried a number of non-traditional means, such as keeping heat in the ballast tanks, pumping steam into the ballast tanks in an effort to eradicate the ice if it builds up. We are one of the only freezing ports that cycle boats through the graving dock (during the winter). If we didn't do this, the owners would have to pull the boats out of service during the prime shipping season. Is it cheap to drydock a boat in winter? No! But the trade-off is our customers having boats in drydock during the prime shipping season. Once our winter season starts, its seven days a week, 24 hours per day to get the work done.

John G. Munson Conversion

So what percentage is this of your repair business?

We do 60 to 70% of our repair work during the winter months. But there is a flow all year long, as our repair business has steadily grown. Ship repair in total is about 30 to 40% of our business.

What's the biggest challenge on running a successful repair business?

It's the timeframe to get the work done. The fleets are aging, so the jobs tend to be bigger, but need to be executed in a shorter period of time. Older boats can also face challenges with regulatory issues.

What are the unique challenges of running a successful ship repair and new construction business in the same yard?

There are people that believe you can't do it. I don't see it as a challenge; I see it as a benefit. The backlog of new construction allows you to market yourself as a good place to work with some longevity. Maritime is cyclical. Our new construction has allowed us to stabilize our labor base by attracting new young people into the business as a viable, year-round job. It gives us flexibility in the case of emergency repairs to have a large employee base that understands both ends of the business.

Looking at employees; finding and keeping good employees seem to be a perpet-

Barge under construction in Large Graving Dock

ual challenge in the maritime industry. How do you do it?

The challenge is attracting the younger generation. It's not always a glamorous business. You have to have an industrial sense; but once they get in the business and work it for a few years, I think they become intrigued with the maritime history and lineage. You find that lineage a lot around Sturgeon Bay; generations and whole families have worked at the shipyard. The aura of building a large vessel and seeing it sail away, or accomplishing a large repair job ….. that alone tends to build on itself and helps to keep key employees excited about the maritime business.

Do you see attitudes changing at all?

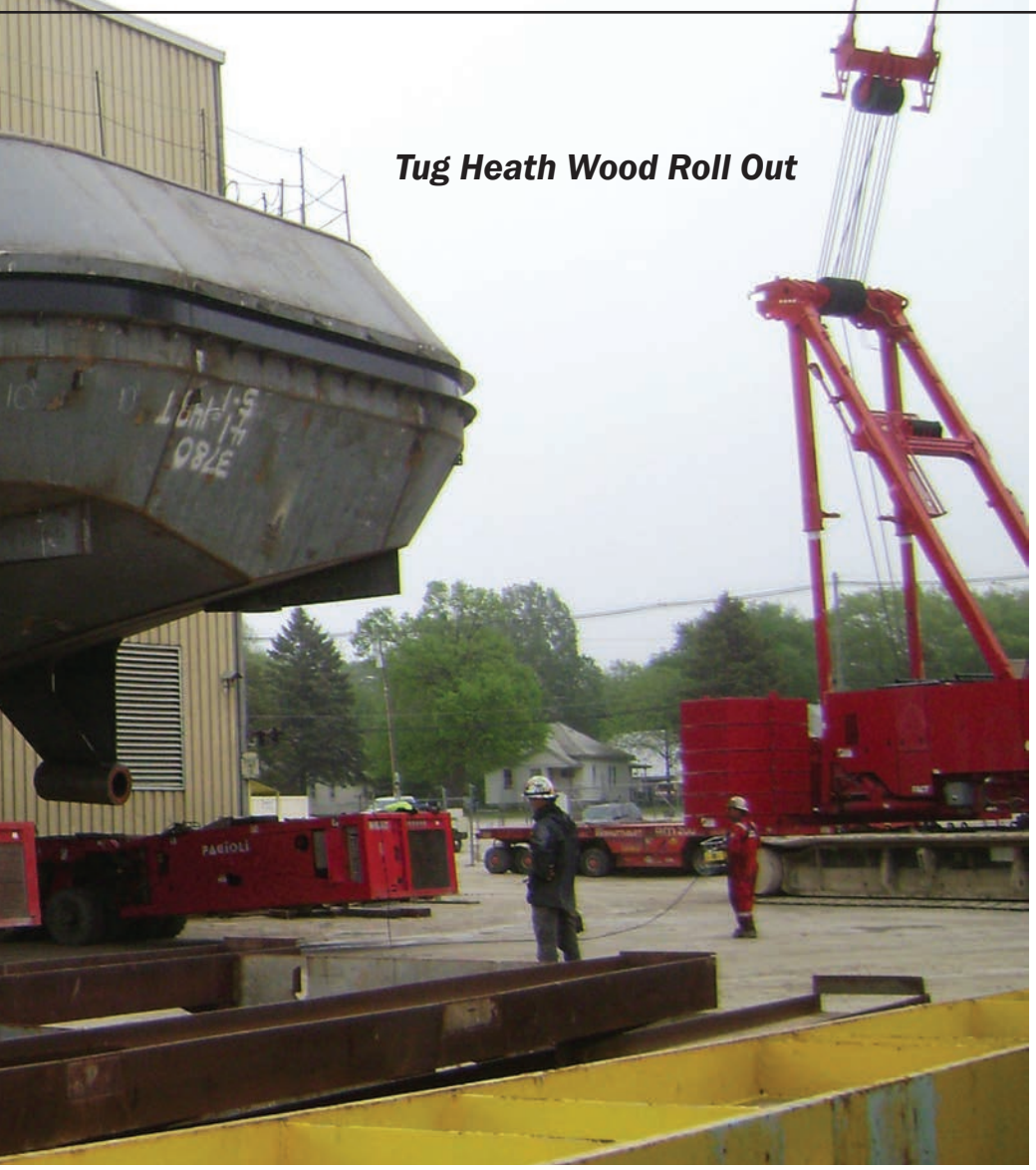
I think the tide is turning, and the State of Wisconsin is working hard to let the younger generation know that it's okay to take up a trade; to become a pipe fitter, to become a welder, etc. You can make a good living with industrial means.

Obviously the acquisition by Fincantieri was a significant point in this facilities history. Can you point to how its ownership has resulted in infrastructure investment?

I think their investment is visible in all aspects of our business. We've invested in equipment like carnage, burning and cutting equipment. We've made brick and mortar investments and in outfitting buildings; recently we've invested in property in the form of a neighboring shipyard (Palmer Johnson) that became available. We've built a floating drydock (2012). Since 2009, Fincantieri has invested more than $40 million in our operation.

Can you tell me a bit more about the Palmer Johnson acquisition?

The courtship was more than a year long and we finalized the purchase in the spring of 2016. It started out as a request to rent some warehouse space, and it turned into an acquisition of buildings that fit well within our current operation. It really was a unique deal, and I don't think you would get the chance again to buy property that is literally homogenous to your existing property. These are buildings purposefully built for maritime activities, so it seemed to make sense. It adds capacity. We view it as an extension of our fabrication build-



Tug Heath Wood Roll Out

ings, and we see the opportunities coming down the pike lending themselves to that, which is the ability to build almost completely indoors.

What products are coming down the pike?

We see the tug business, the ferry business and some small boat markets as having good potential.

When will the new facility be integrated into your operations?

50% of it is up and running now; 70% will be up and running by year's end. There is a fabrication bay where we will increase the lifting capacity to 200 tons, and with that comes the strengthening of the building and raising the roof to allow for a 55 foot hook height and a 200 ton lifting capacity. By the summer of 2017 it should be completely integrated.

On the tour of the yard I saw a lot of activity. Can you give to me a rundown of the business in the yard at the moment?

The first of the Kirby ATBs will be delivered by the end of the month (October). We've got the second Kirby ATB coming behind that. We are starting on our AMA project, which is an 185,000 barrel barge with an 8,000 hp tug that will push it. Then we have another 8,000 hp tug and a 155,000 barrel barge in our backlog. We have an eight boat new construction backlog. Currently the John G. Munson, a 1950s vintage ore carrier, is being repowered; its steam power plant being replaced with a MaK diesel engine. The entire propulsion plant is being gutted and a new propulsion plant, including a Schottel CPP system, is going in. That will be delivered in the spring of 2017. I could go into full details on all of our repair jobs, but I think it best to say that our docks are fully booked through the end of the year.

In your career, is there a technology that you can point to that have helped to make the job of building and repairing vessels more efficient?

Good question. Welding technology certainly has come a long way. Some of the piping products that you're seeing today, you couldn't use in the past. Some things that have gotten approved by ABS and the Coast Guard such as snap-on fittings and some of the composites and plastics, have led to greater efficiency.

CROWLEY

The mantra at Crowley is "safety" and "people," but it's not simply words, rather embedded practice starting from the top. Robert Grune, SVP & GM, Crowley Petroleum Services talks to Maritime Reporter regarding this ubiquitous company's historic success and promising future in the petroleum transport sector.

By Greg Trauthwein

Robert Grune leads one of Crowley's six business units, responsible for U.S. flag Jones Act oil transportation business. The current fleet consists of 17 Articulated Tug Barges (ATBs) ranging in size from 150,000 to 330,000 barrels capacity, as well as four U.S. flag MR oil tankers. In addition Crowley managers an additional 16 U.S. flag MR oil tankers on behalf of a third party, and there is also its LNG transportation and supply business in the Caribbean that comes under Grune's responsibility.

In looking at the Crowley fleet under Grune's guise today, the overarching thought is "young."

While ATBs are a regular site on today's waterways, the concept – relative to the maritime industry as a whole – is still fresh, as Crowley was a leader in the adoption of ATB transportation technology in the U.S., starting with a series of four 550 series units in 2002, followed by an order for 10 larger (185,000 barrel) units a few years later, and including a series of three 750 series units – 330,000 barrel units purpose built for a customer about six years ago. Taking into account the six tankers that Crowley had built in Philadelphia (the last of which was delivered only a few months ago, and since delivery of the first two of the ships were sold to Kinder Morgan).

Crowley is a long-tenured player in the maritime market, and while Grune's Petroleum unit currently has no new vessels under construction, he explains that the Crowley philosophy always has been – and always will be – to not build vessels on spec. Rather tonnage is added to the fleet in close consultation with clients.

"We've been in the oil transportation business since the 1930s, starting in San Francisco using small towed barges on the west coast moving oil," said Grune. "Over time we've increased the fleet. Going into the ATB newbuild program (for example) we already had a substantial towed fleet of offshore barges – about 150,000 barrels, our "450 Series" barges – and they were getting a little long in the tooth, and we knew we needed a fleet replacement."

Hence the dramatic investment move into the ATB business, and as Grune proudly points out, many of the original ATBs (550s) continue to be charted to the original charterers, which is a testament to the vessels.

"Our philosophy has been, and it always will be, that we don't build vessels on speculation. We build vessels for the demand of our customers, and we partner with our customers to help determine their needs … and frankly we have been very successful at that."

– Robert Grune, SVP & GM, Crowley Petroleum Services

Market Fluctuations

Company's such as Crowley that take a long-view of the market are arguably more resilient to fluctuating markets. "Our philosophy has been, and it always will be, that we don't build vessels on speculation," Grune re-emphasizes. "We build vessels for the demand of our customers, and we partner with our customers to help determine their needs … and frankly we have been very successful at that."

The focus of the market for the past two plus years has been a suppressed oil and gas market, as effects of pricing pressures have rippled throughout the U.S. maritime market and indeed around the world. Grune admits that the previously booming shale oil market was one impetus for the construction of new tonnage, particularly the six ships, and that the market has effectively turned with the precipitous drop in oil pricing fed in part by OPEC's refusal to reduce production.

"The market has tightened up," but the essence of what we do here at Crowley is to "run a safe, reliable fleet; that is our focus every day," said Grune. "So the changes to the market affect us, but we're in a pretty good position over the long term because of those relationships. There is a base level of demand for U.S. flag Jones Act vessels that simply will not go away."

While the market is tighter today than two years ago, when Grune looks across the competitive landscape he sees older vessels in the U.S. flag market that could be retiring. "When I took my last look there wer about 22 vessels more than 20 years old that are in the market," said Grune. "While there is no requirement that those vessels have to be retired, as they get older it will be harder to get them approved by the oil majors, so they will start dropping out of the marketplace."

Looking near-term to the coming year, Grune estimates that the market will be "challenging in 2017," but that there are may variables that could conspire to drive the price of oil back up, citing the $60 per barrel as the level where "everyone is going to be just fine."

Challenges Ahead

When looking beyond 2017, the challenges Grune sees are not altogether unique to other maritime operators: adopting a Ballast Water Treatment solution as well as deciding the way forward to comply with ever-stricter emission rules.

"The Ballast Water Treatment issue is a huge issue, and it's not cheap: for one of our Tug/Barge units you're talking about a $2 million investment to buy and install the equipment," said Grune. The key for Crowley, and in fact for all maritime operators is figuring how to recoup this massive capital investment cost. "How do we recoup that? I think it really comes back to the relationships with our customers," said Grune. "They know these are requirements, and we are not simply adding $2 million in capital costs to each unit because it's fun."

When it comes to emission solutions, Grune said that Crowley is leaving no stone unturned, looking at everything from alternative engines to scrubbers to LNG fuelled propulsion, a process too that is conducted in consultation with its customer base to arrive at a solution that is beneficial for all.

While technology is an obvious point of study and investment, Grune insists that Crowley's number one challenge, its number one area of focus historically is the quality of its mariners. "We don't get paid for sitting around doing office work, we get paid from moving oil from 'point A' to 'point B.' I'm not out there moving oil, I used to be a mariner, so I have an empathy and concern for our mariners," said Grune. "We are focused on their training, their quality of life, and we want to ensure they understand our safety culture. Our number one focus are our mariners, they are the tip of the spear."

Photo: McAllister

Steven J. Kress is the Vice President of Operations for McAllister Towing and Transportation, a venerable New York company with a history spanning more than 150 years.

By Greg Trauthwein

How did you find your way to the VP of Ops for McAllister?

(After graduating SUNY Maritime in 1979) with an Unlimited Tonnage Third Mates License in hand, I was recruited by Interlake Steamship Company and proceeded to Toledo, Ohio to receive an "Open Waters" endorsement for the Great Lakes so I could sail and gain the necessary trips to sit for my Unlimited Tonnage First Class Pilots License. With the First Class Pilotage from Duluth to Buffalo and everyplace in between, I sailed mainly on the M/V John Sherwin until her layup, eventually growing weary of being away from home. On a winter break I interviewed at McAllister for a dispatchers position. Since then I have worked my way up to my current position, volunteering services to the USCG Towing Safety Advisory Committee representing the tug and barge industry, Chairman of the New York Harbor Tug and Barge Committee and the New York Maritime Association as a Director along the way.

McAllister Towing & Transportation is of course well known, but can you give us an overview of operations?

McAllister annually assists more than 21,500 vessels which involve more than 46,000 tug assists for global customers, including some of the world's leading oil and gas companies, cruise lines, shipping companies and the United States Navy. Our towing fleet provides coastal services to all the major oil barge companies while also towing dead ships, container barges and anything else that moves on the water. With 65 tugs operating out of 12 ports along the eastern seaboard and San Juan Puerto Rico, McAllister can answer the call relatively quickly no matter the request.

How has the fleet (and the company) evolved over the past five years?

McAllister has always been on the leading edge of innovation in tug design, from kort nozzles and flanking rudders to elevating wheelhouses to the first East Coast tractor tug, and the last five years are not any different than the last 150. As shippers bring in newer and larger ships and barging companies switch to modern double hull barges, McAllister began building tractor tugs with higher EPA tiered engines, higher horsepower and far larger bollard pulls while also putting in place an aggressive internal audit system with a living and growing safety management system that the oil majors demanded of tugs towing oil barges and that our trade organization, the American Waterways Operators, highly recommended. ISO/ISM certification and SIRE inspected boats became the rule rather than the exception and McAllister stayed in the forefront.

What have been the driving factors in this development?

Top priority for McAllister has always been crew safety followed by customer demand for timely services and as Director of Operations I am proud to say that we are accomplishing our goals in these regards.

Rendering of the new builds that will be delivered in 2017, Capt Brian McAllister and Rosemary McAllister. These tugs will be the highest hp in our fleet at 6,700.

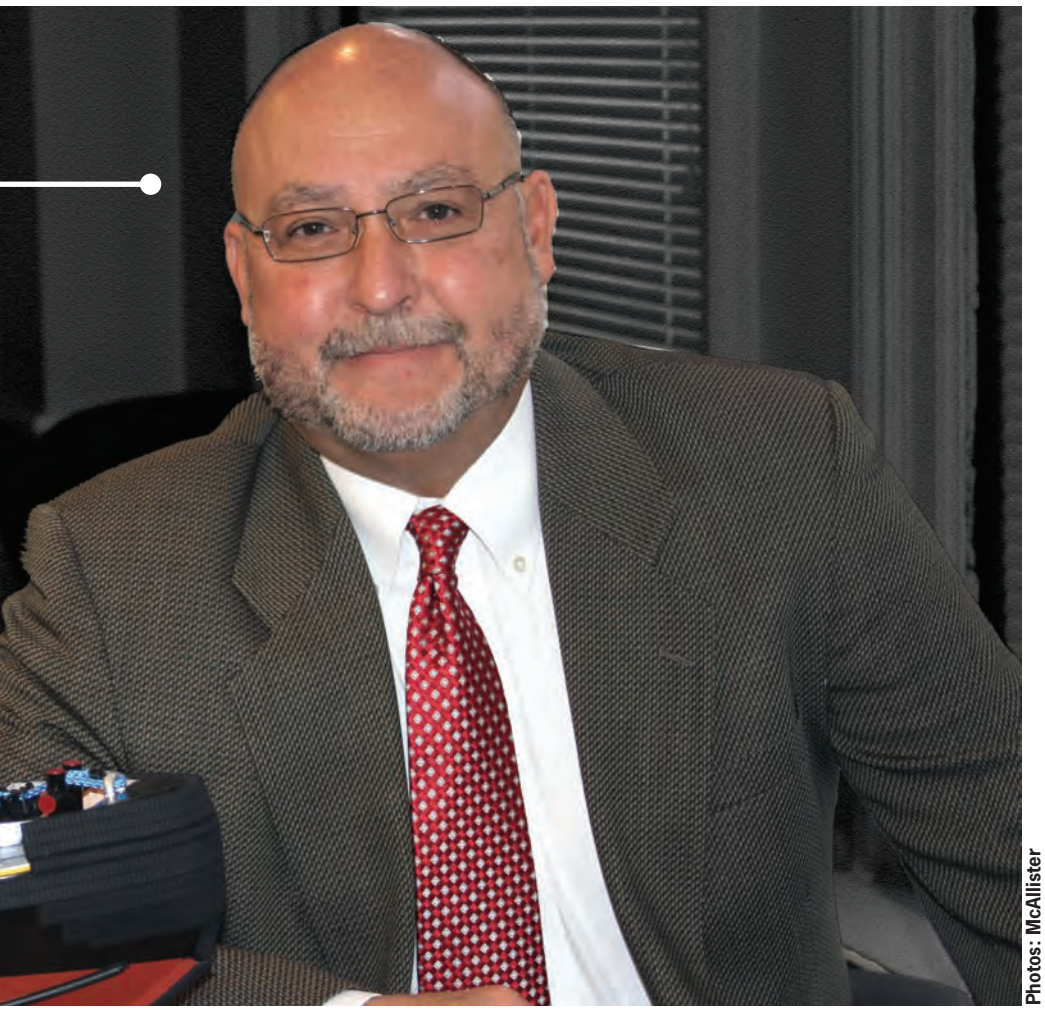
Captain Steve Kress, VP of Operations

What are the primary drivers for fleet evolution?

The marine transportation industry, like most other industries, is in the middle of changes brought on by a concentration in worker safety, modern, efficient operations that provide economical service without sacrificing quality. We have listened to our customers and aim to provide that quality service as the market evolves and steamship lines consolidate. We are a family company whose roots in the industry go back generations and will continue because of our commitment to our customers.

Can you discuss in detail your newbuild program.

Our newbuild program has been in effect for years now with the recent additions of the Buckley and Eric , 5,150 hp Tractor Escort Tugs built at Senesco Marine of Rhode Island, the 6,000 hp Tate, delivered by Washburn and Doughty, and the soon to be launched Jeffrey from Eastern Shipbuilding, a 5,000 hp Tractor. Unique to the East Coast early next year will be the Captain Brian A and the Rosemary, two 6,770hp, Tier IV Tractor Escort Tugs currently under construction at Horizon Shipyards in Alabama. Two more sister



Photos: McAllister

tugs are currently on the drawing board waiting for the final design and decision. These boats are ahead of their time and with over 80 tons of bollard, are sure to be in demand in every port where the Ultra Large container ships will call.

In your mind what is the biggest challenge to running a safe, efficient fleet today?

There are no short cuts for safety and efficiency and the number one challenge remains providing the customer with the quality service they expect. McAllister does this by making sure our crews are well-trained, have the best equipment and that each port has the proper mix of tugs to handle the anticipated demand from shippers and barges alike. Obviously this is much easier said than done, but at McAllister we have shore side professionals with years of sailing experience and a fleet full of seasoned merchant mariners to ensure that no ship or barge is delayed. Having the customers satisfied and your crews going home safely after a week or more aboard is your success, while also being hopeful that it was executed properly so that it is profitable.

New rules and regulation demand investment. What's on the horizon?

McAllister meets, with high anticipation, the upcoming SubChapter M regulations, where all our tugs will have USCG inspections with our computerized maintenance program coming under a more intense scrutiny. From a financial standpoint, the increased expenditures and scheduling that we will be coordinating with the USCG may not be understood by our customers as this will no doubt increase operational expenses and time out of service for the boats.

From the time you entered the industry in 1979 to today, how is running a fleet of workboats most the same, and most different?

Going back to the early 80s and comparing those days to now, you will see much larger ships making fewer port calls being attended by fewer tugs with steerable propellers rather than open wheels. You will see highly advanced, double hull barges plying the waters with EPA tiered tugs with towering wheelhouses. How is managing all this different? It isn't really. Coming to work for the last 35 years for a family company that understands we operate a 24/7/365 business that has a different challenge to meet every day has been a major learning experience and a pleasure to be part of.

Photo: Arpoador Shipyard

Arpoador Shipyard and Pre-salt FSVs

By Claudio Paschoa

Logistics Hubs and Fast Supply Vessels will be key assets in the complex offshore transport solution Petrobras has devised for moving workers and goods, to and from Brazil's remote pre-salt plays. Here is a look at a modern local shipyards building the heavy-duty aluminum vessels, with overall lengths ranging from over 30 meters to around 50 meters. Claudio Paschoa, Maritime Reporter's correspondent in Brazil spoke to Flavio Santarelli, Arpoador Shipyard's Director of Operations.

Pre-salt Logistics Hubs

The logistics involved in transporting supplies and people to the production FPSOs located as far as 300km offshore has been daunting. Offshore logistics hubs, to be located about midway to the pre-salt plays will be used to land helicopters flying from shore, bringing oil workers, which will then be transferred to FSVs for the remainder of the journey. Bulk supplies and equipment will be brought from ports using transport ships and also transferred to the same FSVs that transport the workers.

Petrobras has been using large long-range helicopters for a few years, these can fly between 18 and 22 passengers direct to the current drill ships and FPSOs already operating further offshore at pre-salt plays and some will continue to fly from the hubs and even from land to the FPSOs. However, with the large workforce to be transferred offshore when increased production commences at plays such as Lula, Libra, Sépia and others, solely using helicopter transport would become too expensive and even dangerous. FSVs have become a critical factor in guaranteeing that there is no transportation bottleneck at the pre-salt plays, which could ultimately affect production.

Arpoador Shipyard's Pre-salt FSVs

The Brazilian OSV market continues to struggle to rebound from the effects of Petrobras' crisis, with a considerable number of vessels off-contract and many being sent to other countries. There are few prospect of newbuild orders from the national operator in the near future, one of the few shipbuilding sectors that still has firm orders is OSV shipbuilding, mainly related to small shipyards building modern FSVs pegged to deliver crews and supplies to remote pre-salt plays.

Arpoador Shipyard, also known as Arpoador Engenharia, located in the city of Guarujá, on the coast of the state of São Paulo, can be considered a small to mid-size yard, with a total area of 75,000 sq. m.

"Arpoador shipyard has been in operation since 2006, our first headquarters was in Angra dos Reis, Rio de Janeiro where we produced our first boats in fiberglass. In 2009 we moved to our present site in Guaruja, where we started to produce and specialize in building aluminum boats," said Flavio Santarelli, Partner and Managing Director of Arpoador shipyard, who oversees daily yard operations.

"The yard has a large 75,000 sq. m. area, where only 10,000 sq. m. are currently in use, allowing us to expand when needed. With two 1,100 sq. m. warehouses, each equipped with a 10 ton traveling crane, along with an 80 meter long finishing quay with a draft of 4 meters, a 16 meter wide ramp and a 500 ton crane." Flavio explained that working to Petrobras' ship specifications had a major effect on its production line. "Working to Petrobras specifications affects us completely, since we produce exclusively for our customer, we always try to meet with the best quality all specifications. We always use the best materials on the market and have stringent quality controls. Our works are constantly supervised inspectors from Petrobras and funding organizations. The shipyard meets all safety standards required by Petrobras."

Photo: Flavio Santarelli

New SDSV undergoing sea trials

Photo: Arpoador Shipyard

The shipyard's activities increased significantly after it was awarded a series of contracts to build three different FSV models to Petrobras' specifications. "Since the beginning of activities in Guaruja, we have already delivered nine boats; four P2 type, three P3 type and two of UT4000 type. Currently we are producing two DSVs, in this case, shallow water dive supply vessels (SDSV), which are pioneers boats in the Brazilian offshore market for shallow diving support and equipped with DP-2 system. We have a production capacity to build six boats simultaneously (Up to 50 x 10 m)," said Flavio. All the vessels were originally designed by Incat Crowther. "Our design projects are acquired from an American company, we bought the basic design and did all the detailing, electric and hydraulic projects with our team of engineers."

- *The **P2** vessels have an overall*

P3 FSV showing its speed

Photo: Arpoador Shipyard

length of 36 meters and a 7.5 meter beam, with a cruising speed of 17 knots and maximum speed of 25 knots. It can transport up to 50 tons of general cargo and carry up to 60 passengers, being equipped with three Doen DJ290 waterjets and three Caterpillar C32 engines, with a total output of 4,350 bhp.

• *The P3 vessels have an overall length of 45.4 meters and a 8.25 meter beam, with a cruising speed of 24 knots and a maximum speed of 32 knots. It can transport up to 150 tons of general cargo and carry up to 60 passengers, being equipped with four Caterpillar C32 engines, with a total output of 5,800 bhp.*

• *The UT4000 has an overall length of 48 meters and a 9.5 meter beam, with a cruising speed of 21 knots. It can transport up to 250 tons of general cargo and carry up to 60 passengers, being equipped with four Cummins QSK 50 engines, with a total output of 7,200 bhp and two Rodriquez 150kw tunnel bow thrusters. "The main feature of these boats is speed. Currently our boats are the fastest of the Petrobras fleet and already won the title of fastest FSVs in Latin America," said Flavio.*

The latest vessel built at Arpoador was a DP2 DSV (SDSV), with 43 meter overall length, for local dive operator Oceanica Offshore, and will be used for Petrobras dive support operations in Brazil. A sister ship is also being built at the yard. The innovative design was developed to meet RINA class requirements for special service, diving, and dynamic positioning.

"The large aft main deck will house the hyperbaric chamber, dive bell crane, a portside deck crane, and also a dedicated ROV crane, which will operate a 2,000 meter work-class ROV and a 300 meter observation-class ROV. The propulsion system is composed of four Cummins QSK-19 main engines, each producing 492kW, which will power the vessel's four Hamilton HM-521 jets. The water-jet propulsion has been specifically chosen with diver safety in mind," said Flavio.

Electrical power will be provided by three Cummins QSM 11,300 ekW gensets plus one Cummins 6BT5.9, 92ekW emergency genset. Two Rodriquez 150kw tunnel thrusters provide maneuvering and station keeping power. The vessels will have a cruising speed of 12.5 knots and have berths for 37 technicians in 13 cabins, including divers, operators and crew. It operates a Konsberg DP2 aided by Sonardyne's Hipap acoustic system. The vessel was classed by RINA as Special Service, Dynapos AM/AT R, Divingsupport, AUT-CCS, Unrestricted. All vessels being built at Arpoador Shipyard will be working for Petrobras, but have been ordered by three independent shipowners, two of which are Brazil Supply and Oceanica Offshore, who actually won the Petrobras tenders and awarded the actual building contracts to Arpoador.

Scania: Powering Ahead in Maritime

Scania N. America is finding success in the North American domestic maritime market. ***Mikael Lindner, President****, explains the strategy.*

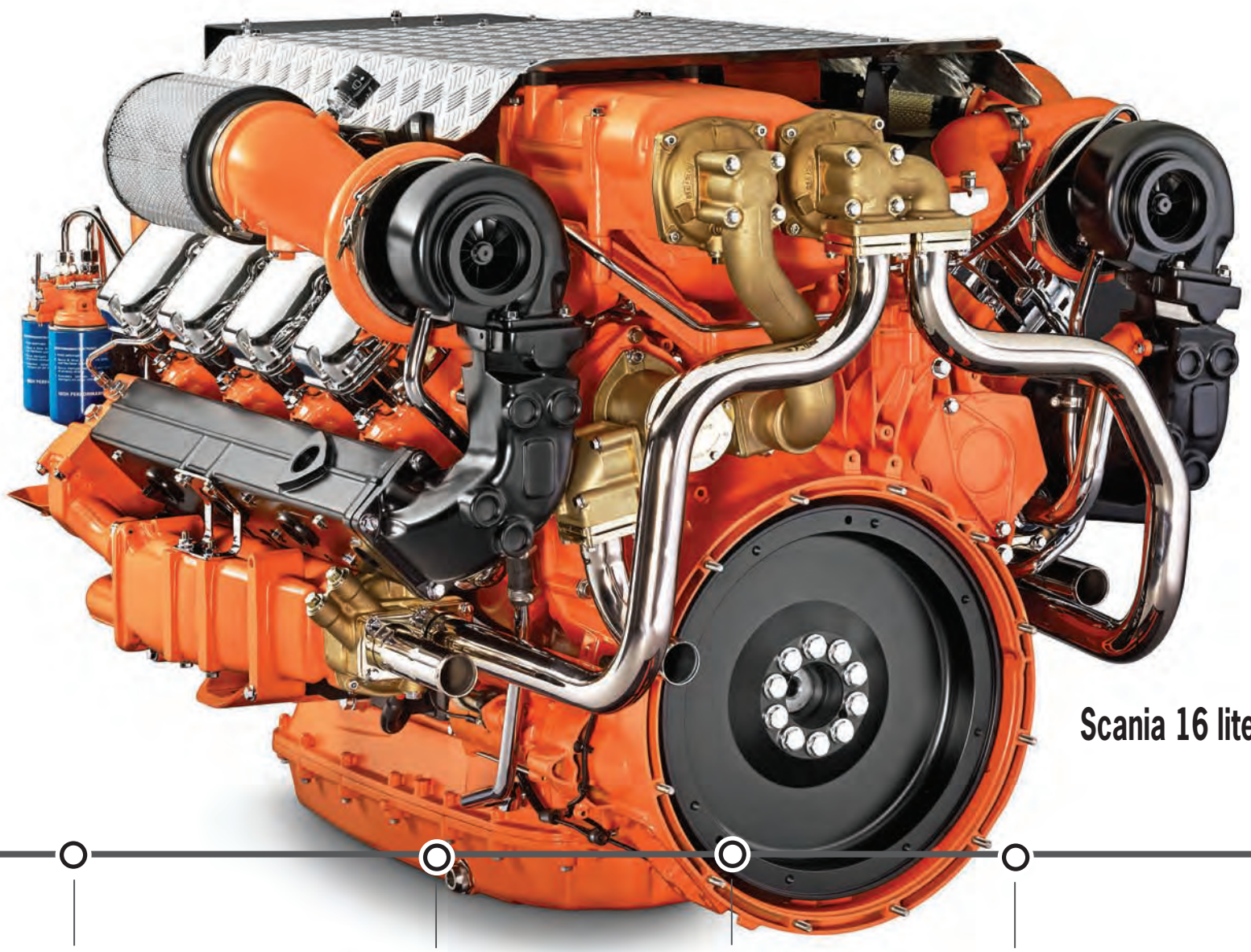
By Greg Trauthwein

The Scania name is ubiquitous in transport sectors globally, as would be expected for a company celebrating its 125th anniversary this year. But in the North American marine sector it is still making headway among vessel owners that have built their fleets and businesses around other brands. But being the newer player in a large market could be considered advantageous in today's tightening maritime sector, as Scania is determined to grow its market share with a growing family of power products that offer excellent power-to-weight ratios and reliability, backed by a global engineering and manufacturing goliath.

"The marine is a market that is doing fairly well for us at the moment," said Lindner. "It is certainly not great across the board, but there are so many niches within the marine market, and so many segments for us to grow in."

Lindner and his team have seen the offshore oil and gas business essentially disappear, yet it touts growth in a variety of market sectors, particularly one. "We have had successes in several segments. The inland waterways market remains a long-term, interesting market in terms of repowers."

Alberto Alcala, Sales Manager – Marine Products, expands on Lindner's sentiment. "What we are see-



Scania 16 liter engine

1902

Scania-Valbis launches its first marine engine with up to 4 cylinders and 6 to 24 hp.

1918

An order is received for 18 marine engines to power nine Swedish customs patrol boats, 6-cyl. models developed from 4-cyl. truck engines

1923

Scania-Vabis designer August Nilsson develops a fourcylinder, overhead-valve engine. The engine's power and reliability are of major benefit in trucks and buses.

1936

Scania-Vabis develops its first diesel engine, something that impresses the trade press during test drives. "To my surprise, I could hardly hear the engine," wrote one journalist. "However, I certainly felt its effect as the bus shot forward like an arrow."

1949

Thanks to a partnership with Leyland, Scania introduces its first direct-injection engine, sold in 4- and 6-cyl. versions

All images courtesy Scania.

"I'm sure the hot topic for everyone to discuss this year will be the Tier 4 emission regulations.
If you went by the Scania booth at SMM in Hamburg, on display was the "IMO III" solution. The IMO III solution will be the basis for Tier 4. I think that this is going to be one of this industry's main challenges going forward."

Mikael Lindner, President, Scania North America

ing is the marine business mirrors the economy, and obviously the oil and gas business in the Gulf of Mexico region is down. But we are finding that there are still needs for our engines in different ways. For example, a customer may not have a newbuild, but the repower business is a possibility."

In particular Alcala said Scania has built a "strong and flexible" network of dealers and distributors, ensuring local presence and fast turnaround times in every major maritime region in North America.

"The fishing market in the Northeast for example, is doing very well. Here the characteristics of the Scania engines, like outstanding power to weight ratios, is giving us some great sales in the Northeast."

"In the Northwest, our reliability is really giving us an advantage," Alcala continued. "In California, where you don't have many OEMs, the flexibility our distributors and dealers provide is opening up more opportunities in the tour boat market."

Updward Trajectory

It was nearly 10 years ago when Scania started to considerably ramp up its outreach to the North American marine market, and Lindner contends that a persistent communication with customers across all market segments is yielding dividends. "Our growth trajectory is continuing, and we are no longer the new guy; the Scania name is now more well-known," said Lindner. "We focus on the (market) segments where our competitive advantage really stands out and can deliver true customer value. Segments where for example total cost of ownership, operating economy, reliability, technology, power and performance, and uptime are important. Customer segments such as workboats, passenger vessels, fishing boats."

From the beginning Scania has sought to prove to the marine market that 'bigger and heavier' does not necessarily equate to 'better.' "It is still a challenge to convince some customers of the advantages of going with our V8 solution versus a larger engine for the same job," said Lindner.

While networks, communication and service are all benefits, the product – the engine – the heart and soul of any OEM, and the Scania team contends that it offers a proven product with several key attributes.

"Our growth is proof that our product is meeting needs in this market. We still have some work to do in convincing operators that our engines offer performance and lifecycle advantages over larger engines," said Sheldon Murdock, Senior Sales Manager – Key Accounts. "Our challenges are different based on market segment, but everyone wants to be profitable. One of the top features of the Scania line is the profitability proposition, particularly when it comes to operating economy.

Frankly when you're running the engine 2,000 to 4,000 hours per year, it doesn't take much to add up to large savings at the end of the year. But that's only one of our product benefits: what we offer is a full package of solutions which can help to make an operator profitable. In terms of product, Scania's V8 engine is our best seller this year."

Tier 4

"I'm sure the hot topic for everyone to discuss this year at Workboat will be the Tier 4 emission regulations," said Lindner. "If you went by the Scania booth at SMM in Hamburg, on display was the "IMO III" solution. As we have discussed in the past, the IMO III solution will be the basis for Tier 4. I think that this is going to be one of this industry's main challenges going forward."

The new Scania marine engine range is based on an exhaust gas after treatment system developed in-house, which reduces the emissions of nitrogen oxides. This represents the cutting-edge environmental aspect of Scania's marine solutions.

In anticipation of a wider adoption of the tough new emissions demands for marine engines that were introduced earlier this year by the International Maritime Organization, Scania has tried and tested new marine engine solutions that comply with the new limits.

Under the IMO Tier III regulations that took effect in January, the limit for nitrogen oxide (NOx) emissions ranges from 1.96 to 3.4 g/kWh, depending on the engine's maximum operating speed. This new limit is a significant reduction from the Tier II range of 7.7 to 14.4 g/kWh.

However, although the regulations do not yet apply outside of the North American and U.S. Caribbean Emission Control Areas, Scania has already prepared itself for the eventuality of the changes taking effect in the wider world.

"To reach these new emission levels, an exhaust gas after treatment system is necessary for the engine sizes Scania provide," said Mats Fanspets, Manager for Marine Classification at Scania Engines.

Scania has considerable experience of exhaust gas after treatment systems. The manufacturer's Selective Catalytic Reduction (SCR) system is a tried and tested technology that has been used both in engines for trucks and industrial applications.

And the NOx limit for Euro 6 trucks and Tier 4/Stage IV industrial applications is 0.40 g/kWh, comfortably within the new emissions requirements.

As a part of its existing modular system, Scania's IMO Tier III-compliant engine solutions have been developed for applications such as auxiliary engines, for example in conventionally-installed marine generator sets or in a diesel-electric setup for cargo vessels that operate in international waters. The solutions also work with propulsion engines, as well as auxiliary and propulsion engines for vessels operating on inland waterways with low emission requirements.

To achieve an approved installation for marine applications, Scania offers installation recommendations on the dimensions and lengths of piping, the cables needed and the parts needed for the after treatment system.

This includes the SCR catalyst, a customized exhaust system, an evaporator for mixing urea and exhaust gas, and a three-way safety valve. The solution is available for Scania's 13- and 16-liter marine engines.

1969
Scania introduces a 350 hp, 14-liter V8 turbocharged engine. It is the most powerful truck motor in Europe at the time and pioneers Scania's low-rev philosophy with a high-torque output at low engine speeds.

1972
A charge-cooled marine version of the 14-l V8 engine is unveiled, delivering 347 hp.

2000
Scania's millionth vehicle rolls off the assembly line.

2002
Yanmar and Scania start a strategic international cooperation giving Yanmar the right to sell and market Scania marine engines to the pleasure boat market.

2012
Scania launches a 16-liter marine V8 delivering up to 1000 hp for patrol craft.

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24/7 SUPPORT

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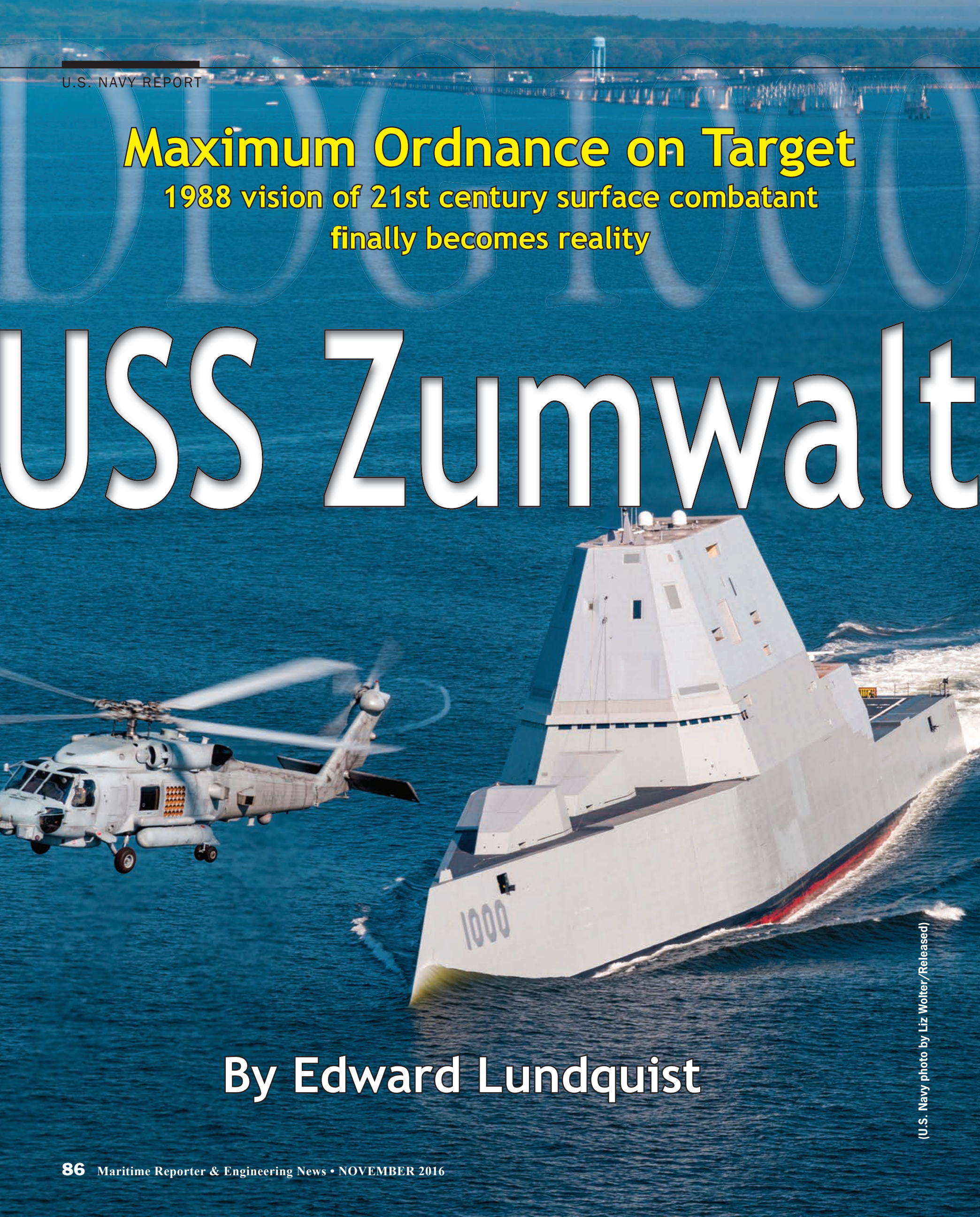
Maximum Ordnance on Target

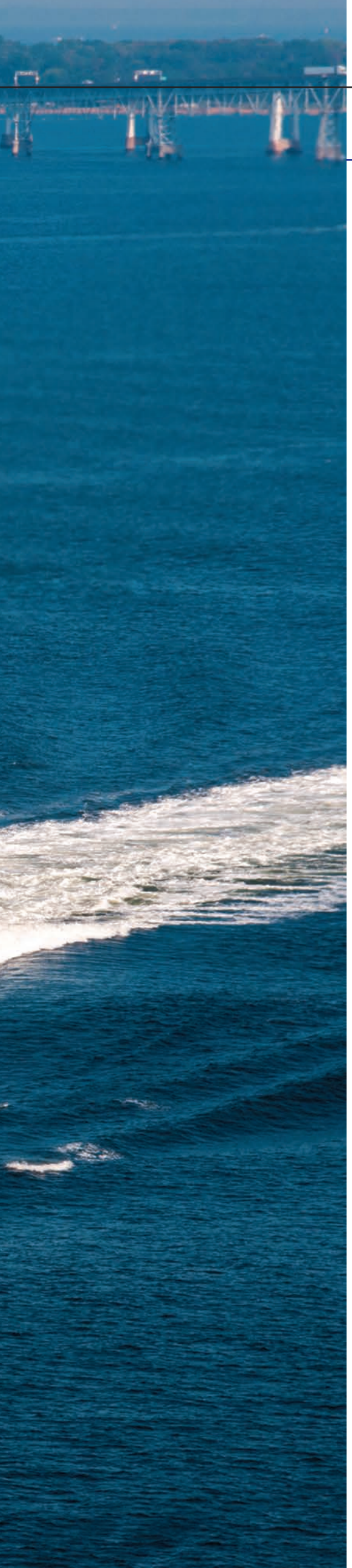
1988 vision of 21st century surface combatant finally becomes reality

USS Zumwalt



(U.S. Navy photo by Liz Wolter/Released)

By Edward Lundquist



An MH-60R Sea Hawk helicopter assigned to Air Test and Evaluation Squadron (HX) 21 flies near the guided-missile destroyer USS Zumwalt (DDG 1000) as the ship travels to its new home port of San Diego, Calif. Zumwalt was commissioned in Baltimore, Maryland, Oct. 15 and is the first in a three-ship class of the Navy's newest, most technologically advanced multi-mission guided-missile destroyers.

> We were constantly goaded into describing the ship physically. We avoided that completely. We didn't want to be tied to a design that people would focus on, or take issue with. We were interested in characteristics and capabilities, regardless of the platform.

USS Zumwalt (DDG 1000), commissioned on Oct. 15, 2016, in Baltimore, Md., is different in almost every way from any other surface combatant afloat. Although it is the most technically advanced destroyer in any Navy, it embodies concepts first proposed in a study completed in 1988, at the height of the Cold War.

The genesis begins with Vice Adm. Joe Metcalf, who was the Deputy Chief of Naval Operations for Surface Warfare (OP-03) on the Navy staff.

It was Metcalf who created the Surface Warfare community from the unrestricted line, and introduced the Surface Warfare insignia and even the SWO sweater, borrowed from the Royal Navy's "woolly pulley," to build a sense of identity. He sent new officers through Surface Warfare Officers School, and developed a warfare qualification system based on "personal qualification standards" that rivaled the aviation and submarine communities.

Metcalf viewed the battle space as multidimensional—up, down and out—where surface, air and undersea warfare had to be conducted simultaneously. In each domain, ordnance on target was surface warfare's primary mission.

Group MIKE

He created Group MIKE (for Metcalf) in 1987 to develop a new breed of warships to examine the art of the possible using emerging technology.

Metcalf stood up two study groups—the Ship Operational Characteristics Study (SOCS) and the Surface Combatant Force Requirement Study (SCFRS)—to examine the operational characteristics required of surface combatant and how many would be needed respectively.

The SCFRS (pronounced "skiffers") report assessed and validated the numbers, types and capabilities of surface combatants needed during the coming quarter century, while SOCS studied the required operational characteristics those ships would need to meet the forecast threat.

The SOCS study took a fresh look at legal, institutional, operational and cultural factors that resulted in surface combatant designs, and the operational and maintenance practices that drove manpower requirements.

One of Metcalf's staff officers, Capt. Lee Gunn, was picked to lead the SOCS effort. Gunn, who retired as a vice admiral in 2000, had a master's degree in operations research from the naval Postgraduate School in Monterey, Calif. Metcalf gave him a million dollars, one year, and a straightforward mission. "We had to answer one question: How to put maximum ordnance on target from a given size ship, but that size was not specified."

The group started with few assumptions. The ships were assumed to be battle force capable in combat; capable of battle force speeds; capable of independent multi-domain warfare—up, out and down; and having a suitable but unspecified hull form.

"The goal of Group MIKE was to develop a revolutionary family of warships that will maximize ordnance on target," said Tracy Connors, PhD, a retired Navy captain who was part of the study group.

"Nothing was off the table," Connors said. "We looked at weapons, propulsion, hull and every functional area of ship design, each with its own core group of analysts."

"Out of that, each area of ship design was advanced, evaluated and prioritized," Connors said. "We were pushing the limits of technology, not just engineering."

"Each of us on Capt. Gunn's SOCS team were assigned responsibility for certain core capabilities," Connors said. "Mine was navigation. Interestingly, while we envisioned satellite navigation as an important capability, we also understood the threat to navigation – as well as other combat systems – inherent in the possibility of electromagnetic pulses which were envisioned as probable in a full combat scenario."

Connors said the SOCS study's ship design criteria required "hardened" electronic systems to prevent or reduce EMP (electro-magnetic pulse) degradation of combat capabilities. In our recommendations, celestial navigation and piloting, traditional Navy skills, were retained as important even with the enhanced capabilities provided by a growing satellite array. Later however, the Navy deemphasized celestial navigation. More recently, celestial navigation training has been reinstated for surface warfare officers."

During the course of the SOCS study, Connors said the team considered a variety of hull designs, including SWATH. "A great deal of that thinking—higher speed, sea keeping, shallow draft—was incorporated into the LCS design."

Through the analysis, they also discovered some low-hanging fruit, good ideas that were available and reasonably inexpensive that could adopted right away. Many of them, such as the "paperless ship," which evolved into "Smart Ship," were implemented on existing platforms.

The team realized that improved information systems had many benefits. The idea of a "paperless ship," where paper was eliminated as a storage medium—was studied aboard USS Vincennes (CG 49). It was found that she carried nearly 40 tons of paper, more than half of that above the main deck.

Using desktop computers and magnetic storage media reduced weight and volume and improved efficiency, and that was based upon the existing IBM PC 80-386 technology of the day.

"We knew we engaged in important planning and analysis," Connors said. "There was quiet, but deeply felt pride in what we did and in those with whom we served."

Maximum Ordnance on Target

In looking at the problem with an eye to "maximum ordnance on target," the study group looked at the volume inside a ship, and how to configure propulsion and systems to dedicate available space for weapons and combat systems.

"The stealth qualities would allow us to get to the fight; while the survivability would allow us to stay in the fight, even if damaged," Gunn said. "With improved navigation and cooperative engagement capabilities, we could enhance our probability of hitting the target."

To achieve stealth, acoustic, infrared, magnetic and electronic signatures would be below those of decoys and deception.

Quiet machinery and other reduced acoustic signatures provided better passive sonar capability and torpedo defense. Cooperative engagement allowed a ship to receive situational awareness and targeting from other platforms to reduce own-ship emissions and maintain stealth.

Damage control and survivability was a single issue. A new survivability standard was adopted so the ship could continue to fight even after being damaged by a missile or torpedo, and survive if damaged by two hits.

"We wanted to protect the crew, and have the ship live to fight again. We also wanted to be able to fight while hurt," Gunn said. "We didn't want to be put out of action while we still had a full magazine."

That called for a robust distributed internal arrangement of key systems, armor and barriers, and redundant pathways for power, communications and fire main. The network could detect a breach and reroute itself. "This concept showed great promise for things like internal communications, and being able to plug in new systems as they became available." Gunn said.

During both routine operations and in an emergency, there is a critical need to understand what's happening on a ship. A suite of sensors – to measure moisture, temperature, light, heat and vibration – could be installed on the network, to collect data on the steady state conditions on the ship.

(Photo: Steve DeCollibus)

While Zumwalt has a bridge for conning, it is completely enclosed, and cameras and microphones provide sensory awareness for the watch team. The 80 vertical launch cells are located around the periphery of the ship for survivability. The two 6-inch guns retract into a stealth housing. It's quiet and stealthy. It has the radar cross section of a fishing boat. Automation has reduced crew size from 300 on a 9,800 ton DDG 51 to 147 on a 15,800 ton DDG 1000.

(U.S. Navy photo/Released)

Concelved In 1987

The 1987 SOCS study group was tasked wlth envlslonlng the 21st century surface combatant, and free to redefine current missions, as well as future mlsslons, because threats and vulnerabilities could change. The final report listed and prioritized 12 imperatlve characterlstics (as well as 22 deslrable characteristics) for future ships:

Prlorlty A: Cooperatlve engagement In all mission areas; integrated machinery systems; survivabillity and the abllity to "flght hurt."

Prlorlty B: Embedded readiness assessment, mlsslon plannlng, and tralnlng; condition-based maintenance; torpedo self-defense.

Prlorlty C: Co-location of ship control and combat information center; access control and securlty; alternatlve (peacetime/wartime) use of volume.

Prlorlty D: Smooth topsldes; new Information management; organic aviation and other off-board vehicles.

Damage assessment would be accomplished remotely, and release of firefighting agents, and control of valves, fittings, ventilation and drainage recommended or accomplished with the help of automation, while the repair party could get suited up and charge hoses.

"With the right data, the system can observe a departure from steady state. And it's more than just an alarm," said Gunn. "You can know more about a space before you open a hatch to go in than just placing the back of your hand on it to see if it's hot. We wanted to be able to conduct an assessment without waiting for the repair party," Gunn said.

Gunn said the study group imagined a helmet and visor system for the damage control team leader that could show normal and actual conditions in a space. "I can see what the space normally looks like, so when I get in there I can see what's changed or has been damaged.

I'll know where the lights, power or ventilation is supposed to be. I may see sensor readings that are different that steady state, that indicates a hot spot or flooding, and I can find out if I'm entering the space that's been damaged, or is on the periphery of the next space that's burning."

The technology was new back then. Today, Gunn said products such as Google Glass can do essentially the same thing.

The use of sensors would enable the crew to monitor the status of tank levels and the condition of voids and unmanned spaces, and protect security spaces from intrusion.

Condition-based maintenance would monitor status, analyze trends, detect faults and predict system degradation or failure.

This would aid in scheduling the right preventive maintenance, as well as guide corrective maintenance and repair management. This would reduce manpower required for maintenance and repair aboard ship, and im-

prove the effectiveness and efficiency of off-ship support.

Mission and battle planning would be embedded, to include realistic combat training for ship's teams at all levels and assess in real time the readiness of the ship's systems and crew.

One unusual concept was the cockpit sized secondary conning station on the bridge, which could be used for restricted maneuvering, with primary control in the combat information center, located safely within the ship. A system of cameras and microphones would be used to provide panoramic visibility with audio cues. CIC would be the "fusion center" for information and decision making.

"Smooth topsides" means the various antenna systems would not interfere with each other.

"We felt that integrating the antennas with the superstructure would harden our essential nodes, and would also deal with the problem of antenna radiation pattern interference," said Gunn.

Retractable or enclosed fittings were proposed for underway replenishment rigs, stanchions and mooring gear. This design resisted ice buildup and presented a reduced radar cross section to enemy sensors. There was no reason for sailors to be outside on the weather decks. And boats launched and recovered by a stern ramp eliminated dangerous Jacob's ladders for boat transfers.

One of the biggest recommendations of the study was the use of integrated machinery systems that opened up new ways to locate power generation equipment and distribute power throughout the ship, from propulsion to weapons and sensors.

Powerful Ideas

"We recognized that biggest challenge would be propulsion," Gunn said.

With electric drive, the prime movers would not need to be located along the shaft lines, and could be placed anywhere inside the hull, while taking into account stability, and reduction gears would not be needed. That would make more space inside available for weapons.

"We looked at inherent vulnerabilities, like rudders. How could we get rid of them? We saw how cruise ships were adopting podded propulsion with electric motors. Our FFG 7 class of frigates had a retractable motor in the forward part of the ship that could bring you home, and we thought there was merit in that idea.

The study group envisioned four external pods with fairly simple external machinery, either fixed or (at least two) trainable or retractable. That would give you redundancy so you could fight hurt, and eliminate much of the propulsion equipment taking up volume inside the hull," Gunn said.

Even back in 1988 the SOCS study team recognized the value of having excess power for directed energy weapons. Power could be generated to meet the current requirement, and more power brought on line to provide more speed when needed, or diverted to energy weapons. Distributing the components increased survivability.

When Gunn briefed Chief of Naval Operations Adm. Carlisle Trost on the

SOCS study group's findings, Trost asked Gunn for the most important take away. "I get 300 briefs a year," Trost said. "What's the one thing I should remember from this one?"

"CNO," Gunn replied, "it's the integrated power distribution system makes everything else possible."

Change is Hard

Eventually, one potential "arsenal ship" concept was dubbed the "turtle ship," which took its name from the famous and successful Korean warship design dating back to the 15th century that resembled a turtle shell. It had no masts, stacks or protruding antennas, with a bridge that sat low to the water. Aiming at maximum weapons load, one of the arsenal ship concepts carried as many as 500 missile tubes and relied on other ships for detection, tracking, targeting and defense.

Offering a visualization would explain how some of these concepts might take shape. In fact, Gunn said there was a lot of pressure on the team to render an illustration of what this ship would look like. But that had its drawbacks.

"We were constantly goaded into describing the ship physically. We avoided that completely. We didn't want to be tied to a design that people would focus on, or take issue with. We were interested in characteristics and capabilities, regardless of the platform," Gunn said. "We were pursuing, evaluating, assessing and understanding different technologies to be able to propose a collection of characteristics not dependent on topside shape or ship hull configuration," Gunn said.

Gunn and Metcalf both knew the proposals would meet stiff resistance. And they knew a significant science and technology investment would be required to advance the technologies needed to realize this revolutionary ship concept.

Writing in the U.S. Naval Institute Proceedings in 1988, Metcalf said, "It is understandable that the Navy will tend to cling tenaciously to whatever it perceives as working in the present, long after it has become a part of the past. This environment of 'steady as she goes' is the one in which the revolution at sea will occur. The issue is not 'if' we are going to change, but 'how.'"

As soon as the studies were complete, the Soviet threat evaporated with the fall of the Soviet empire. What were once lesser localized asymmetric threats emerged as serious contenders to maritime superiority. The fleet optimized to fight a superpower was not dominant against threats such as mines, non-nuclear submarines or small, fast armed craft in a challenging littoral environment. The Navy's role was no less important, but the focus of the fleet had to evolve.

As the Cold War ended, the nuclear cruisers were retired as too expensive, and the other ships were kept as long as possible. The land attack destroyer lost momentum. "What killed it was fall of Berlin Wall," Gunn said.

The arsenal ship morphed into the SC 21 (surface combatant for the 21st century), and then the DD 21 land attack destroyer. In 2001 DD 21 was cancelled but it was resurrected as DD(X), keeping the Zumwalt name for the class. On Feb 14, 2008 the contract was signed for DDG 1000. The Navy originally envisioned

Condition-based maintenance would monitor status, analyze trends, detect faults and predict system degradation or failure. This would aid in scheduling the right preventive maintenance, as well as guide corrective maintenance and repair management. This would reduce manpower required for maintenance and repair aboard ship, and improve the effectiveness and efficiency of off-ship support.

32 DD(X)s, primarily to support expeditionary strike groups. That number was reduced to 24, then 12, then seven. Under then Chief of Naval Operations Gary Roughead, the Navy wanted to terminate the program. Congress eventually let the Navy resume building DDG 51s, but the service was directed to build three DDG 1000s.

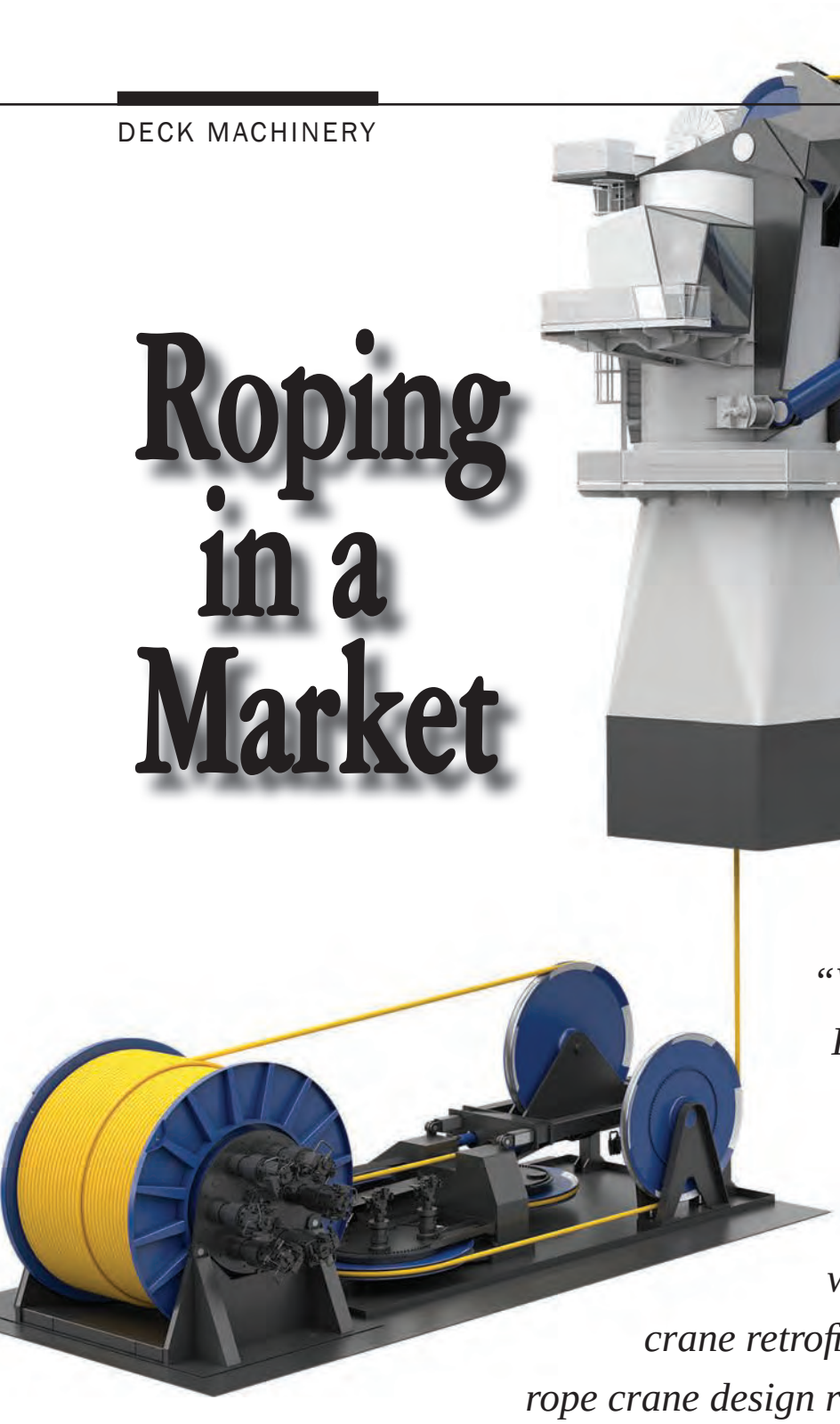
USS Zumwalt today embodies the ideas first proposed in SOCS almost three decades ago. The ship has integrated electric propulsion (generating 78 MW of power); smooth topside spaces with embedded antennas; a high degree of automation and resilient electrical, communications and fire main distribution.

Just as SOCS recommended, While Zumwalt has a bridge for conning, it is completely enclosed, and cameras and microphones provide sensory awareness for the watch team. The 80 vertical launch cells are located around the periphery of the ship for survivability. The two 6-inch guns retract into a stealth housing. It's quiet and stealthy. It has the radar cross section of a fishing boat. Automation has reduced crew size from 300 on a 9,800 ton DDG 51 to 147 on a 15,800 ton DDG 1000.

"In a way, SOCS is at sea," Gunn said.

(Photo: Steve DeCollibus)

Roping in a Market



Rope revolution: the Rolls-Royce rope crane's components.
(Illustration: handout)

"We can now go to any depth you like," says Rolls-Royce senior VP for deck machinery, mooring and anchor-handlers, Ottar Antonsen, about a fiber-rope crane introduced in August 2016 with obvious benefits for deepwater lifts and handling. Similar to wire, weightless (in water) rope opens for vessel and crane retrofits that target offshore costs and new markets. A second rope crane design release in a year from a major deck machinery maker comes 12 months before the start of an anticipated order boom for subsea, and, possiby, one of the busiest eras yet seen for lift activity offshore.

BY WILLIAM STOICHEVSKI

Somewhat surprisingly, Antonsen says Rolls-Royce has cooperated with competitors in early stage research programs on deck machinery engieering dilemnas. Tellingly, too, while rival NOV introduced the Trident fiber-rope crane aboard a VARD vessel design at Nor-Shipping 2015, Rolls-Royce chose ONS 2016 in Stavanger for its rope-crane unveiling. Neither, it is understood, have a ship-owning customer yet, although there's documented industry interest.

VARD, a ship designer and builder, boasts its own unique deck-machinery and automation brand in Sea Q, plus a stake in Seaonics, maker of an electronic crane control system and the owner of a software company. So, several machinery makers who manufacture in Norway have worked together on a Joint Industry Project lead by DNV GL to harness the subsea lift experience of oil companies, contractors and vendors. It lead to Recommended Practice RP H201 in 2014. Some have received research council funds to produce safe rope cranes. Why now, if the braided-rope technology pioneered by 2010 Rolls-Royce acquisition, ODIM, has been around for years and years? Well, rigs are in disfavor for their high offshore rates, so all —including the subsea equipment makers—have committed to helping ships do more. The hope with the Rolls-Royce crane, which appears slighter than some, is that smaller vessels can be used for subsea lifts while larger, high-spec offshore vessels can do lighter work in between bigger jobs.

Antonsen refers to a six-year module-handling study AKOFS Offshore performed for Petrobras that showed the Skandi Santos subsea equipment support vessel, or SESV, had performed 116 X-mas tree operations with a rope-capable Rolls-Royce Cable Traction Control Unit, or CTCU, between 2010, the year

of the vessel's delivery, and February 2016, and found the oil company had saved $5 million per tree installation for using the CTCU and not a rig.

Impressed, beseiged Petrobras asked for one more ship, a new-build, but AKOFS, according to Antonsen, persuaded Petrobras to go for the conversion (AKOFS's Aker Wayfarer) of (a smaller) inspection maintenance and repair vessel, or IMR, into an SESV with a new tower (moonpool), skidding systems and a CTCU unit that uses fiber rope.

Rolls-Royces data about rope cranes swayed minds. Petrobras's high-capital predicament, then and now, mirrors the current costs-crunch for operators with oil stuck at around $50 (was we write, the International Energy Agency is heralding "the end of oversupply").

Big in Brazil

The Skandi Santos with its heave-compensated 250 t crane and 5,000 t load is still half the 11,000 t Aker Wayfarer with its 400 t NOV knuckle-boom and tower, but its fiber-rope "deployment system" makes it a heavy lifter. After a survey and, it is understood, a conversion of some subsea lifting to rope, the Wayfarer will do a range of seabed work and module-handling using a similar CTCU rope-crane system as the Santos has used.

The conversion is a nod to the coming subsea maintenance boom expected across the world and the resumption of normal subsea ordering levels in 2017. "(The Wayfarer) is ready to go to Brazil. This (subsea handling with rope cranes), we strongly believe, will become a part of seabed mining operations in the future," says Antonsen. The Skandi Santos, meanwhile, is still under a $300 million subsea contract extension with Petrobras to handle subsea trees and modules at depths of 2,300 meters.

A scalable Rolls-Royce crane of 150 t lift capacity, it seems, can lower a module to 3,000 m depths that would normally call for a 400 t wire crane. At 3,000 m, a 150 t steel-wire crane can lift about 70 t, while a 150 t rope crane can reportedly lift its full 150 t capacity. These, it is understood, are "the data" Rolls-Royce and other vendors of rope cranes say they have for rope technology rated to 400 t. Getting cranes smaller coincides with an industry wide appeal to shrink subsea equipment for more day-rate and fuel savings. As we contemplated this report, Aker Solutions and MAN Diesel & Turbo announced a pact to try shrinking by half the size of subsea compression systems in the months ahead. One Subea already has. NOV's motto for one of its rig systems is "Cut more, weigh less, last longer."

Ocean Space

Rope cranes are seen leading an industrial drive into "the ocean space" of subsea "factories", offshore diamond-mining, industrial-scale aquaculture, fishing and renewable energy.

When the price of a single, swimming salmon started exceeding that of a barrel of oil, Rolls Royce registered an order boom for winches and cranes, especially for fisheries vessels, including a rope-winch for the mooring systems of a large offshore fish farm. "When a load is stuck on the seabed, you need to have a dynamic winch. We need it in fishing, and we need it in subsea," Antonsen asserts.

Rolls-Royce has had hydraulic and electric drive systems for years and recently made the move into permanent

magnet drives. While the CTCU controls the proper spooling and tension of the fiber rope when launching and recovering — simplified for the fiber rope crane — the key ability of permanent magnet electric winch drives is high-torque at low speeds. “It’s the only thing that counts. It can be hydraulic or electric,” he says.

The Rolls-Royce permanent magnet motor delivers 140 kilo newton meters of torque for a fishing winch by creating rotating magnetic force that propels a rotor around.

The rope-crane’s main structural feature is a version of this winch technology at its base, in contrast to the vertically spooled NOV rope crane. The space freed for having a direct drive system below instead of a problem-prone gearbox above deck is used for a heated, air-conditioned steer house with its own washroom.

Beneath the crane, below deck, the electronic CTCU winch control checks the fiber-rope strands for wear while compensating for vessel movements by spooling in and out.

Antonsen asserts that if you damage the rope, you can splice it onboard, sailor-style: no costly going to port to repair a damaged cable or wire. Sensors in the electronic control system check for diameter changes and the wear that heat and sunlight might incur. A bigger plus is that while the rope stretches as much as steel wire, crews need not fear wire’s lethal “snap-back” upon failure. Rope sags instantly.

Sales Leads

Like its competitiors, Rolls-Royce say they have new-build and retrofit sales leads for rope, including for newbuild offshore construction vessels. Despite over 15 years of trials, there’s only been the 2005 delivery of a rope-lift system for Subsea 7 that could be moved between vessels. For contrast, Aalesund Norway’s Seaonics recently secured a $12.2m order from parent company Fincantieri for a complete package of winches, deck cranes, and over-boarding systems including A-frames and launch and recovery systems for a polar research new-build in Italy.

Antonsen sees the rope-crane “as an enabler for mining … to discover what’s on the seabed,” smaller oilfield vessels seem to hold the most upside. To get things smaller in a hurry, Rolls-Royce is reaching out to engineers from Croatia to India. NOV, Cargotech and VARD are understood to also be in on solving this “shrink-it” conundrum as part of a Norwegian Research Council funded initiative to shrink “ultra-large” cranes. VARD’s Seaonics has a new boomerang shaped crane understood to take wire or rope “from winch to boom tip”.

DNV GL

In the background, standards bearer DNV GL has done its best to pave the way for more cranes. In 2012, 18 operators, contractors and vendors worked on a Joint Industry (crane) Project that produced a recommended practice, or RP, on steel wire motion compensation.

“That created some spinoff opportunities. It was a reason to go deeper,” says one of three DNV GL voices in a conference call. A “unified language” for those systems was sought in a possible prelude to major automation changes in cranes, and Rolls-Royce is understood to have sought funds for more virtual crane design.

In a “Phase 2” JIP started in 2015, safe crane design guidelines give way to the search for a safe operations RP, for which industry partners have been sought. While the JIP’s focus is “the longer perspective” for steel wire — rust; oversized diameters; the challenge of knowing its condition; its uncertain lifetime — fiber rope is not mentioned. Rope-crane manufacturers are a step ahead of class. “They’re on their own, for now,” a source says, although, “Lifting activity has increased. That’s why the technology is advancing, but there’s still uncertainty (in the market and in the tech).” To cut that uncertainty, DNV GL is offering “global lab capabilities for failure investigation” and a new lab in Bergen that’ll offer “one of the world’s largest tensile testing (rigs)” at 2,900 t capacity. Meanwhile, time is ticking: There’s the expected 2017 subsea recovery and subsea maintenance boom, as older systems are serviced and replaced.

Brazil-bound: AKOFS Aker Wayfarer.

(Photo: William Stoichevski)

Rapp Marine Selected for Icebreaker

Rapp Marine Group won the deck machinery and handling systems contract for Australia's new Antarctic Ice Breaker. The 156m long icebreaker will offer scientists unprecedented and extended access to the Southern Ocean and Antarctica.

Replacing the Aurora Australis, which has been in service since 1989, the new icebreaker will be faster, larger, stronger and offer increased endurance. According to a fact sheet released by the Australian Antarctic Division, the new icebreaker will have an icebreaking capability of 1.65m at thtrr knots compared to the existing vessel's 1.23m at 2.5 knots.

The vessel will supply Antarctic research stations with cargo, equipment and personnel, and will serve as a research ship with extensive laboratory facilities on board and a multi-beam bathymetric echo sounder to enable seafloor mapping.

The Australian Government signed the contract for Australia's new icebreaker with the Australian company DMS Maritime Pty Ltd, a wholly-owned subsidiary of Serco. The vessel will be designed and built by the Damen Schelde Naval Shipbuilding, and it will form an integral part of the Australian Antarctic Division (AAD) program for the next 30 years. The custom built research and supply ship is due to arrive in Australia, to its home port of Hobart, in mid-2020.

Image: Damen

New Product

Smith Berger Towing Pins

Smith Berger Marine, Inc. was selected by Edison Chouest Offshore to design and manufacture the Tow Pin Stern Roller units required on its nine new vessels (five escort tugs and four docking tugs). Edison Chouest is building the new tugs to execute its 10-year Ship Escort-Response Vessel System (SERVS) contract with the Alyeska Pipeline Service Company. The tugs will provide tanker escort and spill response services in Prince William Sound. The Tow Pin unit has the capacity to sustain 250 tons of line tension and features three individually raised and lowered towing pins, one hold down hook and a 14-in. diameter stern roller. The tow pins have a dedicated five-hp electro-hydraulic power unit and are operated by a remote control panel located in the wheelhouse.

Smith Berger was also chosen to furnish the Shark Jaws and Towing Pins for the four new Damen Stan 3711 tugs being built at Conrad Industries for Young Brothers Limited. The shark jaws and towing pins will provide for safer towing operations, especially when the crew is connecting the towing bridle to the tow wire from the winch. The four shipsets of equipment is nearly identical to the Smith Berger gear installed on the latest Foss Maritime tugs, the Michele Foss, Denise Foss and Nicole Foss.

www.smithberger.com

Heavy Lift: Giant Pipe Racks

(Photo: Hansa Heavy Lift)

Hansa Heavy Lift has transported five pipe racks and three modules, weighing a total of 1,871.51 metric tons and measuring 24,075 cu. m., for a new FPSO unit off the coast of Brazil.

Brazil to China and then back to Brazil, five pipe racks and three modules weighing a total of 1,871.51 metric tons and measuring 24,075 cu. m. will be transported by heavy lift shipping specialist Hansa Heavy Lift for a new floating production storage and offloading unit (FPSO) to eventually operate off the coast of Brazil.

With the heaviest piece weighing 730 metric tons, the cargo was loaded onto the HHL Valparaiso at the ports of Itajaí and Rio de Janeiro in Brazil before being transported to Qingdao, in the Shandong Province of China, where it will undergo final outfitting before being transported back to Brazil. "Our in-house team of engineers worked closely with the customer from the onset of the order to come up with the most viable and cost effective transport solution for this very complex project," said Joerg Roehl, Chief Commercial Officer, Hansa Heavy Lift. "This included custom-built grillage for load-spreading on deck to accommodate the heavy modules, the modification of lifting lugs and the installation of platforms for safe access."

"We also had limited cargo information which meant a cargo inspection was necessary to assess the clash of rigging arrangements with the equipment and protrusions," said Ian Broad, Director Cargo Management, Hansa Heavy Lift.

The heavy lift specialist also faced additional challenges which included draft and navigational restrictions at the river passage in Itajaí, tight stowage and a long waiting time at all ports, which made general planning more difficult. The pipe racks and modules belong to the FPSO unit P-67, which is being designed for the pre-salt clusters off the coast of Brazil.

Palfinger's Package Deal

(Copyright: Palfinger Marine GmbH, Havyard Group)

Palfinger Marine signed a contract with Turkish shipyard Cemre to supply a deck equipment package to a Havyard 832 MPV vessel being built for Esvagt. The package from Palfinger consists of cranes, winches and offshore equipment. The MPV will measure 81.9 x 17.16 m, with a deck area of 620 sq. m., a speed of 15 knots and a bollard pull of 100 tons. The complete winches and offshore equipment package includes:

- two windlass winches with chain stoppers
- two mooring winches
- two 10 t tugger winches
- three 30 t tugger winches
- three 10 t capstans
- one double-drum 60 t towing winch with spooling devices
- one combined A-frame and stern roller (SWL 60 t and 100 t)

The cranes ordered by Cemre Shipyard include:

- two offshore-rated cargo rail cranes, each 10 t at 10 m and 5 t at 15 m, the cranes come with personnel handling of 1 t and MOB handling of 4 t
- one foldable knuckle boom crane for general cargo and provision handling with 1 t at 12 m

The delivery of the equipment is scheduled for 2017.

FEA Based Corrosion Processing To Minimize Steel Renewal

BY FRITZ WALDORF & ARNOLD BALSTER

About the Authors

Fritz Waldorf (pictured) is Director of Sales and Marketing for Viking Systems International and based in their Houston office. Viking assists shipyards, ship designers and owner/operators with the efficient implementation of advanced analysis tools for floating vessels and structures.

Arnold Balster is an Engineering Manager for Viking Systems International. Arnold is based in Viking's Houston office and has a naval architecture and hull structural background and together with his team is responsible for conducting the various engineering and design tasks.

Every FPSO and FSO vessel will reach a point in its lifecycle where there is a need for conducting corrosion analysis. Obvious reasons for such analysis are for life-extension purposes, as well as protecting the feasibility and class approval of the hull structure. Such work can be conducted on both new builds as well as conversions, especially when the work done at conversion was not extensive enough. The distressed oil prices our current market presents, requires vessel owners and operators to focus on efficiency in every aspect of their operations. SAGA, Viking System's structural assessment software, consists of a highly specialized 3D modeling tool that has assisted in confronting the issue of corrosion and asset integrity for floating structures. The method and software tools within SAGA have been developed for the processing of standard gauging reports to identify and visualize the location as well as the extent and severity of excessive corrosion. The structural processing and optimization process is used to minimize the extent of any required steel renewal, proving extreme savings in expense.

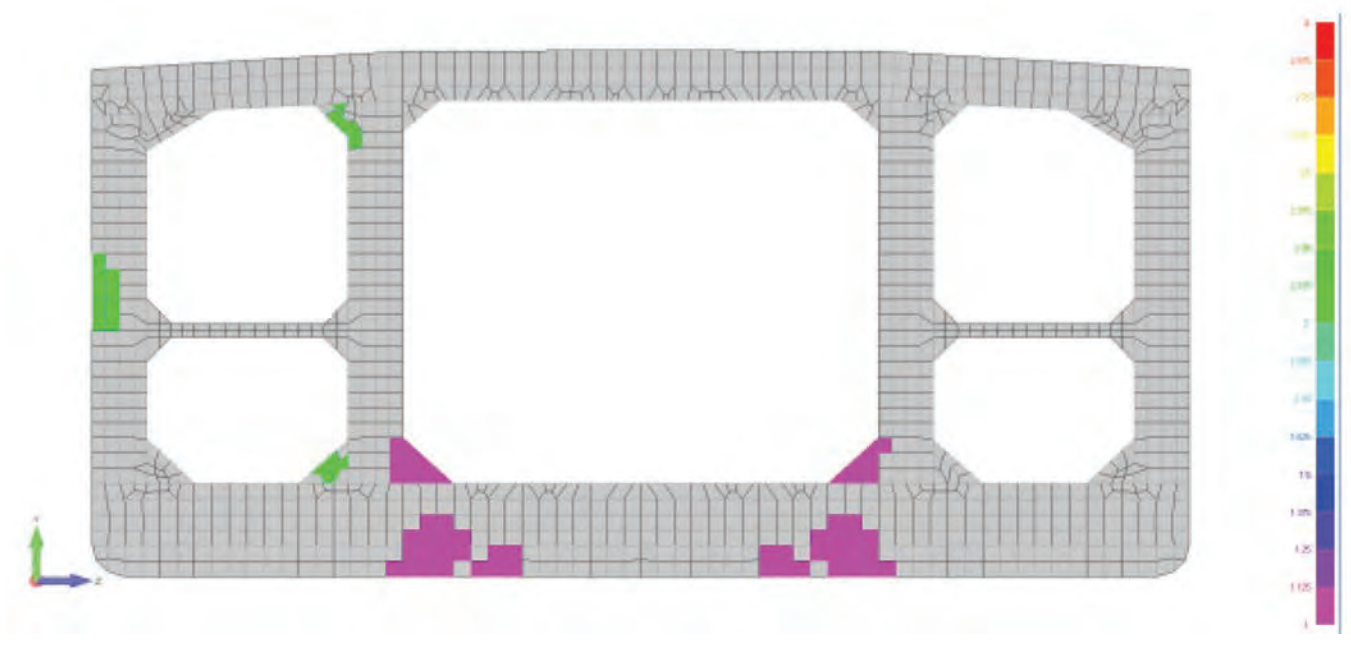
As many of these vessels are getting older and far enough into their design life or even into extension, Viking Systems is focusing on corrosion processing and is finding instances in which corrosion is developing at a faster rate than originally expected (for various reasons while in operation). In many cases, Viking is receiving special report surveys back from the unit in operation with scantlings under their substantial corrosion level or rule renewal values.

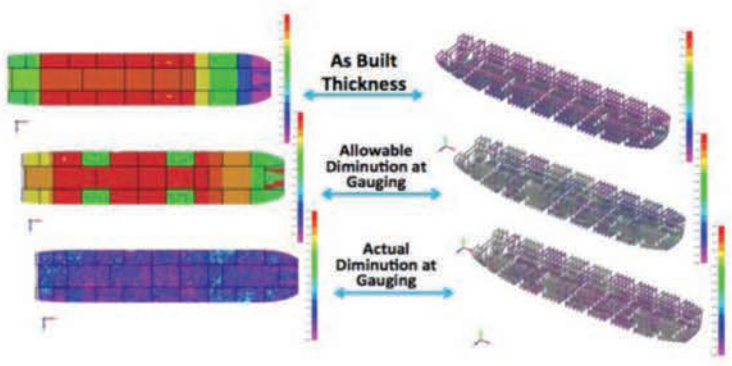
With a good representation of the current scantlings throughout the hull structure, the assessment for decision of what can be done to minimize the required steel renewal for the client begins. Starting with class software operating within the SAGA program suite, Viking identifies the minimum rule scantlings that satisfy both global strength and local scantling requirements. Viking then works through a FEA based strength and fatigue verification process ensuring that any scantling optimization done moving forward is not invalidating the structural assessment and fatigue life-predictions performed at construction.

At the point of satisfaction with a balance between minimum scantlings and structural integrity, the reassessed scantlings are then placed back through our corrosion processing program within SAGA, calculating the new scantlings at substantial corrosion while revising the steel renewal plans to reflect the new optimized scantlings.

The following examples and images come from a particular FPSO vessel in which Viking Systems has applied this methodology, drastically reducing the amount of steel renewal required in order to keep the FPSO in service.

Class uses different definitions of corrosion and allowable diminution during design and operation in the surveys after construction. For example, ABS uses a nominal design corrosion value, which varies between 1 and 2 mm for a 20-year design life for various structure types.





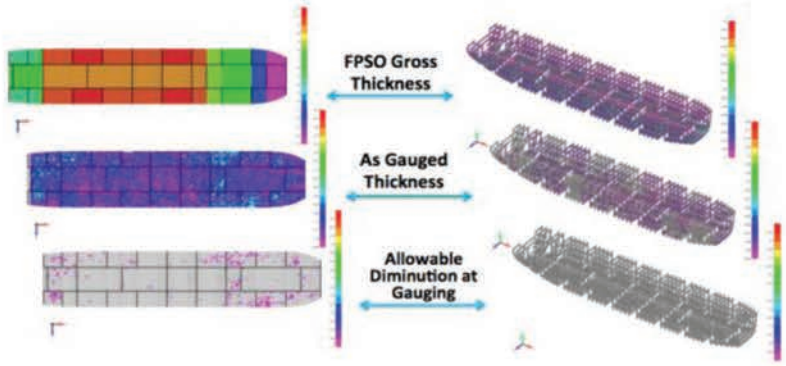


Image: Viking Systems International

After construction, the allowable diminution is defined by a percentage of the required thickness (called wastage allowance), usually between 20-25%, that can waste away before the structure has to be renewed. In a conversion situation, we start with the original tanker thickness. Using the class minimum scantling criteria with the site specific environmental conditions, Viking defines the minimum net scantlings that satisfy both the global and local scantling requirements, and then add on the Nominal Design Corrosion Value (NDCV) to define the FPSO gross thickness. Depending on the construction of the original tanker (in the instance of a conversion vessel), we often find the FPSO minimum required gross thickness to be less than the original tanker as-built scantling, which provides additional margin for future corrosion.

As we move into operations, the allowable wastage is now based upon our FPSO gross thickness, and we have two minimum thicknesses to consider. Rule renewal thickness is the first, which is as thin as the structure can go before it has to be replaced as dictated by class. The second to consider is the thickness at substantial corrosion of hull structural components, meaning 75% of the way to the renewal thickness (i.e. 75% of the wastage allowance), and is the scantling where annual special surveys are required.

Depending on location of the corrosion – main deck plating or structure in way of void spaces – we may be able to accommodate annual inspections with minimal impact on operations. With that being said, it is preferred to retain a five year special survey schedule and keep all scantling above this threshold through the end of the service life. Based on how much service life is left for the FPSO, we add a set amount of thickness to allow for additional future corrosion, and define a minimum acceptable thickness to be compared against the current gauging data. If we need additional margin to avoid plate renewal, then in some cases we can try to reduce the minimum required thickness by changing the still water allowables and/or adding additional stiffeners. However, if the scantling requirements are driven by local criteria it may not always be feasible.

Special survey reports of the hull structure typically include tabulated survey data: original and gauged thicknesses, diminution and allowable wastage based on original thickness, as well as drawings showing the location used to measure thickness. Comprehensive survey reports can include thousands of pages making it difficult and tedious to interpret the data, identify trends or draw conclusions.

For the corrosion processing within SAGA's FEA modeling capabilities, past and future corrosion is taken into consideration. Attentions are given to tanker life, service life, future corrosion allowance and all available corrosion data. These considerations are used to calculate current corrosion rates from multiple surveys, projected corrosion on non-gauged structures from similar corrosion gaugings and the location and extent of

(Continued on page 103)

Efficiency at the Forefront in the New Operational "Norm"

Claes Skat-Rørdam, Fouling Control Marketing Manager at Hempel, discusses the importance of operational efficiency in challenging times.

The shipping industry is in the doldrums, freight rates are low and volatile, and most sectors are facing significant overcapacity, with shippers chasing a finite amount of cargo. This seems to be the new operational "norm" and as a result, ship operators are being forced to seek efficiencies wherever they can to save time and cost while being mindful of their environmental footprint as international regulations increase.

The current market has led to many ships lying idle for increasingly longer periods of time and this affects their ability to maintain a clean hull. As every good operator knows – a clean and smooth hull reduces friction between the ship and the sea, improving the movement of the ship in the water.

The trend for slow steaming is somewhat continuing, despite the lower oil price, which significantly affects the antifoulings that rely on the relatively fast movement of the vessel through the water to help remove biological organisms. The accumulation of biofouling on a ship's hull creates added drag which, in turn, increases fuel consumption and the release of harmful emissions into the atmosphere. Reducing biofouling is probably the easiest and cheapest activity that a ship operator can undertake to save both fuel consumption and minimize the vessel's CO_2 emissions.

Image: Hempel

When searching for efficiencies an operator cannot rely on one single energy saving initiative but needs to implement a mix of design, technical and operational factors such as hull form, engine type, intelligent weather routing and enhanced crew training. But the choice of marine coating can also impact significantly on the performance and efficiency of a vessel.

Fouling Mitigation

Mindful of this, a few years ago, Hempel launched the hull coating Hempaguard, which is designed to deliver significant fuel savings. It has shown an outstanding resistance to fouling during idle periods of up to 120 days. Hempaguard also provides shipowners with trading flexibility at slow and regular steaming speeds.

Actiguard, Hempel's patented technology behind Hempaguard, was five years in development and is based on silicone-hydrogel and biocide science. Actiguard integrates silicone-hydrogel and a full diffusion control of biocides in a single coating. The surface retention of the biocide activates the hydrogel, which then holds the fouling organisms at bay, cutting friction to a minimum, while using a minimum amount of biocide.

This very low level of biocide helps to ensure that the coating stays smooth after application. It also has the long-term stability and mechanical properties required of a durable solution. The result is a unique fouling defense system, which provides advantages for fleet operators globally.

Shipowners in particular are enamoured with Hempaguard, which purports to achieve a fuel saving of 6% on average compared with a conventional, low-cost antifouling product.

Further efficiencies can be gained under normal circumstances and parameters. Hempaguard requires one less coating layer, saving time and money.

The Future

Hull coatings have a significant role to play in the endless search for efficiencies and environmental protection. In 2015, Hempel went one step further and signed a corporation agreement with DNV GL enabling it to work together to bring vessel owners clear, comprehensible, comparable and verifiable analytics that track and assess hull and propeller performance.

Hempel plans to continue to invest in R&D, formulating flexible and robust coating solutions. Hempel keeps in close touch with all regulatory developments, recently taking an active role in the soon to be published ISO 19030, to ensure that any new coating meets the environmental and efficiency demands of its customers.

(Continued from page 101)

structure expected to corrode below the substantial thickness level before end of service life. SAGA can furthermore apply Rule Based Optimization to the FEA model to help reduce the weight of steel renewal at conversion as well as during its service life.

SAGA also allows for the calculation of average corrosion for each survey period. Due to the fact each survey takes place over certain durations of time, SAGA then calculates the median data of the gauging dates within each survey. This added tool gives the Viking Systems team of engineers the ability to investigate the adjusted corrosion level since the vessels' as-built date as well as how the average corrosion changes between each survey.

An annualized rate of corrosion between surveys is calculated in order to get a sense of whether, potentially, the corrosion rates are accelerating. In some circumstances, variations of where the gaugings were taken and how many gaugings were taken make the data unreliable as a means of calculating instantaneous corrosion. For example, if average corrosion may be more or less in a subsequent survey, this leads the data to point to a 'negative' corrosion rate, which in reality is impossible. A negative corrosion rate can also happen when, for example, a shipyard has used thicker material during construction than specified on the construction drawings.

For global model corrosion processing using the FEA model – accounting for corrosion and structural optimization – steel renewal weights can be extracted and separated by location, structural member, material grade, and renewal weight. This allows the clients and shipyards to gauge the condition of an existing vessel and the feasibility of extending the vessels' service life.

At the optimization phase of the scantling reassessment (using the example of an ABS classed vessel), information is thread through ABS ISE software, ABS HGSA Software, and lastly steel renewal tables via SAGA. FEA strength verification and FEA fatigue verification are generated through the reassessed scantling process. At this point, the renewal update is reassessed with a smaller scope of locations needing steel renewal. The below images show the extraction process (before and after) from (1) As Built Thickness, (2) Allowable Diminution at Gauging, and (3) Structure under substantial thickness:

As all FPSO and FSO owners and operators are can be faced with a high expense per metric ton (mT) of steel, scantling reassessment and optimization can be an effective tool to drastically reduce steel renewal cost as well as generating more time operating in the field. With that being said, the process requires a proven method of processing the gauging data in order to identify the location and extent of excessive wastage, as well as the experience to find the right balance between scantling reduction and hull strength and fatigue life. Structure scantlings are therefore optimized to be as minimal as possible while still meeting strength requirements. This strategy has been executed by Viking Systems on multiple vessels over the last three to five years and has proven to generate large savings of renewal steel weight required per project.

Next Generation Shock Mitigation Workshop

More than 80 people attended three one-day workshops for the sub-IMO/ sub-80 feet professional sector in Southampton, U.K. in October. The 'Next Generation' Workshops brought together an international group of experts for discussion of problems and potential solutions.

Workshop lead John Haynes introduced the agenda. A wave of cutting edge innovations were to be examined and discussed by professionals from sectors including military, search and rescue, government agencies, maritime police and commercial operators. Boat builders, specialist equipment manufacturers and naval architects also attended. Haynes opened the Shock Mitigation Workshop with a session tilted *'Developing a Holistic Strategy for Shock Mitigation on Fast Boats.'* "Since the 1990s focus has mainly been on developing mechanical suspension seats to reduce the effects of vertical accelerations," said Haynes. "Areas requiring further investigation include fore-aft, lateral and vector forces, plus improving seat cushion performance and comfort. The challenge for the builders of next generation high speed craft is delivering platforms that balance high performance with the physical demands on crew and passengers."

This was followed by Dr. Tom Gunston of the British Standards Institute Whole Body Vibration (WBV) Panel who said, "The marine industry is taking its first steps towards standard tests for shock and vibration protection seating, but boats are not the only sector that risks injuring people by shaking them around." With five suspension seat manufactures in the room his session 'ISO Standards for Seat Testing and Seat Usage in Various Transport Sectors,' led to a lively panel discussion. In all, the day featured eight subject matter experts and each session had two presenters. Commander RN (Rtd) Richard Finnemore gave an update on the UK Ministry of Defence Whole Body Vibration Working Group. This pairing worked very well alongside of Pete Sheppard, Senior Naval Architect at The Royal National Lifeboat Institution, who looked at how the RNLI is assessing WBV exposure and implementing improvements on small craft.

SKYDEX Technologies were lead sponsor for the NEXT GEN event. Dave Parsons, Vice President of Product Development at SKYDEX, has more than 25 years of experience in the development and provision of specialized seating. His presentation utilized a unique combination of physiology and engineering knowledge to introduce a range of high performance seating and decking solutions the company have launched to reduce effects of impact and WBV in marine applications. James Taylor, President & CEO of SKYDEX, delivered a separate presentation that highlighted how its engineers are using polymers and geometries to create multiphase springs for commercial and military applications.

Next in this session was Dr. Tim Rees of SHOXS who highlighted how the Canadian company constantly advance its product line through sea trials, lab testing, science and engineering. He described the challenges that seat manufacturers face in the design and deployment of new technologies. From this the group were able to discuss some of the science involved in shock-mitigation, including recent ex-

H.O. Bostrom Celebrates 70 Years

John Bostrom has almost seen it all. He has been with the H.O. Bostrom seating company 56 of its 70 years, starting to work summers with his father at the age of 14. "Dad said, 'you're coming to work with me because I don't want you hanging out all summer on your own."

The company started in Milwaukee 1946 "out of a garage" as a service company, and over the years has grown and moved into increasingly larger spaces and moved further to the west. The year 1957 was the first time the company moved into its own building and structure, and it was 1989 when the company moved into its current purpose-built facility in Waukesha, Wis.

Today H.O. Bostrom is somewhat of an anomaly: a U.S. manufacturer exporting to the world, currently serving 65 countries. It employs nearly 90 people serving multiple markets, with the lion's share of its business today coming from the fire and emergency services market.

While Bostrom readily admits the current market in many maritime sectors is down, he certainly is not out of this unique market niche which the company entered in 1990. "Every five years or so it seems that the marine market goes into a depression," Bostrom said, but it always bounces back, and there are always opportunities to find.

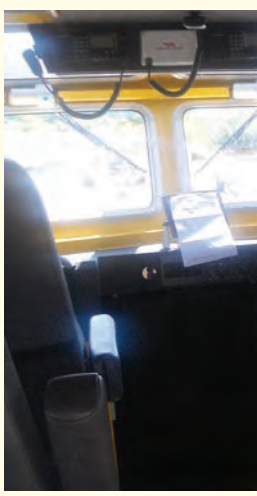
Made for Marine

The SeaPost family of pilot chairs and mechanical suspension seating for commercial marine vessels serves a niche in the mid-range price segment of the global commercial vessel market. New product development in the SeaPost line has benefited the company's portfolio of seating systems and accessories for the commercial marine vessel market.

Bostrom proudly maintains the "Made in America" stamp, with complete design, engineering, fabrication and assembly of seating systems and components in its 60,000 sq. ft. manufacturing space located on a 4.5 acre campus in Waukesha, Wis. H.O. Bostrom offers the advantage of single sourcing their seating requirements, and a walk through its spacious design and manufacturing facility confirms that it is indeed self-sufficient and "in house." The firm was the recipient of the 2016 Governor's Export Achievement Award, which recognizes success in global business development.

Up until the recent maritime market downturn, the Asia Pacific market was particularly active for H.O. Bostrom, though it remains busy in the fire and emergency vehicle seating sector. Lillian Young is a 10-year H.O. Bostrom veteran, born and raised in Shanghai, China, and she leads the sales effort in Asia and Oceania. She said that quality and reputation is central to success in these markets, and in fact the "Made in America" stamp carries significant influence. She said the company's main competition comes from European seating manufacturers, and succinctly sums up the market climate today: "Activity is down, and the competition is brutal."

Young is significant as she embodies the Bostrom international business philosophy: communicate well with your



perimental results. SHOXS were also a sponsor of the NEXT GEN event.

Phill Moxley, a senior engineer working in the noise and vibration team of Frazer-Nash Consultancy, presented a session on the issues of human exposure to noise on small, fast, open craft and the practical measurement of exposure levels.

As control of an individual's exposure to noise is an important part of safety at work and occupational health this was highly relevant to many of the participants.

A long term supporter of the Shock Mitigation Workshop format is Julian Morgan, MD of KPM Marine, whose glimpse into the world of cybernetics generated lively debate. Having designed and manufactured thousands of suspension seats he has reached the conclusion that we need to find new ways to test the next generation of seating. His innovative presentation introduced the world to a high tech humanoid simulant called 'Cassie'. A primary objective of this project is to replace dummies in the testing and recording of whole body vibration and crash in boats, vehicles and systems in hostile environments.

Boat builders and specialist component manufacturers now recognize that they need to work together to develop next generation systems that fit the rapidly changing requirements of modern fleets. The unique knowledge gained from these workshop sessions will help to shape long term decisions that lead to improvements for in-service systems and procurement of next generation vessels.

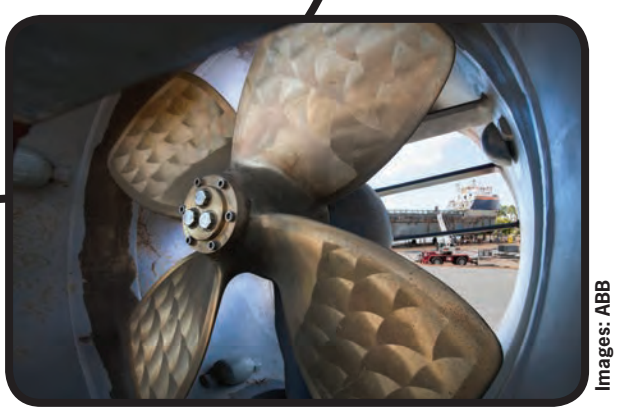
customers and representatives in their language. "It's all about relationships, about knowing the local habits and the local traditions," said Bostrom. "You build strong ties based on clear communication in the native language."

Greg Trauthwein

Pictured, starting bottom left:

- **A Chinese rescue vessel**
- **H.O. Bostrom employees during its Team Picnic to celebrate its 70th anniversary.**
- **Seats in a North River Boat**

(All photos courtesy H.O. Bostorm)



Images: ABB

Mastering Drive Enabled Electronic Thrusters

Alabama has the largest concentration of builders of metal fabricated vessels under 300 feet in the country, and Master Boat Builders Inc. of Bayou La Batre, has established its niche by building sophisticated offshore supply vessels (OSVs) to serve the oil industry. The company started in 1979 as many in the area did, initially building fishing boats, before expanding into small offshore supply vessels. Since 2000 it has focused primarily on the supply vessels, each year expanding the build size capability.

Electric Powered Thrusters

Master Boat has cultivated its oil rig supply boat business, in large part, by being one of the first builders to transition to thrusters powered by electric motors and variable frequency drives (VFDs). These electronic thrusters are compatible with the Dynamic Positioning (DP) systems that automatically maintain a vessel's position while it is serving an offshore oil platform.

Baldor motors and ABB drives have been integral components of Master Boat thrusters since the early stages of the transition, because both components are uniquely able to withstand the harsh marine environment and the tremendous demands of the DP system.

As Master Boat grew it forged a relationship with Gulf Coast Air & Hydraulics Inc., located 25 miles up the road in Mobile. Founded in 1985, Gulf Coast began the marine portion of its business doing engine control and steering work on tug boats. Thirty years later Gulf Coast is a full line distributor and fabricator specializing in air, hydraulic and electric products and services for the heavy industrial and marine markets. Along the way it has become one of Master Boat's most valued suppliers.

Gulf Coast's early work with the offshore boats included supplying mechanically operated bow and stern thruster systems driven with hydraulic motors.

"In the mid-2000s or so, Master Boat told us they were going to build a boat with electric thrusters and VFDs, and asked if we were willing to learn the new technology," said Chuck Moorehead, Gulf Coast president and co-founder. "Being able to fall into the VFD technology changed everything for us."

The biggest benefit of the electric thrusters is how smoothly they interface and respond to the DP systems that are required by the American Bureau of Shipping (ABS), and the oil companies that contract the boats to supply their offshore oil rigs.

DP – A New Challenge for OSVs

When engaged a DP System simultaneously and continuously controls the bow thrusters, main propulsion system and rudders to hold the ship in place, no matter the wind, current or wave action. The orchestra of control is essential in the supply process to keep a boat from hitting the floating oil rig, and potentially moving it off its mark, causing major damage while drilling in three to five mile sea depths.

"DP systems became a requirement on almost every offshore supply vessel operating in the Gulf," said Andre Dubroc, the general manager of Master Boat. "We had to move along with that new regulation and ensure that all of a boat's equipment could meet the rigors of operating under dynamic positioning."

From a macro perspective there were immediate DP system benefits realized

by moving from hydraulic to electric thrusters. In general, the interface of an electric motor and VFD is more efficient, the system reacts far quicker and requires less maintenance.

The electric system also eliminated the complex interface between the mechanical thrusters and the DP software required with the hydraulic system; including an electronic board that converted signals to a processor that drove the hydraulic motor coupled to the shaft of the thruster. The intricate set of moving parts limited the performance of the DP system and was prone to frequent breakdown.

The Motor and Drive Package

Before bringing Gulf Coast into the electric thruster initiative, Master Boat had contacted a Baldor Electric distributor for initial information about potential electric motor and drive products.

"Gulf Coast was already providing 24/7 service to Master Boat and their customers on existing ships, so bringing them into the electronic thruster equation made sense. Master Boat also saw the benefit in purchasing product and service from one organization, so Gulf Coast became involved in the electric thruster business, setting the stage for further growth," said Mike Mitchell, the ABB application manager who has worked with Master Boat on the electrical systems from the beginning.

In 2011, just after ABB acquired Baldor, the switch was made to the ABB ACS800 VFD and the Baldor RPM AC motor, providing additional system performance and longevity.

The ABB motor and drive package is especially suited for the rigors of the marine environment and the intense demands of the DP system.

"Because of their modular construction the ABB drive is perfect for the marine industry. When you are under contract to an oil company, the people way out on that rig are depending on the boat to bring groceries, fresh water, cement or whatever their needs might be. You just cannot have any extended downtime," said Moorehead.

When the vessel is on station or in a positioning mode, depending on wave height, current and wind, there can be quite a demand put on the thrusters depending on the position of the boat. The ability for the ABB ACS800 and the Baldor RPM AC motor to execute very quick and rapid accelerations and decelerations simplifies the positioning process.

"In the DP application, the VFD will typically be ramping from 1,000 rpm in one direction to 1,000 rpm in the other direction in less than 10 seconds - a full reversal in less than 10 seconds. You can't do that consistently with a standard induction motor and a standard scaler type VFD, they just can't take the abuse," said Mitchell.

The direct torque control (DTC) technology in the ABB drive, and the low inertia aspects of the AC motor, provide excellent control throughout the entire speed range, from 2 rpm to 1,800 rpm. They allow efficient acceleration, deceleration and full reversals, reducing generator load and increasing the overall performance of the system.

Master Boat's Dubroc added, "These boats will basically hold in 10 knots of wind at the beam. In other words, you could have the wind coming from the beam into the side of the vessel and it will hold.

If the wind or current was coming from the bow, you could probably hold in hurricane force winds."

Bow and stern thrusters are also used for docking the boats and maneuvering in tight spaces like rivers and canals where boats may be passing within three feet of each other. The demand on the drives is not as severe as in the DP system, but precise performance is still required. The thrusters essentially allow the boat to move sideways to negotiate tight spaces without the need for a tug or push boat.

Custom Cabinets

Master Boat's new class of 220 ft. vessels contain the fourth iteration of drive enabled design at 800 hp. This move has increased the width of the drives beyond the tight space available within the boat, where every inch of space is a premium. Working together Master Boat, Gulf Coast and ABB created a custom design that reduced 30 inches of width on each drive cabinet, saving five feet of space with the two cabinets mounted side by side.

"By everybody collaborating together ABB basically created a whole new drive for us," said Moorehead.

ABB provides a complete system including the drive and the motor, and then works with Gulf Coast to integrate them into the master DP control system, from initial engineering through to commissioning and start-up.

Gulf Coast supports the effort with an experienced team that has all the Homeland Security clearances and insurance necessary to fly out to an oil rig or directly to one of the larger offshore supply vessels, covering the area from Brownsville, Texas to Tampa, Fla.

"In 10 years I think we have had three warranty calls. That's not a bad record when you are operating electric motors in some of the worst conditions possible," said Moorehead.

Additional Applications

As the Master Boat building team and their boat owner customers have become more comfortable with the electronic systems, motor and drive packages have spread to other areas of the offshore supply vessels. Since 2012 the electronic packages have been used in the following areas:

- **Mud Pumps:** an efficient mud delivery system that increased efficiency and eliminated some existing mechanical issues. It allows softer starts so the mud pump doesn't go right to 1,800 rpm, potentially damaging the hoses and pipes. Mud, or liquid cement, is used in the oil drilling process.
- **Ventilation Systems:** allows better control of the fans that ventilate the engine room, efficiently varying the loads to better balance air inflow and outflow.
- **Fire Pumps:** allows operators to vary the speed of the water flow to feather the water load to whatever spot is desired, providing better accuracy in fighting fires. It also eliminates the huge back pressures that result when controlling the water flow with the nozzle.
- **Deluge Pumps:** to better control the fire protection system on the ship.

(hoto: COX)

(hoto: Vard/Schottel)

COX's 300hp Diesel Outboard

Cox Powertrain will preview its professional outboard motor, the CXO300, at the workboat show in New Orleans. Cox brought together engineers from Formula 1 racing and automotive engine design to develop this new concept diesel engine, providing gasoline outboard performance, with diesel economy and reliability. Cox will display a full sized model of the CXO300, which is an opposed-piston, diesel outboard designed specifically for professional marine users. Delivering 300hp and weighing 660 lbs., it is designed for commercial, government and military applications.

www.coxmarine.com

Schottel: 72 Systems for Kazakh Module Carriers

Having already secured the contract in early summer to fit 15 Vard design 9 21 module carriers, Schottel has received a follow-up order to fit three additional Vard design 9 28 vessels with 12 main and auxiliary units. For the Norwegian Vard Group, who are building the first 15 vessels for Topaz Energy and Marine, and the later three for KMTF, the National Maritime Republic of Kazakhstan, it was Schottel's experience and service in the Caspian Sea that reportedly made the difference. These waters are extremely shallow in places, and are also clogged with mud, fishing nets and fishing lines. Schottel has many years of experience with its sealing systems and product variants in other customer fleets. Another positive was Schottel's on-site service, enabling downtime to be kept as short as possible.

A total of 36 special variant SRP 340 Rudderpropellers (formerly SRP 1012) were ordered as the main propulsion units for all 18 carriers. Along with them, 30 STT 1 CP transverse thrusters are being used as well as six SPJ 132 Pump Jets as an additional maneuvering aid in the three wider vessels. The delivery period is scheduled for the 12 months leading up to the end of 2017.

www.schottel.com

Keller Gearbox for Giant Cutter Dredger

C u. W Keller GmbH & Co.KG (Keller) has manufactured gear wheels and gearboxes for more than 100 years, and today is a specialist gearbox supplier to dredging operations. When the Chinese dredging and shipping company Tianjin Dredging Corporation (TDC) decided to build the Tian Kun, one of the largest dredging vessels for the Chinese market, Keller was commissioned to build three pump gearboxes and also the cutter-head gearbox. In addition to gearing systems for two inboard pumps and an underwater pump, this project also involved a cutter-head gearbox with a nominal engine power of 5,000 kW. This contract is particularly interesting for Keller as the company is very well known in Europe – claiming about 75% of all large cutter-head gearboxes in Europe over the last decade – yet a relatively new name in the Asian market. For Tian Kun, in addition to the classic bearing, shaft and interlocking calculation, comprehensive research was also carried out on the deformation and stress behavior of the gear-casing structure using FEM. This was conducted with the aim of optimizing the casing structure due to the immense and additional changing loads that occur during the dredging process. The optimized gears have a final weight of 180 tons.

www.keller-getriebe.de/index.php/en

(Image: Maritime Reporter TV

(Image: USN, NASSCO)

(Image: Roystpm_

Wärtsilä Launches Sea-Master

Launched at SMM 2016 in Hamburg, Wärtsilä Sea-Master system uses digital technology to monitor shaft bearings and seals to help customers maximize uptime and lower lifecycle costs of vessel shaft lines. The Sea-Master system collects real-time data from the tail shaft of the vessel, providing information about the operational health of the tail shaft equipment.

"The Wärtsilä Sea-Master system is an exciting example of how digitalization can advance the maintenance of propulsion technology," said Matthew Bignell, Sales Development Manager, Wärtsilä Seals & Bearings. "The system provides extensive real-time technical information and applies data analytics to deliver careful expert analysis and performance-enhancing recommendations."

"With the Wärtsilä Sea-Master, our customers will have a window into the operational health of the vessel's shaft line and gain knowledge about, for instance, the wear rates of the equipment. This allows for more accurate maintenance planning and reduces vessel downtime," Bignell said.

www,wärtsilä.com

Watch Maritime Reporter TV: Matthew Bignell, Sales Development Manager, Wärtsilä Seals & Bearings, discusses the development of the new Sea-Master with Maritime Reporter TV at the SMM 2016:
http://www.marinelink.com/videos/video/maritime-reporter-tv-interviews-matthew-bignell-wrtsil-seals--100077

Rolls-Royce to Power USN TAO

Rolls-Royce won a contract to supply diesel generators, propellers and shaft lines for the U.S. Navy's new fleet replenishment oiler ships, the John Lewis Class. Planned to total 17 ships, the new John Lewis class (previously known as TAO – X) will increase the U.S. Navy's capability to transfer fuel to its surface ships, in operations around the globe. For each ship, Rolls-Royce will supply two Kamewa 150A Controllable Pitch Propellers (CPP), while two Bergen B32:40xL8A generator sets will provide power to satisfy on board energy requirements.

Each ship will have capacity to carry 156,000 barrels of fuel oil, and also provide significant dry cargo capacity, aviation capability and will operate at speeds of up to 20 knots. The contract covers the first ship, with options for five more, in a project which plans to see 17 new ships built at the rate of one per year. Equipment for the lead ship is scheduled for delivery in 2018.

Kohler Tier 3 Diesel Marine Generators

Kohler Power Systems announced the availability of its new single- and three-phase Tier 3 marine diesel generators. The company's 14-24EKOZD/12-20.5EFKOZD integrate Kohler diesel Tier 3 engines and other enhancements, including improved sound shields and Kohler's Decision-Maker 3500 controller (DEC 3500).

In addition to enhanced sound-dampening and engine reliability, users of these new models will also benefit from the ability to quickly and easily parallel two or more Kohler generators with a single communication wire, which is delivered through the company's DEC 3500 controller.

The DEC 3500 controller's space-saving design eliminates the need for oversized switchgear among other benefits, including: built-in load management software, which removes over-fueling issues and the need for exhaust treatment systems; remote monitoring, which provides the ability to monitor and control the generator from anywhere on the vessel; fully potted circuit boards and sealed connectors, which protect against corrosion; and fewer failure points for superior dependability.

www.kohlerpower.com

Royston Debuts Engine Diagnostics Service

Royston expanded its traditional engine service and repair business with the introduction of a new engine diagnostics, health check and consultancy service. As well as supporting onboard engine maintenance routines and class surveys, the extended Royston Health Check program will also provide fully trained and experienced service engineers for emergency engineering responses, fault-finding and problem diagnoses.

Royston's engineering teams will use bespoke test equipment, handheld computers and proprietary software to carry out quick but thorough trouble-shooting analysis of medium and high speed engines on all types of vessels.

The Royston engine diagnostics test list includes a comprehensive function test of the engine including a borescope examination of the combustion chamber taking in liner bores, piston crowns, cylinder heads and valves.

Assessments are also made of peak pressures, exhaust gas emissions, fuel pump timing and laser alignment of the propeller shaft. Crankshaft deflection detection and thermographic surveys of electrical components and connections are also included.

www.royston.co.uk

(Image: Damen)

ASD 3212 artist impression

(Image: ECO)

Gary Chouest

(Image: Damen)

Jan van Hogerwou

(Photo: Cummins/Alan Haig-Brown)

Damen Gets 13-Tug Order from ECO

Edison Chouest Offshore (ECO) teamed with Damen to build 13 heavy duty mooring assistance and escort tugs. These will be deployed on two maritime projects for which ECO has recently won contracts, based in part on the use of Damen tug designs. The vessels will be built using ECO's network of five shipyards and Damen's support. The first of these is a contract that ECO won earlier this year with a new Corpus Christi based LNG export terminal. The agreement is for the supply of four escort tugs with a bollard pull of 80 tons, to operate at this new LNG terminal in Texas, which is currently under construction. The Damen tugs will be the escort/mooring ASD 3212 design.

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

In total ECO is now investing in the construction of a total of 13 Damen-designed tugs at its shipyards. The contract has been handled by Damen's new Area Support office in Houston, which opened in August 2016, and has since won order for the construction of 27 tugs in four U.S. yards.

Fort McHenry: Vane Bros.' New 3,000 hp Tugboat

Vane Brothers is hailing the newest addition to its fleet: the Fort McHenry, a 3,000-hp tugboat named in honor of the historic landmark that can be seen from the company's Baltimore, Md., headquarters. Designed by Frank Basile, P.E., of Entech Designs, LLC, the Fort McHenry is the most recent of 12 "Sassafras Class" tugboats delivered to Vane since 2008 by Chesapeake Shipbuilding of Salisbury, Md. Measuring 94 x 32 ft.with a hull depth of 13 ft., Fort McHenry is similar in most respects to the previous 11 tugboats built for Vane as part of the Chesapeake contract. The vessel is equipped with twin Caterpillar 3512 Tier 3 main engines and operates with a Jon-Rie Series "500" hydraulic towing winch. "Soft-core" panels, heavy, fire-rated doors and top-line accoutrements are used throughout, offering the crew a quieter, safer and more comfortable living environment. Fort McHenry, one of nearly 150 vessels currently operating out of seven Vane Brothers locations along the U.S. East Coast, has joined the company's New York-based Alpha Fleet and is primarily tasked with towing petroleum barges engaged in the North Atlantic coastwise trade. Meanwhile, another new addition, the Double Skin 317 bunker barge, is now part of Vane's Echo Fleet, working out of Philadelphia, Pa. The DS-317 is the last in a series of seven 35,000-barrel bunker barges to be delivered by Conrad Shipyard's Orange, Texas, operation.

Aitana B: Power & Versatility

In April 2016 Zumaia Offshore, S.L., a workboat owner and operator based in the Basque Country, took delivery of the Cummins-powered MPP workboat Aitana B from Neptune Shipyards in the Netherlands. At 27 x 12-m with a three-meter draft it is one of the largest models of Neptune's Eurocarrier series of workboats, which are specifically designed for dredging assistance, port construction and maintenance, dive and ROV support, sea renewables, Geotechnical survey and general offshore support in shallow waters. The range of equipment built into the rectangular platform is remarkable. An accommodation and wheelhouse block set on the port side provides six staterooms, mess and galley for up to 12 people. In addition there is another 150 sq. m. of clear working deck. Tankage includes 124 cu.m. of fuel and 76 cu. m. of fresh water.

Mounted on that space is deck equipment capable of handling a range of marine projects. A forward deck crane lifts up to 11 tons at 18.5-m extension, also mounting a 10 ton SWL winch for swift deployment of survey equipment. The aft mounted deck crane lifts ten tons with a 12.17-m extension. In addition to the vessel's 15-ton tugger winch located starboard aft, the vessel is fitted with an anchor-handling winch with a 125-ton braking hold force and capable of lifting 100 tons at nine meters per minute or 18 tons per minute with a high speed setting. The A/H winch carries 400 meters of 52-m/m wire. This workboat is fitted as well for towing with a dedicated 50ton winch with a 65-ton braking hold force with 550 meters of 36/mm wire, a 30-ton SWL towing hook and

(Photo: Cummins/Alan Haig-Brown)

(L to R) Lady Loren at launch in 2008; Russel Plaisance; Recent image of the Lady Loren.

towing pins aft. The bow has a 6,000 by 1,220 m/m heavy duty roller with a Triplex guide pins, stopper and shark-jaws set up. The wooden deck has flushed-in container twist lock fittings for multiple container configurations. On request, the vessel can also be "plug&play" fitted with a four-point mooring installation and hydraulic connections for LARS-ROV and diving support operations. The vessel also has deck fittings both fore and aft to allow an a-frame for related jobs.

On top of the above, this workhorse has a BV-certified AM/AT dynamic positioning system, based in independent rudders and powerful tunnel thrusters fore and aft, which provides safety and versatility for an increasing number of works in the current offshore support market. The vessel has been working on DP requiring projects non-stop from delivery, with a proven record of station keeping capacity during support operations on difficult conditions, proving a remarkable DP plot. The vessel is also equipped with a side-moonpool to assist survey operations with GAPS.

With a speed of 10.8 knots, a pair of Cummins QSK38-M diesels powers the "Aitana B" producing 1381 bhp each at 1800 rpm. The engines turn 1850 m/m fixed-pitch propellers in nozzles. This provides a 35-ton certified bollard pull, which together with the towing-winch allows the boat to provide reliable towing services. In addition to the propulsion and rudder system, both thrusters mounted fore and aft, provide this vessel with increased maneuverability on close quarters.

Ultra Large Tug Alp Striker

From Japan's Niigata Shipbuilding & Repair, Inc. (NSR), fully owned by Mitsui Engineering & Shipbuilding Co., Ltd., comes the first in four of a series of ultra large, ultra powerful tugs. The first in line is dubbed Alp Striker, delivered to Alp Striker BV (ship owning company of ALP Maritime Services BV, Netherlands) in early September 2016. Alp Striker is one of strongest and largest towing vessels in the world, able to sail to a top speed of 19.16 knots, 13 knots in ordinal sailing and to tow 309.6 tons. Alp Striker is able to tow large floating objects, such as FPSO, FLNG, RIG etc., for long distances (45 days non-stop) and also work for anchor handling service. To maintain this heavy workload, Alp Striker has been built to have class notations of Ice Class 1B, External Fire Fighting System Fi-Fi II, Dynamic positioning System DP Class II. NSR is now building three more vessels and planning to deliver all by 1Q of 2017.

Lady Loren: Big Hours, Little Wear

Russell Plaisance, president of Louisiana Carriers, built the pusher-tug Lady Loren at Dickie Adam's Lockport Fabrication in 2008. At the launch, he explained that the boat was the result of five years of planning and a lifetime of experience in the maritime world of the Gulf of Mexico. The 82 x 29-ft. Lady Loren was the seventh boat in the LA Carriers' fleet. "I keep my business diversified," Plaisance said. "We do $10 or 11 million gross per year including some business with the oil industry, but we do a little of everything else as well. We barge pipe and we once even towed baseball dirt from Houston to Tampa Bay for spring training. This new boat has a contract to tow corn syrup from Memphis to Tampa Bay."

Jump ahead eight years, the corn syrup plant was converted to other products and that contract disappeared. But their diversity has kept LA Carriers healthy even during the slump in the oil industry. The Lady Loren, with both towing and pushing capabilities, is currently engaged moving a pair of hopper barges on a run between New Orleans and Tampa.

The Lady Loren is a triple screw tug powered by three Cummins QSK19-M3 diesels rated at 660 hp each to give a total of 1.980 hp. The engines turn three 63 x 67-in. propellers in kort nozzles.

"The engines had 36,000 hours on them so I decided to rebuild the middle engine," Plaisance said recently. "Without removing the engine, my crew, together with Cummins mechanics replaced the shaft bearings, pistons and rods, heads and injectors. When we looked at the wear on the parts that came out of the engine we realized that they could easily have given us another 4,000 hours with no risk of down time."

As a result he feels confident in leaving the rebuild of the two outside engines for another year by which time they will have a remarkable 40,000 hours each. Crediting Cummins quality Plaisance also has a very proactive service and maintenance program on the engines. Oil is changed every 300 hours, and injectors adjusted every 10,000 hours.

LA Carriers has changed some of the fleet in the eight years since the Lady Loren was launched and they have several different engine makes in his seven-boat fleet. Plaisance is unreserved in his praise for the Cummins engines. "In future, if I have to replace an engine in one of my other tugs, it will be with Cummins," he said.

By Alan Haig-Brown

$100M South Africa Tug Contract

(Image courtesty: Transnet National Ports Authority)

Transnet National Ports Authority (TNPA) is on track with its $100m tug building contract and celebrated the ceremonial launch of the fourth of its nine new tugs being built in Durban. The tug – named Osprey in honor of the fish eagle – will serve at the Port of Saldanha. The naming of the vessel was carried out by Lady Sponsor, Thandeka Mabija, GM for HR at TNPA. "The work by Durban shipbuilder, Southern African Shipyards, on this project has helped to cement the marine shipbuilding and support industry locally," said Phyllis Difeto, COO, TNPA. "Having a local manufacturer also promises excellent after-sales support for the 35-year service life of these vessels. Local shipbuilding expertise is exactly what the government's Operation Phakisa initiatives aim to leverage in unlocking the potential of the ocean economy."

This is the largest single contract TNPA has ever awarded to a South African company for the building of harbor craft. Nine new tugs are being built over three and a half years, as part of a wider fleet replacement program that covers tugs, new dredging vessels and new marine aviation helicopters. Five tugs are under construction simultaneously at any given time due to the project's tight deadlines. To date two tugs – Mvezo and Qunu – have been delivered to the Port of Port Elizabeth. Saldanha took delivery of Cormorant in August and Osprey will be delivered in December, followed by the port's third tug next year. The Ports of Durban and Richards Bay will also receive two new tugs. There will be handovers every three months until the last tug is launched in early 2018.

TNPA's new fleet of nine tugs are each 31m long with a 70 ton bollard pull. The older fleet of 29 tugs has 32.5 to 40 ton pulls. The increased bollard pull of these new generation tugs meets international standards and they also feature the latest global technology such as Voith Schneider propulsion which makes them highly maneuverable and able to change direction and thrust almost instantaneously while guiding large vessels safely into South Africa's ports.

Crewboat Lady Tierney Delivered

Lady Tierney was built for Sea Supply Inc.

Halimar Shipyard announced the delivery of Lady Tierney, a 205-ft. monohull, DP-2, ABS-classed, USCG-certified crew supply vessel for Sea Supply, Inc., a B&J Martin Inc. subsidiary of Galliano, La. With design expertise from Incat Crowther's Lafayette, La., office, combined with concept design and standards from the Morgan City, La., based shipyard and the vessel owner, the vessel will meet the needs of the demanding deep water offshore industry in the Gulf of Mexico.

For transportation of supplies, Lady Tierney features a large aft cargo deck comprising of 3,950 sq. ft. of timber covered area with a capacity of 450 LT. Also featured on the aft deck are two FFS 1200LB, 5300 gpm fire monitors for emergency fire extinguishing. Forward of the cargo deck is a main cabin featuring seating for 50 passengers, plus a bathroom, a dedicated luggage area, a storage room, a room for dynamic positioning equipment from Beier Radio, plus an HVAC closet. A generously-sized deck locker accessible from the cargo deck is also integrated into the main cabin.

Above the main cabin sits a wheelhouse featuring forward and aft control stations, with DP controls well-arranged at the aft station that provides unobstructed views of the cargo deck and offshore structures. Inflatable life rafts are situated outboard of the wheelhouse on each side of the vessel and are easily accessible for rapid deployment in case of an emergency. Below deck crew accommodations features five crew staterooms, each with double bunks and locker, a bathroom, a HVAC closet, galley, pantry and a mess/lounge area.

Forward of the crew accommodations lies a bow thruster compartment featuring two Thrustmaster 30TT200AL tunnel bow thrusters. A series of tanks located between the engine room and crew accommodations have a capacity of 20,720 gallons of ship's fuel, 44,000 gallons of transferrable rig fuel, 44,330 gallons of transferrable rig water and 2,600 gallons of ship's water.

The engine room includes main propulsion machinery consisting of four Caterpillar 3512C, Tier III engines operating at 1911 bhp at 1600 rpm coupled to Twin Disc MGX 61000 SC reverse reduction gears. Each engine drives a four-bladed NiBrAl propeller enabling a top speed of 27 knots and the two inboard engines are also arranged to drive FFS SFP 250x350 XPC fire-fighting pumps.

The generator room houses two John Deere 6090AFM75, 150ekW generator sets and two John Deer 6090AFM75 auxiliary engines providing power for bow thruster hydraulic pumps. The steering gear room features a Beier Radio (Sentinel Controls) steering system to control the two oversized stainless steel rudders which enhance station keeping and maneuverability.

Windea La Cour Goes to Work

(Image courtesty:Ulstein Group)

Windea La Cour

Designer: Ulstein Design & Solutions AS
Builder ULSTEIN VERFT AS (yard number 309)
Owner: Bernhard Schulte Offshore/ICBC Leasing
Operator: WINDEA Offshore
Length: 88 m
Beam: 18 m
Dead weight: 3490 tonnes
Draft (max): 6.4 m
Speed (max): 13.9 kn
Accommodation: 60 POB
Deck area: 380 sqm
Fuel oil: 1,150 cbm
Fresh water: 1,200 cbm
Ballast water: 2,400 cbm
Classification Det Norske Veritas +1A1, SF, E0, DYNPOS AUTR, DK(+), HELDK, TMON

Two years on from the launch of the Ulstein Group's X-STERN design at the ONS 2014 maritime exhibition in Stavanger, the first vessel to feature the innovative hull line has entered service at the Gemini offshore wind farm.

The newly built Windea La Cour incorporates the X-STERN: a pointed stern instead of a conventional transom stern, offering increased comfort and flexibility due to reduced vibrations and slamming, according to Ulstein. These are key assets for the Norwegian-designed and -built vessel, which will accommodate, transport and transfer technicians from shore to the Gemini wind turbines via a motion compensated gangway. Windea La Cour, a purpose-built service operation vessel (SOV) for the offshore wind industry, was delivered by Ulstein Verft on June 23, 2016 to owners Bernhard Schulte Offshore/ICBC Leasing and named in a ceremony in Hamburg on June 30. Now contracted by Siemens Wind Power Service to ensure the production of green energy from 150 wind turbines in the Gemini wind farm in the Dutch part of the North Sea, the vessel is operated by WINDEA Offshore.

On the sea trial, the crew wanted to test the vessel's abilities going astern, pushing the vessel to the max speed backwards. As a result of the X-STERN, the ship managed to keep a speed of 12.1 knots while backing, as compared to her forward speed of 13.95 knots, a difference of less than two knots. he X-STERN shares much of the same characteristics as Ulstein's patented X-BOW bow design, also featured on the Windea La Cour. Ulstein said the vessel will experience no bow or stern impact in terms of slamming, as the acceleration levels are lower. Also, vibration levels will be lower and the sustained speed is higher. BS Offshore has another SOVl under construction at Ulstein Verft, where the ship is built, equipped and painted inside a covered dock hall, ensuring a controlled atmosphere and the best quality of work.

Eastern Delivers Escort Tug

Eastern Shipbuilding Group, Inc. delivered Oceanus (Hull# 240), the third in series of four identical Robert Allan, Ltd. (RAL) designed Z-Tech 2400 Class Terminal & Escort Tugs built for Suderman & Young Towing Company at Eastern's Nelson Street facility.

The first two vessels of the series, Triton (Hull #235) and the Neptune (Hull #237), have already been delivered. Eastern is also constructing four tugs for Bay-Houston Towing Co.

G&H Towing Company is the owners' onsite representative and agent during the engineering, construction and delivery for both companies Suderman & Young and Bay Houston. G&H Towing Company will operate the vessels for the owners after delivery.

Robert Allan, LTD (RAL) of Vancouver, B.C. has provided the Z-Tech 2400 Class Terminal & Escort Tugs design and Eastern has provided detailed engineering.

G&H Towing's fleet currently consists of eight Z-Tech tugs in operation. This Z-Tech incorporates the latest technology for escort service and ship assist.

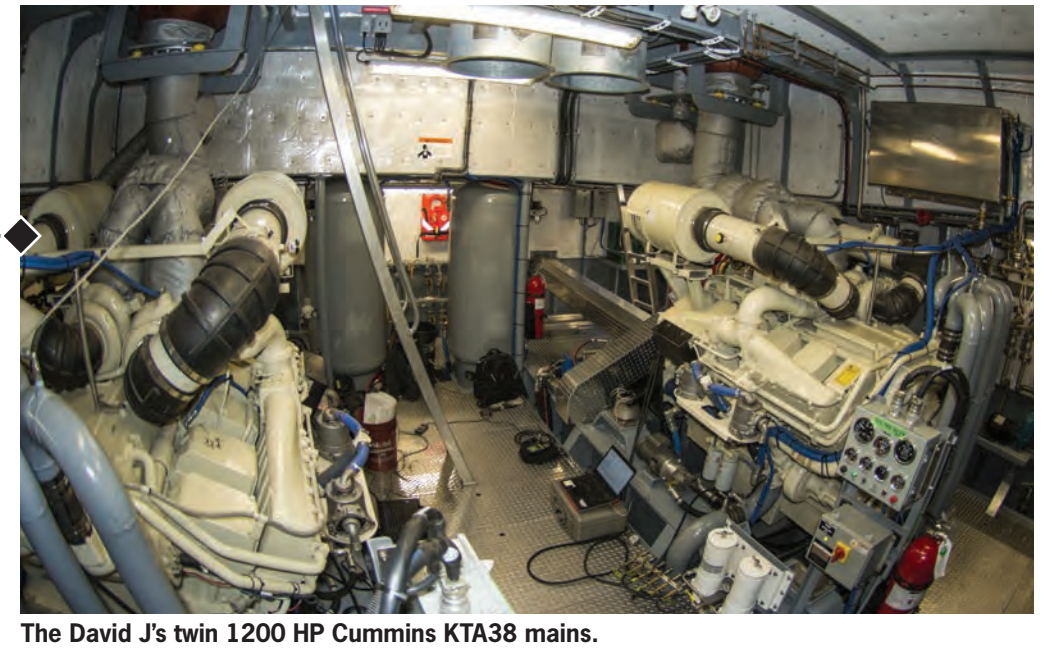
(Photo: Eastern Shipbuilding Group)

The Z-drive tug David J meets the water for the first time.

Daryl Jones at the launch of the David J.

Handy Size, Ample Power, Ship Handler

The well laid out bridge includes a forecastle access hatch.



The David J's twin 1200 HP Cummins KTA38 mains.

(All photos courtesy of Haig-Brown/Cummins, GA courtesy of A.G. McIlwain Ltd.)

"Steady, smooth, powerful, highly maneuverable," these were comments by mariners, who were onboard for sea trials of Jones Marine Group's new tractor tug David J. The new boat was put through its paces in fine form. The boat is an A.G. McIlwain-designed 53 by 26.5-ft. handy-sized tractor tug with a hefty14-ft. molded depth. The beam offers remarkable stability while the length allows the tug to work in tight spaces.

Built by Sylte Marine of Maple Ridge for Jones Marine Group Ltd, of Chemainus, it is, as company president Daryl R. Jones explains, "A new breed for us, so we have brought in Don Westmoreland, a retired captain who has operated Z-drives in the port of Vancouver. He will be training my crew."

Jones has built a successful company with a fleet of nine boats. Until now, all were conventional drives. One, the Helen J, has the same Cummins KTA38 engines as the David J, but with an 850 HP rating and conventional drives. It is also a McIlwain/Sylte tug. The Jones firm handles all the ship docking for Chemainus, Crofton and Nanaimo on Vancouver Island. "The ships are getting bigger," explained Daryl Jones, adding that, "the pilots are accustom to have Z-drives in Vancouver." He expects that the new tug will be able to handle most ships, especially those with bow thrusters, on its own. The compact tug packs significant power with a pair of IMO Tier II compliant, Cummins KTA38-M2 mains each delivering 1200 hp at 1800 rpm through carbon-fiber shafts to a pair of Rolls-Royce Marine US155 P14 Z-drives, with fixed props in nozzles. The soft mounted engines and carbon-fiber shafts serve to isolate vibrations and noise from the tug's hull.

The wheelhouse if isolated on soft mount pedestals to provide improved crew comfort. The controls are mounted on two consoles port and starboard of the operator's central position. An angled hatch set forward between the pedestals provides access to the large forecastle. The starboard console includes the winch controls so that the mate/deckhand, in a two-person operation, can step into the wheelhouse from the foredeck and work the winch while in direct contact with the captain. An additional set of controls is mounted near the hawser winch that was supplied by Vancouver's Burrard Iron Works. "I thought of putting a towing winch on it as well," said Jones, whose firm also tows log booms, "But I decided that I didn't want to put those Z-drives anywhere near logs. So it will be a dedicated ship hander." Like the rest of the Jones Marine fleet the David J will operate as a two-person day boat. A pair of crew boats, including a big RIB that cruises at 30 knots and can do 45 knots, provide quick crew changes when the boats are working.

Why Maritime Museums Matter

By Jeremy Bonds

With today's focus on digital technology, mobile apps, enhanced reality and the overall digital landscape, the maritime industry often gets overshadowed, leaving some to ask, "Does maritime still play a significant role in today's society?" The answer, of course, is a resounding "Yes!"

Maritime museums, such as GulfQuest National Maritime Museum of the Gulf of Mexico, are here to introduce to some (and reinforce to others) the continued importance of maritime history and the cultural and economic impact the industry has on a global scale. By doing so, more and more millennials are discovering jobs outside of Silicon Valley, ones that do not require sitting behind a desk all day; jobs that enable you to travel the globe, experience other cultures and have a significant and visible impact on the global economy.

GulfQuest, the world's only maritime museum dedicated to the historical, cultural and economic significance of "America's Sea" - the Gulf of Mexico - aims to help expose people to this industry. With 90 interactive exhibits housed inside the stern of a full-sized replica of a containership, GulfQuest encourages visitors to immerse themselves in the maritime industry and show them how they can be part of this exciting industry.

"We have taken extra measures, every step of the way, to design an immersive experience for our visitors. The exhibits are both entertaining and educational, and encourage visitors to explore every maritime aspect of the Gulf of Mexico," said Tony Zodrow, GulfQuest executive director. "From the ramp ways on either side of the [container] ship, to the sounds of the ship's engines humming, to the lighting effects, visitors will feel very much like they are inside a life-size vessel."

GulfQuest's containership, the SS McLean, commemorates the concept of containerization, an idea pioneered by Malcom McLean in the 1950s as the owner of Waterman Steamship Corporation in Mobile, the museum's home port. Containerization revolutionized world trading by dramatically lowering shipping costs, thus making it possible for companies to manufacture their products and ship them worldwide at affordable costs.

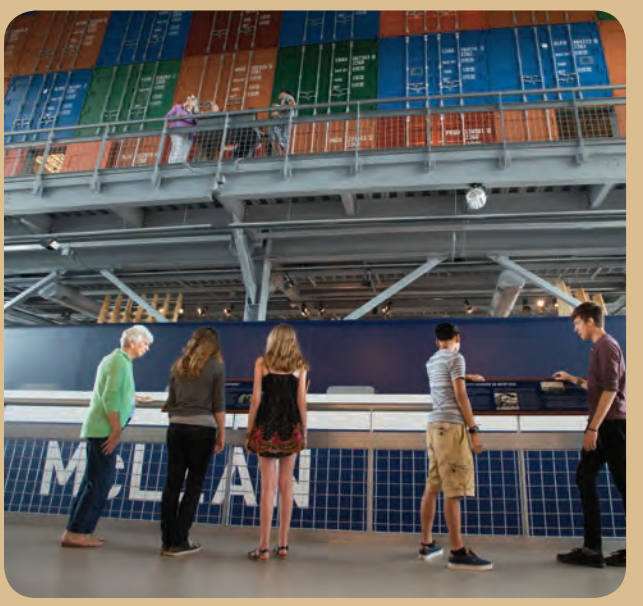
Interactive maritime museums such as GulfQuest allow visitors to experience of the industry in a more hands-on way. As Joan Wages stated in a recent Huffington Post article tilted Why Museums Are Important, "Seeing something in person is quite different than seeing it in the pages of a book or on a computer screen."

By exposing the public to the wonders of the maritime industry, translating the industry language to the laymen and passing our maritime traditions down to the next generation in an interactive, fun and engaging way, we can ensure the achievements, culture and impact of the industry will continue to be felt across the globe.

If we can inspire one person, just one, to consider maritime as a career option, then we know we have done our job.

The Author

Jeremy Bonds is the Public Relations Coordinator at GulfQuest. Before joining GulfQuest, Jeremy was Assignment Editor for the NBC affiliate in Mobile and a radio producer/marketing specialist for two local radio stations. A graduate of the University of South Alabama, Jeremy previously free-lanced as a properties artisan in New York City, creating specialty props for TV, film and Broadway, and interned for late-night talk show CONAN on TBS.



All Photos: GulfQuest

Profile: Fuji Trading Co.

Fuji Trading Co., Ltd.

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F: +81-78-413-1386
E: mhq@fujitrading.co.jp
W: http://www.fujitrading.co.jp

Founded:..... 1953 in Kobe, Japan
Offices:.....Japan
Head Office .....Yokohama
Others in ..... Tokyo, Kobe, Imabari, Moji
No of Employees: 220
Group Total: 920

Fuji Trading's Global Network

Japan

- Fuji Transport Systems Co., Ltd.
- Yokohama Tsusho Co., Ltd.
- San-Ai Fuji Co., Ltd.
- MARIK K.K.

Overseas

- Fuji Trading (Marine) B.V. (The Netherlands)
- Fuji Trading (Singapore) Pte., Ltd.
- Fuji Horiguchi Engineering Co., Ltd. (Singapore)
- Fuji Trading (Shanghai) Co., Ltd.
- Hanil-Fuji (Korea Co., Ltd.
- Fuji Marin e Logistics (HK) Ltd.
- Fuji Global Logistics Co., Ltd.
- Fuji Marine Logistics (Shenzhen) Ltd.
- Fuji Trading (America) Inc.
- Fuji Metalock Brasil S.A.
- Middle East-Fuji L.L.C. U.A.E.
- Middle East-Fuji Khimji's Co., L.L.C. (Oman)
- Fuji Transport Systems (China) Co., Ltd.
- Yokotsu (Shanghai) Co., Ltd.

Yu Fukada, was appointed president of Fuji Trading Co., Ltd., Japan, in June 2016. He said "the current circumstances surrounding us is not very well, especially for the maritime industries due to the low freight rate, and due to the world economy which has been slowing. The good changes may come some day, but we can not wait for that. What we have to do now is to carry out what we can do for our customers to meet their requirements even under this unclear sky. As the trading house, our task is to provide high quality of service to the customers/vessels all over the world cooperating together with the manufacturers and supply sources. In order to achieve this, we focus on improving each function, strengthening our global network and integrating all facilities which we possess. On the other hands, 'Information,' 'Procurement,' 'Logistics' and 'Engineering' are our key words."

In a positive light, he noted that Fuji Trading has been approved as AEO exporter by the Customs in June 2015. The company opened the office in Houston, and started store supply service to the ships calling at ports in U.S. Gulf area since October 1, 2015.

Finally, Fuji Transport Systems Co., Ltd. expanded its warehouse in Japan and opened the site office in Rotterdam in 2015 to expand Total Marine Logistics Services.

Yu Fukada, President, Fuji Trading Co.

Fuji Trading's Main Services

- Machinery & Equipment Sales

As a bridge between customers and manufactures, Fuji Trading sells and supplies a wide range of machinery equipment to be installed aboard ships and floating facilities to overseas shipyards, engineering companies and shipping companies including high value-added vessels such as LNGC, FSO,FPSO,FSRU and FLNG.

- Spare Parts Supply Service

For more than 40 years, Fuji Trading has kept its position as a leading spare parts supplier. Thanks to the largest dealing volume and strong policy to supply only genuine parts for proper maintenance, it has built trusting relationships with more than 800 Japanese manufactures, which enable it to offer reasonable prices with the manufacturer's warranty and technical support. In emergency cases, it can arrange fast and urgent shipment at low cost in close cooperation with its group company of logistics services; Fuji Transport Systems Co., Ltd.

- Technical & Engineering – Service

Fuji Trading provides a wide range of technical services which are essential to ensure smooth operation of ships. Its experienced marine engineers are continually learning the latest technologies to offer best possible maintenance services to ships and work on a worldwide basis. In addition to general afloat repair, repair of machinery equipment installed aboard ships and reconditioning of engine parts, it is engaged in agency work for crane loading test by water bags, annual inspection of lifeboats/davits, overseas drydocking, among others.

- Marine Stores & Provisions Supply Service

Having a long history since its establishment in 1953, Fuji Trading provides ships with marine stores and provisions supply essential to their navigation, and continues to render best supply services in marine supply at ports worldwide.

- ICT – Service

Fuji Trading supports safe operation by Ship-Shore Network Manager for data communication such as e-mail, crew internet access, seamless file sharing between ship and shore, firewall function. It provides a variety of services for information and communication technology.

- Plant Machinery & Equipment Service

Fuji Trading contribute to safe operations through sales of parts and equipment to plants around the world.

- Catering – Service

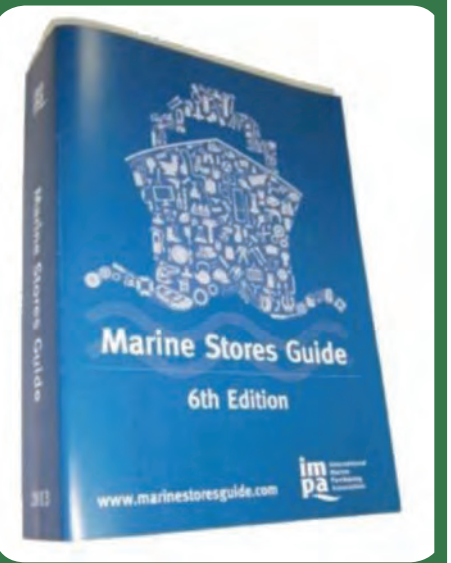
Making full use of its experience of marine supply and worldwide network, it provides catering service to ships.

- Total Marine Logistics Service

Fuji Transports Systems Co., Ltd. provides Marine Logistics services such as warehousing, packing, customs clearance, forwarding, shipping administration, local delivery abroad by taking full advantage of global network of Fuji Trading Group.

- Global Marine Safety Services

Yokohama Tsusho Co., Ltd. provides Survey/Inspection services of safety equipment including Liferafts, Fire Fighting Equipment and GMDSS Appliances.



Marine Store Guide

In 1974, we published "Marine Store Guide" a product guide utilizing Fuji Trading unique 6-digit codes. Highly appreciated in the shipping industry worldwide, the guide was in 1993 renamed "IMPA Marine Stores Guide" through our partnership with IMPA (International Marine Purchasing Association). All the products in the guide are translated into five languages: English, Spanish, Chinese, Russian and Japanese together with photos as well as descriptions and 6-digit product codes is allocated to each size available. This guide has been used not only by ships navigating the world, but also widely used by shipyards, marine equipment manufactures and ship's suppliers in many countries when handling orders for marine store items.

MARITIME REPORTER AND ENGINEERING NEWS

2017 EDITORIAL CALENDAR

JANUARY

AD CLOSE: DEC 21

The Ship Repair & Conversion Edition

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

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

FEBRUARY

AD CLOSE: JAN 24

The Cruise Industry Edition

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

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

MARCH

AD CLOSE: FEB 21

The Green Marine Technology Edition

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

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

APRIL

AD CLOSE: MAR 21

The Offshore Annual

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

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

MAY

AD CLOSE: APR 21

The Marine Propulsion Edition

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

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

JUNE

AD CLOSE: MAY 24

The Annual World Yearbook

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

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

2017 EDITORIAL CALENDAR

MARITIME REPORTER AND ENGINEERING NEWS

JULY

AD CLOSE: JUN 23

The Marine Communications Edition

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

AUGUST

AD CLOSE: JUL 25

The Shipyard Edition

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

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

SEPTEMBER

AD CLOSE: AUG 24

Maritime Port & Ship Security Edition

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

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

OCTOBER

AD CLOSE: SEP 22

The Marine Design Annual

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

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

NOVEMBER

AD CLOSE: OCT 25

The Workboat Edition

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

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

DECEMBER

AD CLOSE: NOV 22

The Great Ships of 2017

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

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

**Editoral calendar content may be subject to change

Obituary

Adm. Robert E. Kramek, 20th Commandant of the Coast Guard

Former U.S. Coast Guard commandant Adm. Robert E. Kramek died October 20, 2016. Kramek served as the Coast Guard's 20th commandant from 1994 through 1998, during which time he 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. Before he became the Commandant of the Coast Guard, his assignments as a flag officer included Coast Guard Chief of Staff, commander of the Seventh District and commander of the Thirteenth District. 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 serving around the world, particularly in Alaska and the Atlantic, Caribbean and Pacific regions.

Hendry Marine President & CEO Passes Away

Aaron W. Hendry died at the age of 80. Hendry passed away peacefully after a battle with pancreatic cancer. Aaron's father, Captain F.M. Hendry, started the family business more than 90 years ago. Over time, the company grew dramatically as the dredging fleet expanded and additional maritime services were performed to meet the demands of infrastructure. A fourth-generation Floridian, Aaron started his career at Hendry Corporation as a teenager in 1952 as a deckhand, working his way up through the ranks as a boatman, foreman, mate and leverman.

SNAME

Thomson

Rolls-Royce

Schell

Rolls-Royce

Dohle

Odffjell

Mørch

SNAME Honors Thordon's Thomson

At the 2016 SNAME Maritime Convention, George A. (Sandy) Thomson was elected a Fellow of the Society of Naval Architects and Marine Engineers (SNAME). Thomson has a long family history in the maritime industry. Thomson's great, great grandfather was a deep sea captain sailing the Great Lakes before becoming a lighthouse keeper; his uncle was head of Shell Canada when Shell maintained a fleet of steam powered tankers operating on the Great Lakes; while his father owned and operated Thomson-Gordon, a marine and industrial products supplier in southern Ontario.

Sandy attended Northrup University in California obtaining a Mechanical Engineering degree and eventually migrated back to Canada to work in the family business in 1965. His passion for the marine industry redirected the family business from distributing engineering supplies to manufacturing propeller shaft and rudder bearings – thus leading to the development of Thordon Bearings. Sandy is currently owner and Chairman of the Board of Thomson-Gordon Group, the parent of Canada-based Thordon Bearings Inc.

Rolls-Royce Appoints Schell CEO

Rolls-Royce said that Andreas Schell has been appointed as Chief Executive Officer of Rolls-Royce Power Systems (RRPS). Schell will join Rolls-Royce later this year, reporting to Chief Executive Warren East, and take up his new position from January 1, 2017, succeeding Dr. Ulrich Dohle who is retiring. Schell joins Rolls-Royce from UTC Aerospace Systems and will work alongside Dr. Dohle until the end of the year to ensure an effective transition. Schell is a German citizen with an MBA from Michigan State University and a master's degree in mechanical engineering, with a specialization in energy systems engineering, from Technische Universität Clausthal in Germany. Schell is a member of the Association of German Engineers (VDI) and the Society of Automotive Engineers (SAE).

Odffjell to Build Record Size Stainless Steel Chem Tankers

Odfjell has ordered four chemical tankers (with options for an additional four) with stainless steel cargo tanks from China Shipbuilding Trading CO., Ltd. and Hudong-Zhonghua Shipbuilding (Group) CO., Ltd. The ships cost $60m each. The 49,000 dwt ships, with a cargo capacity at 54,600 cbm, reportedly makes them the world's largest stainless steel chemical tankers, according to the Norwegian owner. "We are very happy with the agreement we have signed today, which is a significant step in solving our tonnage replacement needs," said Kristian Mørch, CEO Odfjell SE. The first ship is expected to be delivered in June 2019 and the following vessels with three months intervals.

Intellian: New Americas GM

Intellian appointed industry veteran Edward Joannides to take the helm of its Americas business unit as General Manager. Joannides' experience in both the maritime and satellite communications industries spans over 25 years. This includes time at sea as a Chief Officer working for CMA CGM, and senior shore-based posts including Fleet Manager for Northern Navigation, Director of Strategy & Business Development at Inmarsat and most recently Program Manager for SATCOM Services at Northrup Grumman.

Sullivan Joins Viega as CFO

Viega LLC announced John Sullivan as its new Chief Financial Officer, responsible for overseeing, managing and planning strategy for all of Viega's accounting, financial and IT initiatives. Sullivan has more than 25 years of experience in executive leadership for the industrial, pharmaceutical, healthcare and technology industries. He also has seven years of experience working in the residential, commercial and industrial water application sectors.

Faststream Appoints Diaz

Faststream announced the arrival of U.S. Coast Guard and Maritime recruitment expert Adam Diaz to its Houston office. Diaz has spent over 10 years working within the Maritime sector, starting out in U.S. Coast Guard training in 2006 before moving into operations at the U.S. Coast Guard sector in Houston.

ABS to Direct DHS Cyber Project

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

SpeedCast Acquires Harris CapRock

SpeedCast International Limited entered into a definitive agreement to acquire Harris CapRock in a cash transaction valued at $425 million. Harris CapRock is a leader in the energy and maritime segments. The acquisition strengthens SpeedCast's position in the maritime industry, in which Har-

Watch

Maritime Reporter TV's Joe Keefe Interviews PJ Beylier, CEO, Speedcast.

www.marinelink.com/videos/video/maritime-reporter-tv-interview-pj-beylier-ceo-speedcast--100063


Intellian

Joannides


Viega

Sullivan


ABS

Fireman


Inland Marine

Luna


Inland Marine

King


Inland Marine

Howell

ris CapRock has a leading position in the fast-growing and bandwidth-hungry cruise sector, and creates a global leader in energy, positioning the company for future growth. The combined entity will service over 6,200 vessels, hundreds of rigs and platforms, and enterprise and government customers around the world with a wide portfolio of communications and IT services, and an industry-leading global support network. This expanded global footprint and infrastructure, with over 240 field engineers around the world, will enable SpeedCast to provide best-in-class services and support to customers in over 100 countries.

Retlif Opens New Composites Lab

Retlif Testing Laboratories, an independent global leader in EMI/EMC and Environmental (ESS) testing and compliance, officially launched its new dedicated Composites Testing Laboratory, providing testing for Carbon Fiber Reinforced Polymers (CFRP), Glass Fiber Reinforced Polymers (GFRP), Aramids (Kevlar), as well as for Non-Fiber Reinforced Plastic. The result of three years of planning, the new Retlif laboratory is testing composites being used in commercial aviation, aerospace and avionics, maritime, military and rail applications.

Inland Marine Appoints Four

Four professionals have recently joined Inland Marine Service (IMS). Kristina Luna has joined IMS as HR Manager. Moses Garza will serve as Tankerman Supervisor. Caleb King comes on board as manager SHEQ/Compliance Director. Brian Howell will serve as Assistant Port Engineer and will be responsible for everyday maintenance of all vessels.

Goldstein Named Chairman at FCCA

The FCCA said that Adam Goldstein, President and COO of Royal Caribbean Cruises, will become Chairman of the FCCA, effective January 1, 2017. Micky Arison, Chairman of Carnival Corporation & plc and current FCCA Chairman, broke the news during FCCA's annual CEO Roundtable, where both the current and future Chairman shared insights.

SMS Appointed

O. Øverland appointed Scandinavian Micro Systems in Florida as its Dealer/Distributer for U.S., Canada, and the South- and Central Americas. Scandinavian Micro Systems is stocking all of the Type Approved NMEA splitters: UPC-3002, UPC-3005, UPC-5000P and UPC-6000, as well as some models of the older UPC-2000 line of devices.

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

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

BUYER'S DIRECTORY

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

ANCHORS & CHAINS

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

ANTI-CONDENSATION COATINGS

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

APPROVED U.S. COAST GUARD MARINE SANITATION DEVICES

Environmental Marine, Inc., 711 Colyer Rd., Bronson, KY , USA , tel:(606) 561-4697, bobkenison@aol.com

AUTOMATIC IDENTIFICATION SYSTEM

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

BALLAST MONITORING

KING-GAGE Systems / King Engineering (tank level & draft monitoring), 8019 Ohio River Blvd, Newell, WV , USA , tel:855-367-2494, marine@king-gage.com, www.king-gage.com

BARGE FABRICATION

McDonough Marine Services, 3500 Causeway Blvd., Suite 900 Metairie, LA 70002 , tel:(504) 780-8100, fax:(504) 780-8200, dwalkowski@mcdonoughmarine.com

COATINGS/ CORROSION CONTROL/ PAINT

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

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

COMMUNICATIONS

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

CORDAGE

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

COUPLINGS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA , tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

CRANE - HOIST - DERRICK - WHIRLEYS

Essex Rental Corp., 1601 NE. Columbia Blvd. Portland ,OR 97211

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

DRILLS

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

DRIVESHAFTS

Centa Corporation, 2570 Beverly Drive #128, Aurora, IL 48331, USA , tel:(630) 236-3500, fax:(630) 236-3565, bobl@centacorp.com

Driveline Service of Portland, Inc., 9041 NE Vancouver Way, Portland, OR 97211 , USA , tel:(503) 289-2264, fax:(503) 289-5838, info@driveshafts.com contact: Kevin McCaffrey, www.driveshafts.com

EDUCATION

San Jacinto College, 8060 Spencer Highway Pasadena, TX 77505

ENVIRONMENTAL SOLUTIONS

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

Evonik Resource Efficiency GmbH, Active Oxygens, Rodenbacher Chaussee 4, D-63457 Hanau, Germany, , tel:+49 6181-59 5326, fax:+49 6181-59 75326, juergen.meier@evonik.com , www.evonik.com/peraclean-ocean

FILTERS/FILTER SYSTEMS

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

GAS GENERATION SYSTEMS

Generon, 16250 Tomball Parkway, Houston, TX , USA , tel:713-937-5200, jalford@generon.com

IGS Generon, 16250 TOMBALL PARKWAY highway 249 Houston, TX 77086

GROUNDING & EARTHING BRUSHES

Sohre Turbomachinery, Inc., 128 Main Street, Monson, MA , USA , tel:413-267-0590, fax:413-267-0592, tsohre@sohreturbo.com contact: Tom Sohre, www.sohreturbo.com

HOISTS

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

HYDRAULIC SYSTEMS

Jastram Engineering, 135 Riverside Drive, North Vancouver, BC, V7H 1T6 Canada , tel:Office: (604) 988-1111 Cell: (604) 808 - 6281, csimon@jastram.com

INTERIOR DESIGN

Metalcolour Sweden AB, Box 510, SE-372 25 Ronneby, Sweden , tel:+46 457 781 00, fax:+46 457 666 75, info@metalcolour.com , www.metalcolour.com

INTERIOR MATERIALS

Metalcolour Sweden AB, Box 510, SE-372 25 Ronneby, Sweden , tel:+46 457 781 00, fax:+46 457 666 75, info@metalcolour.com , www.metalcolour.com

LIFESAVING EQUIPMENT

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

LIFT EQUIPMENT

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

Tandemloc, 824 FONTANA BLVD Havelock, NC 28532

LIGHTING SYSTEMS/ EQUIPMENT

Larson Electronics LLC, 11035 Jeanell Drive Kemp, TX 75143 , tel:(903) 498-3363, cred@larsonelectronics.com

MARINE EQUIPMENT

Alfa Laval Inc., 955 Mearns Road, Warminster, PA 18974 , USA

MARINE TRANSPORTATION

Central Boat Rentals, Inc., P.O. Box 2545, Morgan City, LA , USA , tel:985-384-8200, fax:985-384-8455, earl@centralboat.com or gary@centralboat.com

MECHANICALLY ATTACHED FITTINGS (MAFS)

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

MILITARY PATROL CRAFT MANUFACTURERS

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com , www.brunswickcgp.com

NAVAL ARCHITECTS, MARINE ENGINEERS

Bristol Harbor Group, Inc., 99 Poppasquash Road Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, kribeiro@bristolharborgroup.com

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com

JMS Naval Architects, 70 Essex Street, Mystic, CT 06355 , USA , tel:(860) 536-0009 EXT 102, RickF@JMSnet.com contact: Rick Fernandes, www.JMSnet.com

The Shearer Group, Inc., 99 Poppasquash Road, Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, kribeiro@bristolharborgroup.com

NITROGEN GENERATORS

Air Product AS, Vige Havnevei 78, 4633 Kristiansand, Norway, P.O.Box 4103 Kongsgaard, 4689 Kristiansand, Norway , tel:+47 38 03 99 00, norway@airproducts.com , www.airproducts.no

PAINTS AND ANTI FOULANTS

Sherwin-Williams, 101 W. Prospect Avenue Cleveland, OH 44115 , tel:(216) 515-4739, klarmstrong@sherwin.com contact: Kim Armstrong

PRESS FITTINGS

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

RUDDER BEARINGS & BUSHES

Tenmat Inc,, 23 Copper Drive. Unit 5 Newark, DE 19804

RUST AND PAINT REMOVAL

Rustibus, 2901 WEST SAM HOUSTON PKWY, NORTH SUITE E-325, HOUSTON, TX , tel:832-203-7170, fax:832-203-7171, houston@rustibus.com , www.rustibus.com

SATELLITE COMMUNICATIONS

MARLINK, Lysaker Torg 45 Post Box 433 NO-1327 Lysaker NORWAY , tel:+47 22 58 20 50, customercare@marlink.com , www.marlink.com

SENSORS

R.M. YOUNG COMPANY, 2801 Aero Park Drive, Traverse City, MI , USA , tel:(231) 946-3980, fax:(231) 946-4772, met.sales@youngusa.com

SHIP REPAIR

Malin International, 320 77th street, Pier 40/41 Galveston, TX 77554

SOUND DAMPING INSULATION COATINGS

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

STEERING GEARS/ STEERING SYSTEMS

Jastram Engineering, 135 Riverside Drive, North Vancouver, BC, V7H 1T6 Canada , tel:Office: (604) 988-1111 Cell: (604) 808 - 6281, csimon@jastram.com contact: Chris Simon, www.jastram.com

STERN TUBE BEARINGS/ BUSHES

Tenmat Inc,, 23 Copper Drive. Unit 5 Newark, DE 19804, Newark, DE , USA , tel:302-633-6600, marco@tenmatus.com

VACUUM TOILET SYSTEM

Jets Vacuum AS, Myravegen 1 6060 Hareid , tel:47 700 39 100, fax:47 700 39 101, post@jets.no , www.jetsgroup.com

VALVES

Wager Company Inc., 570 MONTROYAL RD Rural Hall, NC 27045

WASTE WATER TREATMENT

Scienco/FAST – Marine Sanitation, Water Treatment, 12977 Maurer Industrial Dr., Sunset Hills, MO 33309, USA , tel:1-314-756-9300, solutions@sciencofast.com , www.sciencofast.com

WATER JET SYSTEMS

Marine Jet Power Inc., 6740 Commerce Court Drive Blacklick, OH 43004-9200, USA, Columbus , tel:(614) 759-9000 , www.marinejetpower.com

WELDING AND CUTTING EQUIPMENT

Profile Cutting Systems USA, Boulder Creek, CA 95006 , tel:(831) 338-8251, john@pcsusa.pro, www.pcsmachines.com

WINCHES & FAIRLEADS

Superior-Lidgerwood-Mundy, Corp., 302 Grand Ave. Superior, WI 54880 , tel:(715) 394-2383, stenerelli@lidgerwood.com contact: Sean Tenerelli

Manager Maintenance & Repairs

Bouchard Transportation Co., Inc.
Salary: $ Based on Experience , Full Time , Executive
Category: Engineer /Naval Architect
• Bachelor of Science in Marine Engineering/Marine Transportation
• Minimum 5-7 years of sailing experience or equivalent shore side Maritime experience
• Ability to travel as needed
• Proficiency in MS Office (Word, Excel), and NS5 a plus
• Detail Oriented
• Ability to multi-task and work in a fast pace environment
• Strong verbal and written communication skills
• Neat & professional in appearance
Description:
• Manage the daily maintenance and repair activities of the fleet alongside the Manager.
• Responsible for and maintains NS5 Nautical System
• Daily reviews of NS5 maintenance system to ensure all vessels are up to date with maintenance activities.
• Assigns PO numbers and vendors for repairs requested by Vessel Supervisors.
• Inputs purchase orders assigned into NS5.
• Maintains budget information and provides monthly recaps of actual vs. budget expenditures for annual and shipyard expenditures for the fleet.
• Attends vessels during shipyard periods to review progress of repairs and budget status.
• Functions as a Vessel Supervisor for assigned group of vessels
• Is trained in emergency response and serves as a member of the oil spill response team.

Chief Engineer Unlimited

Transatlantic Lines LLC
Salary: $ $650.00 a day , Full Time , Mid Career
Category: Shipboard Officer / Personnel / Crew
Job Location: 6 Lincoln Avenue Greenwich, CT, 06830 USA
Contact: Crewing Manager
Email: tony@transatlanticlines.com
Work Phone: Fax # (504)328-0470
Cell Phone: (504)909-4770
6 Lincoln Avenue Greenwich, CT, 06830 USA
Must have a US Coast Guard MMC with Chief Engineer Unlimited
Must have a valid Medical Certificate
Must have a valid TWIC card
Must have a Valid US passport
Must have STCW Gap closing classes. (ERM) (L&M) Management of electrical and electronic control equipment.
Must have VPDSD security endorsement
Description:
Sailing on a US flagged container ships as Chief Engineer unlimited sailing stateside and international to many different ports. Maintaining bow thruster's, Pumps, generators, water purifying system and main engine. Primary propulsion (Wartsila)
90 or 120 day hitches
Medical and dental insurance after 60 days.
401K Plan after 1 year
All travel paid to and from the ship plus a days pay for travel.

Snr Power Plant Mechanic - Pacific Island

Full Time , Engineer
Category: Engineer / Naval Architect
Job Location: MAJURO ATOLL MAJURO, MH, 96960 MARSHALL ISLANDS
Contact: CTO
Email: meccorp@mecrmi.net
Work Phone : +692-6255885
MAJURO ATOLL MAJURO, MH, 96960 MARSHALL ISLANDS
A Minimum of 10 yrs experience in similar industry work is essential and with experience in isolated locations preferable. A qualification in Mechanical Maintenance Engineering or any combination of equivalent experience
A knowledge of computerized maintenance management systems and performance of major engine overhauls and repairs such as 40,000hr rebuilds of industrial engines and ancillary equipment is a requirement. A knowledge of steam, refrigeration air-conditioning and water generation equipment as well as hydraulic and pneumatic systems is required. We operate diesel fuel engines rated at 10,000Hp and smaller. The generators are made by Deutz, Wartsila, Cat, Cummins, Peilstik plus others with the Deutz units being the base load engines.
Description:
The job is located on Majuro Atoll in the Marshall Islands in the Central north Pacific. We are a US dollar country. We operate Deutz BV16M640 6.4MW units as base load with Cat 3616 and Peilstik PC2.2 units as peaking units maintained by a small local workforce. We also have several smaller power plants on remote outer atolls within the country
Reporting to the Management team of MEC, the applicant will be responsible for;
The safe and efficient operation, maintenance and overhaul of all mechanical systems within the utility on a daily basis.
To initiate and monitor procurement of mechanical service items
The supervision and skill enhancement of local staff
Implement policies, rules, and regulations of the corporation
Assisting with the transition of remote plants to hybrid systems
Maintain, control and further develop maintenance procedures for all operations
Perform other duties or projects as required or as assigned by management.

MR
Vessels, Barges & Real Estate for Sale/Rent

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51	Becker Marine Systems USA, Inc.	www.becker-marine-systems.com	(844) 267-8721
103	Blount Boats	www.blounboats.com	Please visit us online
91	Boll Filter Corp.	www.bollfilterusa.com	(248) 773-8200
97	Bug-O Systems International	www.bugo.com	(800) 245-3186
112	Capilano Maritime Design	www.capilanomaritime.com	(604) 929-6474
75	Cimolai Technology S.p.A.	www.cimolaitechnology.com	011 39 049 940 4539
91	Colonna's Shipyard	www.colonnashipyard.com	(800) 265-6627
105	Creative Systems	www.ghsport.com	(360) 385-6212
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98	DeFelsko	www.defelsko.com	(315) 393-4450
61	DNV GL	www.dnvgl.us/maritime	(281) 396-1000
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108,109	Electronic Marine Systems	www.emsmarcon.com	(732) 382-4344
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35	Holdtight Solutions	www.holdtight.com	(800) 319-8802
9	Horizon Shipbuilding, Inc.	www.horizonshipbuilding.com	(251) 824-1660
112	Hougen Inc.	www.hougen.com	(810) 635-7111
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22	Kidde-Fenwal, Inc	www.kiddemarine.com	(508) 881-2000
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5	PPG Protective & Marine Coatings	www.ppgpmc.com	(888)-9-PPGPMC
105	R.M. YOUNG COMPANY	www.youngusa.com	(231) 946-3980
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101	Scandinavian Micro Systems, Inc.	www.scansys.no	(954) 583-3699
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99	TTS MARINE INC.	www.ttsgroup.com	(281) 227-5999
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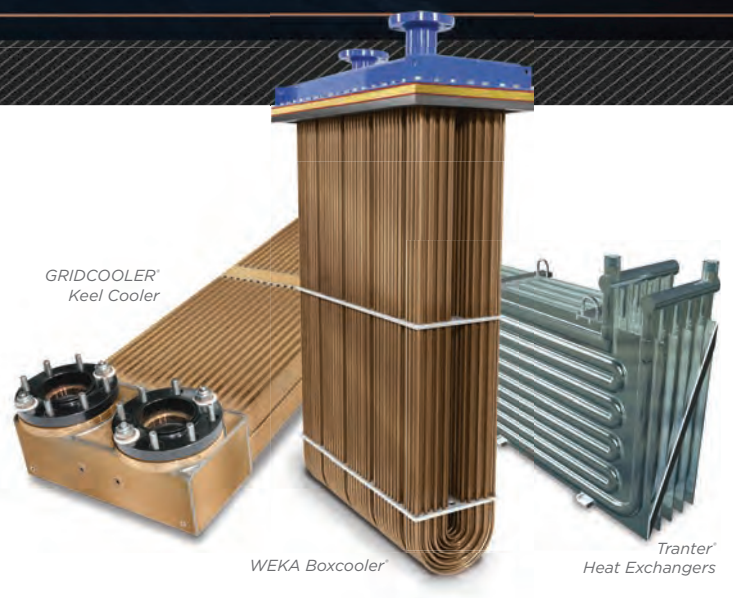

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