Maritime Professional

1Q 2014 | www.MaritimeProfessional.com

Safety, People & Energy the Crowley Way

Catlin underwriters don't just recognize potential risk. They anticipate it. Catlin's Marine underwriters spend every workday focused solely on Marine risks. Both large and small. Then use their expertise to provide you with the best coverage. Combine that with our drive for transparency and superior claim service and you'll find there's a reason that so many of the world's best brokers prefer to work with Catlin underwriters.

Learn more about our Marine underwriting expertise at **CatlinUS.com** or talk to your broker about Catlin today.

CATLIN

Underwriting Ambition

MARINE INSURANCE

AM Best *rating of* **A (Excellent) XV**

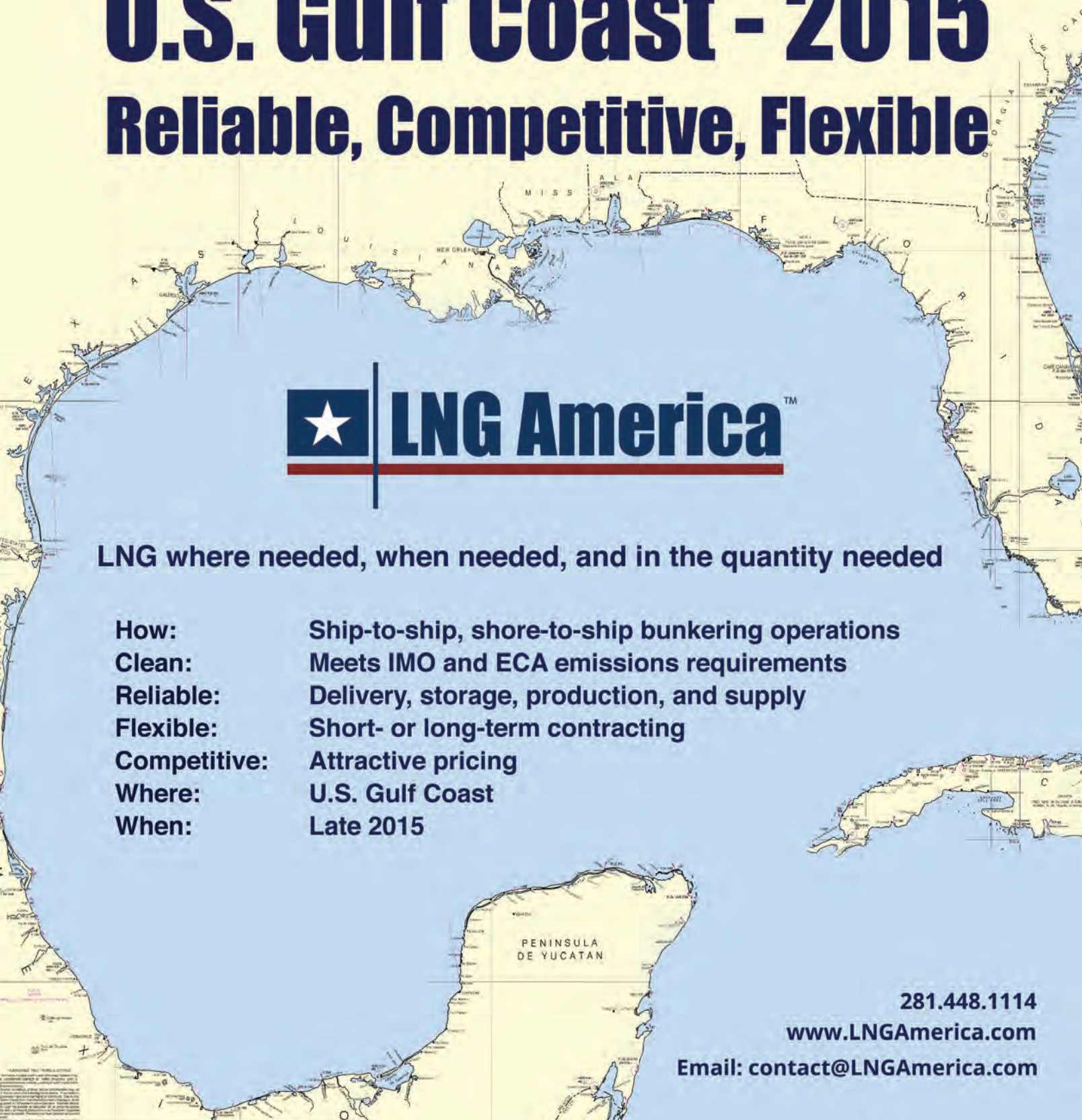
Brown Water Hull | Builder's Risk | Cargo in Transit | Excess Marine Liabilities | Marine Liabilities | Protection and Indemnity | Recreational Yachts

LNG Bunker Fuel

available

U.S. Gulf Coast - 2015

Reliable, Competitive, Flexible



LNG America™

LNG where needed, when needed, and in the quantity needed

How:	**Ship-to-ship, shore-to-ship bunkering operations**
Clean:	**Meets IMO and ECA emissions requirements**
Reliable:	**Delivery, storage, production, and supply**
Flexible:	**Short- or long-term contracting**
Competitive:	**Attractive pricing**
Where:	**U.S. Gulf Coast**
When:	**Late 2015**

281.448.1114
www.LNGAmerica.com
Email: contact@LNGAmerica.com

1st Quarter
2014
Volume 4
Number 1

Maritime Professional

1Q 2014 | www.MaritimeProfessional.com

Northern Lights

AIDA

Crowley Maritime Corporation


DNV GL

ESRG


Crowley Maritime Corporation

ON THE COVER

Crowley Maritime Corporation is the epitome of energy transport in and around the United States, and its ubiquitous leader Tom Crowley, Jr., is the natural cover story for this, our Energy edition. Read how the shale oil and gas revolution literally helped to change Crowley's business overnight. **p. 32**

KVH INDUSTRIES
MINI-VSAT BROADBAND
WORLD'S NO. 1 MARITIME VSAT SERVICE

The World in One Dome

KVH TracPhone V11IP – The only **truly global** VSAT solution, *now* with IP-MobileCast™ content delivery service

Dual-mode C/Ku-band VSAT with built-in network management delivers seamless, global coverage and the fastest data speeds.

- **Internet café & VoIP calling for improved crew morale**
- **Licensed news, sports & movies for crew entertainment**
- **Meet key requirements of MLC-2006**

FREE
MLC-2006 Guide
minivsat.com/IPMC

Plus:
KVH offers the single provider advantage for service and support. Get the whole story at:

www.minivsat.com/VIP

KVH INDUSTRIES WORLDWIDE

World HQ: United States | info@kvh.com
+1 401.847.3327

EMEA HQ: Denmark | info@emea.kvh.com
+45 45 160 180

Asia-Pacific HQ: Singapore | info@apac.kvh.com
+65 6513 0290

58

55

(Photo: Austal)

interviews

24

20

FUTURE CARE INC.®

CARING FOR THE CREW PROGRAM®

ANYWHERE, ANYTIME, WE'RE THERE FOR YOU AND THE CREW

CARING FOR THE CREW® PROGRAM

www.futurecareinc.com

FUTURE CARE®

A Special Program from Future Care® providing Medical Advice and Support Services 24/7 for Crew members at Sea and Landside.

New York corporate offices servicing clients throughout the USA, Central America and South America. Operations Offices in Greece and Manila servicing clients throughout Europe, Asia, Africa and the UAE.

Meeting MLC Title IV

info@futurecareinc.com
WWW.FUTURECAREINC.COM

MarPro Contributors

John Barnwell

John Barnwell is head of Allianz Global Corporate & Specialty's Global Marine Business in the Americas, which includes a team of more than 420 marine insurance professionals in the United States, Canada, Mexico and Brazil. Prior to joining AGCS, John was Vice President of Ocean Cargo Product at Fireman's Fund Insurance Company. He started his career at Aetna as a Property and Liability Underwriter before transferring to inland and ocean marine underwriting. He earned his undergraduate degree and MBA from St. John's University in New York.

Patricia Keefe

Patricia Keefe is a veteran journalist, editor and commentator who writes about technology, business and maritime topics.

Robert Kunkel

Robert Kunkel, President of Alternative Marine Technologies, is currently serving as the technical advisor to Coastal Connect, a U.S. company actively developing LNG propulsion as a maritime component of short sea shipping He is a past Vice President of the Connecticut Maritime Association, Past Chairman of the Federal Short Sea Shipping Cooperative Program and a member of the ABS Special Committee on Ship Operations.

Barry Parker

Parker, bdp1 Consulting Ltd provides strategic and tactical support, including analytics and communications, to businesses across the maritime spectrum. www.conconnect.com

Harry Ward

Ward leads the transportation and logistics practice at The McLean Group, a middle-market investment bank based in the Washington, DC area. He has executive management experience in the marine industry and focuses on mergers and acquisitions for mid-sized companies. He is a US Naval Academy graduate.

Maritime
Professional

HQ 118 E. 25th St., 2nd Floor
New York, NY 10010 USA

Tel +1 212 477 6700
Fax +1 212 254 6271

URL www.maritimeprofessional.com
Email trauthwein@marinelink.com

ISSN - 2159-7758
USPS # 005-893

Editor
Joseph Keefe
keefe@marinelink.com
+1 704 661 8475

Blogger Roster @ **MaritimeProfessional.com**

Lead Commentator	Joseph Keefe
U.S. East	Dennis Bryant
U.S. West	Martin Rushmere
Brazil	Claudio Paschoa
Mumbai	Joseph Fonseca
Hong Kong	Greg Knowler

Publisher
John C. O'Malley
jomalley@marinelink.com

Associate Publisher/Editorial Director
Gregory R. Trauthwein
trauthwein@marinelink.com

VP Sales
Rob Howard
howard@marinelink.com

Production
Nicole Ventimiglia
nicole@marinelink.com

Corporate Staff
Vladimir Bibik, IT
Mark O'Malley, Public Relations
Esther Rothenberger, Accounting

Subscription
Kathleen Hickey
marprocirc@marinelink.com

Advertising Sales
Terry Breese
breese@marinelink.com
+1 561 732 1185
Frank Covella
covella@marinelink.com
+1 561 732 1659
Mitch Engel
engel@marinelink.com
+1 561 732 0312
Mike Kozlowski
kozlowski@marinelink.com
+1 561 733 2477
Dawn Trauthwein
dtrauthwein@marinelink.com
+1 631 472 2715
Jean Vertucci
vertucci@marinelink.com
+1 212 477 6700

The Future is Clear

ME-GI dual fuel done right

MAN B&W MC/MC-C Engines **MAN B&W ME/ME-C/ME-B Engines** **MAN B&W ME-GI/ME-C-GI/ME-B-GI Engines**

The new ME-GI generation of MAN B&W two-stroke dual fuel 'gas injection' engines are characterised by clean and efficient gas combustion control with no gas slip. The fuel flexibility and the inherent reliability of the two-stroke design ensure good longterm operational economy.
Find out more at www.mandieselturbo.com

Engineering the Future – since 1758.

MAN Diesel & Turbo

MAN

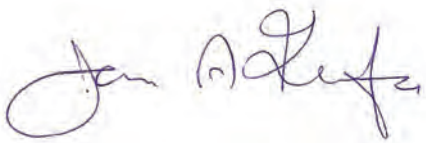
Energy: Moving it & Using it

Energy. We start 2014 with great energy and optimism for a robust and prosperous year in this, the most international of all businesses. That enthusiasm, however, should be tempered with the knowledge of what is in store for maritime stakeholders in terms of regulatory, financial and operational pressures; all lurking just over the proverbial horizon. These are curious times. For example, consider that for the first time in decades, the North American part of the global shipping equation finds itself in arguably better position than its foreign flag cousins. Energy, of course, has a lot to do with that metric.

When it comes to energy, no one perhaps has more of it than Tom Crowley, Chairman and CEO of Crowley Maritime. If you want to keep up with him these days, then you better strap on some high end waterjets. Central to the theme of this edition, Crowley's business plan calls for robust expansion that takes its roots, in part, from the energy boom now permeating every sector of the domestic waterfront. That it embraces a Jones Act model to do so, says even more. What comes next for the privately held $2B plus per year U.S.-based transport and logistics organization with a fleet of more than 200 U.S.-flagged vessels is therefore one of the year's top stories. The discussion begins on page 32.

Apart from the energy that literally fuels the world of shipping – both in terms of business planning and what goes inside the engines of world's waterborne commerce – the interaction of IACS classification societies, quality open ship registries, global and local regulators and the cutting-edge technology that links them all combine in 2014 to shape the way forward shipowners and energy producers everywhere. IRI President Bill Gallagher tells MarPro this month that the success of the Marshall Islands flag has a lot to do with IACS members and, in the same breath, says that shipowners, caught in a time of stagnant freight rates and regulatory pressures, increasingly look to the flag state for help when solving those tricky technical problems. That symbiotic relationship can be applied to a dozen more maritime stakeholder relationships. Turn the page and find out how, why and when it will come to pass for you.

This edition – and your business model – wouldn't be complete without including technology in our discussions. And, it doesn't matter what sector of global shipping in which you find yourself slow-steaming across the seven seas. The rapid infusion of technology into newbuild and existing hulls alike is no longer a pricey luxury add-on to consider. Those who fail to incorporate at least some aspect of remote monitoring, management tools or other analytical assistance will eventually find themselves going the way of the T-2 tanker. All of which brings us full circle to a red hot U.S. shipbuilding cycle that includes as many as a dozen newbuild tank vessels on domestic order books. It'll take energy to get all of that done. Who saw that coming?



Joseph Keefe, Editor | **keefe@marinelink.com**

THE LIST People & Companies in This Edition

Insights

Energy Growth Fuels Transactions

North America's energy revolution is starting to have a profound impact on the maritime and offshore sectors.

By Harry Ward

North America is undergoing a gradual revolution in energy production, and the transformation has begun to have a profound impact on the maritime and offshore sectors. Despite a few volatile years and mixed performance of public companies in the offshore service and drilling markets, the outlook for energy services seems to be positive according to most analysts. Recovery in the Gulf of Mexico (GoM) continues to accelerate since the Deepwater Horizon spill and deep water rig utilization rates are at their highest level in five years. According to IHS, the number of deep water rigs under contract in the GoM is up from 75 to 80 in the past twelve months. Optimism stemming from such statistics has been reflected in increased deal activity including company acquisitions, new vessel orders and purchases of drilling rights in recent months.

Offshore Service and Maintenance

A wide range of companies that provide operations and maintenance services to the offshore industry have seen overall demand increase, and there has been a noticeable increase in the number of middle market M&A deals in the space. Late in 2013, Teledyne Technologies (NYSE:TDY) acquired CD Limited (CDL), a supplier of subsea inertial navigation systems and motion sensors for marine and offshore applications, for $22.5 million. Teledyne continues to build on its strong position in subsea instrumentation and imaging products, with the acquisitions of CDL and BlueView Technologies within a year of one another. Similarly, US-based Roper Industries (NYSE:ROP) acquired a UK offshore technologies company with its $55M purchase of Advanced Sensors Limited. Advanced Sensors holds a strong position in the growing segment of oil-in-water analyzers, and is likely just one of several acquisitions to come for growth-oriented Roper.

Offshore oil production creates a tremendous amount of waste, and there is a thriving industry built around consulting and cleaning services for the oil patch. In early February, private equity firm Lariat Partners announced the $100M acquisition of Newpark Environmental Services from Newpark Resources (NYSE:NR). Lariat will combine two acquired Newpark divisions with its platform company Offshore Cleaning Systems, to create a new industry leader called Ecoserv. Another small, private equity-backed deal was the acquisition of $34 million Coates Offshore by Houston's SCF Partners. Coates provides specialty rental equipment for well and pipeline test and maintenance to offshore operators in the North Sea, and was divested by Coates Group Holdings Pty of Australia.

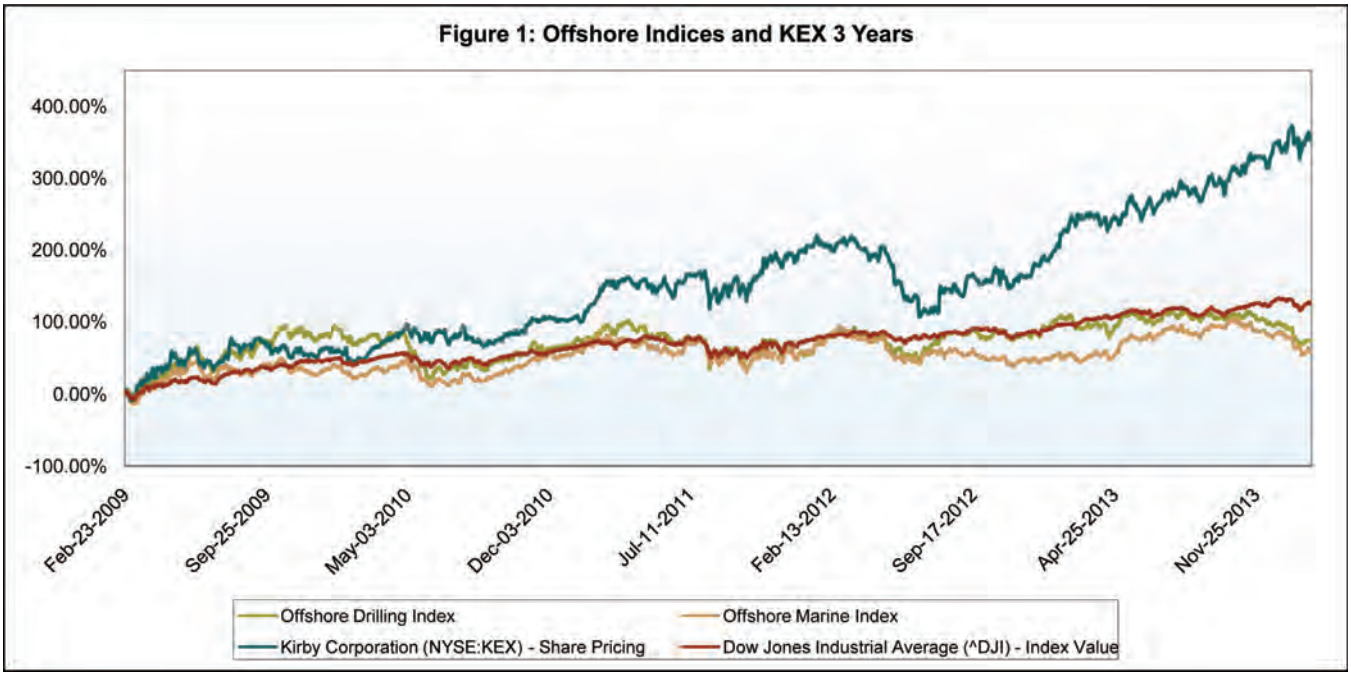
Clearly there has been a great deal of appetite among American companies and investors for niche offshore services companies in the UK. Closer to home, business activity in the GoM continues to grow overall, despite some short-term fluctuations. Offshore service company Harvey Gulf International Marine has been making headlines for several quarters now as it executes on an aggressive growth plan. Backed by the large private equity firm The Jordan Company, Harvey Gulf has expanded via acquisitions and newbuild projects, and has established itself as a leader in the migration to LNG fuel systems for its fleet. In the fourth quarter of 2013, Harvey Gulf completed the acquisition of Abdon Callais Offshore, LLC for $460 million. Abdon Callais came with a young, technically-advanced fleet of 48 offshore supply vessels. The company also acquired 20 other advanced vessels from Gulf Offshore Logistics and Bee Mar in the past couple of years, and has a number of new vessels under construction. In a final note, Harvey Gulf recently broke ground on its $25 million industry-leading LNG fueling facility Port Fourchon, LA.

Jones Act Deals

Beyond offshore service vessels, the energy revolution has energized business activity in other Jones Act segments. US-flagged carriers for coastwise and inland transport of energy products have been in high demand, and some high-profile financial transactions have reflected this trend. In December, pipeline and terminal giant Kinder Morgan Energy Partners, LP (NYSE:KMP) agreed to acquire American Petroleum Tankers (APT) and State Class Tankers (SCT) from an investment group including The Blackstone Group and Cerberus Capital Management. The $962 million cash deal gets Kinder Morgan into the petroleum marine transport business with nine product tankers of about 330,000 barrels of capacity, including four scheduled SCT newbuilds under way at the General Dynamics NASSCO shipyard.

Another interesting story in the Jones Act carrier world has been the transformation of Aker Philadelphia Shipyard (Oslo: AKPS) from a struggling, government-supported facility to

Unfortunately for many of us, **the enormous returns of KEX and AKPS** are simply hindsight, but there are some trends developing that will drive investment and open new markets in the coming years.



a booming Jones Act shipbuilder in recent years. Norwegian holding company Aker took over the yard in 2005 and worked a contract with Shell Oil for 12 product tankers. The yard was hit hard during the financial crisis and with the help of state and local taxpayers, Aker kept the operation alive by securing financing for two spec-built ships. Fast forward three years, and AKPS has booked contracts with SeaRiver Maritime and Crowley Maritime for up to 14 new vessels, and the publicly-traded stock is up over 2200% in the past 18 months.

On the topic of excellent public stock performance, it is hard to miss the outstanding run at Kirby Corporation (NYSE:KEX). In previous articles, we have followed the dramatic growth of Kirby both organically and via acquisition. The company made six acquisitions since 2008 with a total value of over $800 million, and it seems that their strategy and integration efforts have proven successful. Figure 1 displays the outsize performance of KEX stock, especially when compared with the lagging offshore service and offshore drilling indices over the past three years.

Trends to Watch

Unfortunately for many of us, the enormous returns of KEX and AKPS are simply hindsight, but there are some trends developing that will drive investment and open new markets in the coming years. Foremost is the opening of the Mexican portion of the Gulf of Mexico to competitive investment and production. Mexican President Enrique Pena Nieto spearheaded a successful constitutional reform effort to open the offshore region of that country, and foreign companies are lined up to develop alliances and compete for exploration and drilling rights. And as always, analysts and investors are keeping an interested but wary watch on developments in sea-based alternative energy in North America. Cape Wind, LLC will be supplying the first offshore wind farm in the United States, a 3.6 MW operation off the coast of Nantucket. Even more nascent is an effort to support hydropower facility development, as embodied in a proposed bill by US Senator Ron Wyden of Oregon. Look for future editions of this article series to track ongoing developments in traditional and alternative energy finance.

Harry Ward leads the transportation and logistics practice at The McLean Group, a middle-market investment bank based in the Washington, DC area. Mr. Ward has executive management experience in the marine industry and focuses on mergers and acquisitions for mid-sized companies. He is a US Naval Academy graduate and earned an MBA at San Diego State University.

Insights

Is Your Ship the Next Prius?

Reducing operating costs by saving energy is a concept that has moved from discussion to action in shipping.

By Robert Kunkel

The debate has been fueled by pending emission regulations and options that may be an alternative to the use of high cost low sulfur distillates when operating in the emission control areas or in restricted ports. This quest for energy efficiency has gone beyond "ECO" main engine performance, slow steaming or variable frequencies of motor and pump operations to reduce electrical load. Shipping is now diving deeper into efficiency details with the use of LED lighting, computerized modeling of hull optimization and further introductions of sophisticated hull coatings to assist those new optimized hulls through the water without burning fuel. Moving from sail, to steam and finally to internal combustion engine, shipping is now following the lead of the automotive industry and talking Hybrid marine power.

At a recent industry conference, owners asked the major engine manufacturers how they could reduce their fuel consumption. There answer: "Don't run your engine." The arguably sarcastic reply, however, was right on the money. And, that is exactly what many Hybrid power systems are designed to accomplish.

The definitions of hybrid marine power or hybrid marine propulsion describe main and auxiliary systems where power is supplied from more than one source. Diesel-electric propulsion lends itself best to the hybrid power application and we are seeing future ship designs moving away from standard direct drive applications and more towards this style of propulsion system. And, here's why: Diesel/Electric systems have mechanically disconnected the combustion engine from the propeller creating the ability to fix the engine speed at an optimum load, match the power required by the ship and then convert the power to electric energy required by the motor to drive the azimuth or propeller.

The combustion engine(s) operate at an efficient constant speed and load. For internal combustion engines driving direct shafts at speeds below normal continuous ratings (NCR), energy efficiencies are decreased and emissions increased at these low loads. This is especially true with shipping's acceptance of "slow steaming." To meet "ECO" fuel consumption demands in ship design, smaller direct drive engines have been installed to meet these new slow steaming loads sparking a heated safety debate between builders, owners and managers.

BAE Hybrid Drive traction motor during Factory tests in Seattle.

Hybrid Applications Defined

A hybrid application can demand a higher load from the combustion engine than required by propulsion to maintain an efficient fuel burn. The additional energy supplied is buffered in a battery bank and utilized as the second power source. Once the batteries are fully charged, the engine can be secured and propulsion power is provided directly from the batteries. When the batteries become depleted, the engine is reengaged and the cycle is repeated.

The Hybrid systems are best suited to applications where the power variations are high. The operating profiles for tugboats, offshore supply vessels, research vessels and small ferries fit well. Foss was the first to commission a hybrid tug in 2009. The first hybrid offshore supply vessel, Viking Lady, was also commissioned in 2013. Amtech's Hybrid example is a sixty-five foot catamaran research vessel under our construction su-

pervision at Derecktor Shipyard in New York. The Maritime Aquarium of Norwalk's The Spirit of the Sound utilizes a BAE Hybrid/Northern Lights propulsion application with Corvus Energy battery storage and Lugger Generators. The research vessel will be delivered into service in the summer of 2014. The BAE Hybrid system was chosen after analysis of the Aquarium's operating schedule and the need for silent running during certain research tasks or educational seminars on board the vessel. The lower emissions and "green" application also followed the Aquarium's quest for a cleaner Long Island Sound.

Battery Technology Comes of Age

The opportunity to investigate Hybrid technologies has been created by the advancement of battery technology and energy storage. Lithium applications have led the charge over conventional lead acid for industrial applications where three vital attributes are considered: power density, energy density and the number of cycles (charges and discharges) required. Corvus Energy has been the battery of choice in many if not all of the recent marine applications.

Where Lithium Ion (Iron Phosphate) batteries are now a standard in both domestic and small industrial applications of laptops, smart phones and small DC power supplies, the Corvus Energy system utilizes a Lithium Nickel Manganese Cobalt (NMC) configuration. The Lithium NMC battery, beyond supplying stronger initial power, also provides a better life cycle, ambient temperature control, power density and a controlled charge/discharge rate. The substantial weight reduction of Lithium NMC versus Lead Acid is a leading reason why battery power can now be considered in commercial marine applications.

Northern Lights & Lugger Engine generator engine coupled to BAE Hybrid Drive

Corvus lithium batteries in operation during hybrid engine testing at Northern Lights facility Seattl, Wash.

Small Beginnings; Bigger Things Looming Large on the Horizon

The Hybrid Marine propulsion examples to date may look to serve only a smaller niche. However, many stakeholders – including this writer – see the technology serving auxiliary power applications in larger bluewater shipping sectors and providing a solution to the emerging emissions restrictions on marine generators. Remember Einstein's basic theory that "Energy cannot be created or destroyed, it can only be changed from one form to another."

As we continue to lower ship electric power demands with variable frequency drives, LED lighting and regulated energy management systems the kilowatt load and size of the generators on board that supply this power will also be reduced. Buffering that energy supply with a battery bank will serve to create a cycle where battery power can be utilized in port to service hotel loads and/or cargo loading and discharge requirements without burning fuel or creating emissions. The generating units may also be secured under certain at sea conditions – not a bad choice when you consider the emissions regulations looming just over the proverbial horizon for those ECA operating areas. Again, it is important to note that the benefit of a particular hybrid power system is closely associated with the operational profile of the ship application.

In general, the aim of a modern hybrid system or hybrid technologies will be to provide power to a ship in a manner which will be more efficient and cleaner than traditional fossil fuel based systems. Considering the cost and effort required to install scrubbers or make the leap to natural gas, hybrid is a selection that should be considered in your business decisions. If we use the automotive industry hybrid success as the prime example, then perhaps your next ship just may be a Prius.

Robert Kunkel, President of Alternative Marine Technologies, is currently serving as the technical advisor to Coastal Connect, a U.S. company actively developing LNG propulsion as a maritime component of short sea shipping He is a past Vice President of the Connecticut Maritime Association, Past Chairman of the Federal Short Sea Shipping Cooperative Program and a member of the ABS Special Committee on Ship Operations.

Cruising Beyond Compliance

The global cruise industry quietly takes a prime mover role in maritime scrubber technology. That's just smart business.

By Barry Parker

A recent issue of *Virtuoso Life*, a glossy magazine aimed at upscale travelers, featured a short article highlighting Princess Cruises' Royal Princess, christened by Duchess Kate Middleton in June, 2013. This article, along with numerous other reviews, highlighted the magnificent atrium, the spa, and the private cabanas. While Princess's bona fides in shipping's green camp are well known to shipping people (Princess was an early proponent of cold ironing as far back as 2000; hooking up to shore power at Pacific ports such as Juneau and Seattle), such developments are far removed from the general public – the industry's customer base.

Two Kinds of Green

Cruise lines, with their voracious appetite for power – feeding both propulsion and hotel load – are also making tremendous, but quiet strides towards energy efficiency. At the same time, restrictions on the sulfur content of fuels are increasing the cost of operations for all manners of global maritime commerce. For example, owners trading within the North American Emission Control Area (ECA) saw a 1percent ceiling on sulfur content imposed in the summer of 2012. In 2015, vessels trading within the ECA will see that ceiling again dropped to 0.1%. Analysts anticipate that the cost differential of low sulfur marine fuel over the high sulfur grade (3.5% maximum since 2012) will increase. And, during December 2013 and January 2014, low sulfur "bunkers" (IFO 180) cost more ($50 to $70/ton) around the U.S. East Coast and, even more ($150 to $195/ton) at U.S. West Coast ports.

The advent of severe restrictions in the ECA's, a profound business disruptor, has forced the cruise industry to take action. Consider that Carnival Corporation made the news in September 2013, when it announced that it would be spending a reported $180 million on development, partnering with a so far un-named vendor, on a space-saving combination scrubber/particulate filter. Initially, the technology would be deployed on up to 32 vessels trading mainly around North America, including those in Princess and Holland America brands, besides its eponymous Carnival Cruise Line.

Business Models that Make Sense

The Cruise Lines International Association (CLIA) said, in a 2013 position paper: "A one-size-fits-all approach that exclusively requires the use of low sulfur fuel throughout the

"A one-size-fits-all approach that exclusively requires the use of low sulfur fuel throughout the 200-mile ECA is not the most effective or efficient compliance option allowed under the regulations." – The Cruise Lines International Association (CLIA)

200-mile ECA is not the most effective or efficient compliance option allowed under the regulations." In the cruise industry, therefore, a more creative solution is emerging.

Roger Frizzell, Carnival Corporation's Chief Communications Officer, told *MarPro* in February, "We are tremendously excited about the progress we are making with our new and innovative scrubber technology." Mr. Frizzell also pointed to plans for Carnival's European brands, adding , "… we are also looking to expand this breakthrough technology to our other brands that are based outside the United States," mentioning Aida and Costa. He also noted, "Aida, for instance, is one of the early adopters of the scrubbers, with plans to install the technology across its fleet." Aida, where shorter voyages mean more port time, had announced a €100 million investment program in the summer of 2013. That technology was described as a new, comprehensive filter system that would be deployed on existing and newbuild vessels.

Slimming Bunker Buys with a Heavy Helping of Technology

For 2014, Carnival estimates its overall fuel spending to be a staggering $2.1 billion, based on 3.2 million metric tonnes at an average price of $650/tonne. In regulatory filings from 2013, Carnival had estimated that extra fuel costs, because of ECA's, would be $265 million in 2015. From the perspective of payback on its scrubber investment, Carnival's Chief Financial Officer, Mr. David Bernstein, said, on Carnival's latest investor call, "At this point, it's fair to say that more than the majority of that $265 million will disappear, so the number will be less than half." These economics are impressive by any criterion: annual benefits of as much as $130 million on an investment of around $180 million. Moreover, Carnival claims in its latest 10K filing (tied to its 2013 Annual Report), "As a result of installing these scrubbers, we believe the cost of complying with the 2015 ECA sulfur emission requirement will not be significant to our results of operations." Published reports suggest that Carnival has gained an extra year, to 2016, to achieve implementation. During port calls, the vessels will switch over to shore power, or burn low sulfur fuel. Particulates, trapped in a filter, will be disposed of in port.

Bud Darr, CLIA's Senior Vice President of Technical and Regulatory Affairs, spoke at length with Maritime Professional about the cruise industry's proactive and forward-thinking posture regarding emissions. He explained how CLIA's approach has evolved over the past few years, at a time that the technologies for emissions reduction are evolving rapidly, saying "both operational and technical equivalencies (which could incorporate the use of scrubbers, shore power and alternative fuels, he points out) are of great importance" in considering all viable mechanisms that will achieve emission reduction requirements and goals. He noted that MARPOL ANNEX VI Regulation 4 provides for broad equivalencies. Specifically, the existing text provides that the requirements can be met by any fitting, material, appliance, or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative if they are "at least as effective in terms of emission reductions."

Carnival isn't alone in the quest for alternative solutions to the emissions quandary. Others have embraced scrubber technology. At RCCL, scrubber technology from Wärtsilä will be deployed on two newbuilds from the Meyer Werft's Papenburg yard. The 4,200 passenger Quantum of the Seas will debut in November 2014 followed by her sister-ship Anthem of the Seas in April 2015. NCL initially dipped its toe in the water, going with Green Tech Marine's "GTM-R" equipment on its Pride of America (based in Hawaii) and on its two "Breakaway Plus" newbuilds; the Norwegian Escape and Norwegian Bliss, also with a 4,200 passenger count, coming out of the same Meyer Werft yard, in Q4 2015 and Q2 2017. In mid February, the line also announced that it would be retrofitting six vessels with GTM-R equipment, including Norwegian Breakaway and Norwegian Getaway. NCL explains that: "The GTM-R scrubbers are compact, making it possible for the builds to avoid the loss of cabin space or other service areas. GTM uses one smaller scrubber for each engine instead of a large multi inlet scrubber serving several engines, and the scrubber also replaces the silencer, which is very suitable for cruise ships."

Distinct Advantages for Early Adaptors

CLIA's Bud Darr also explained that designers of new builds where scrubbers will be deployed have far more flexibility than those seeking to retrofit scrubbers. He noted that "Cruise ships normally employ medium speed diesel engines that are vertically short in height to fit the allocated machinery space. Space is at a premium, so typically the scrubber will be placed in the stack area," adding that "sometimes the scrubber can be fitted in the footprint of the silencer."

In embracing scrubbers, the cruise industry has moved ahead of the overall curve. In DNV GL's rigorous study "Shipping 2020," the Class society expresses a view that industry uptake of scrubbers will not be widespread prior to 2020. The possible usage of scrubbers is predicated on the advent of the 0.5% worldwide restrictions on vessels' sulfur emissions against a backdrop of high fuel prices. And yet, the cruise industry has moved ahead aggressively, nevertheless. News released by AIDA, the brand within Carnival serving Europe, provides clues as to the technologies that might be deployed in the cruise giant's company-wide initiative. AIDA explains: "With this as yet unrivaled exhaust treatment technology, we are able to filter and thus reduce by between 90 and 99 percent,

all three emissions, namely soot particles, nitrogen oxides, and sulfur oxides, for the very first time." They add: "This comprehensive filter concept is a milestone for AIDA Cruises, but also for the cruise industry as a whole."

AIDA also points to the differences in its technology (borrowed from the power generation and automotive spheres). "The system developed within the Carnival Group for treating emissions relies on cutting-edge technology with an especially compact design that is revolutionary because it can technically accommodate all relevant treatment processes. Nitrogen oxides are chemically bound in a catalytic converter and soot and fuel residues are precipitated in a filter. The sulfur oxides are removed in a scrubber without any chemicals being added." *Maritime Professional's* interview with CLIA's Darr also provided clues into another aspect of CLIA member companies' thinking; namely, wash water effluent from scrubbers – something which has caused a great deal of practical concern. He stated that hybrid scrubbers, which provide for both open and closed loop operation, "have a great deal of appeal" to operators of vessels that might be operating near to shore (where a closed loop system might be essential) and then, the next week, operating far out on the ocean where effluent discharge of seawater (used to treat the vessel exhaust) is not problematic.Since the cruise lines are playing a major role in driving scrubber technology, Mr. Darr's observations offer guidance well beyond the cruise sector, which has already shown itself to be an early adapter of scrubber technology. In doing so, and strictly in terms of a business strategy, the cruise industry appears to have embarked on a particular course that is designed to both meet and exceed regulatory requirements and preserve, if not fatten the bottom line at the same time. Imagine that: making money in the environmental game. Cruising beyond compliance, indeed.

Interview

MARPRO PROFILE

Vice Admiral William Burke (Retired)

Chief Maritime Officer and EVP, Carnival Corporation & PLC

By Joseph Keefe

When Vice Admiral (ret) Burke joined Carnival Corporation & plc in December of 2013 as Executive Vice President and Chief Maritime Officer of Corporate Maritime Operations, it is likely that the way cruise ship lines do business may have changed forever. That's because the newly created position, where Burke is responsible for driving the company's commitment to safety, has its focus – in Burke's own words – "driven solely by the commitment to safety and not necessarily influenced by other things."

Burke graduated from the United States Naval Academy with a Bachelor of Science in Systems Engineering and has since completed his MBA and numerous other higher education honors. The oldest of nine children, Burke went to the U.S. Naval Academy thinking he could get a good education on the cheap and give his brothers and sisters other opportunities. Interestingly, his next two brothers attended the school, as well.

During a long and distinguished naval career, Burke served on five submarines including command of USS Toledo (SSN 769) and his Washington, DC assignments include tours in the Navy Office of Legislative Affairs, Joint Chiefs of Staff directorate for Combating Terrorism, Navy Warfighting Assessments Branch, and as the Executive Assistant to the Vice Chief of Naval Operations. Burke's flag assignments have taken him just about everywhere else, including command of the Logistics Group Western Pacific in Singapore.

Perhaps most important to his fit for the current billet, Burke became a submarine commodore where he had as many as six submarines in his squadron. "I spent a good bit of my time riding those submarines helping them try to get better and improve training, both from a deck and a technical perspective. I think one of the reasons Carnival wanted to hire me is that from the standpoint of a nuclear submariner, I understand both the deck and technical sides of the equation, which as you know, is quite different from the cruise and merchant side of the equation. And, my other billets tended to be focused more on logistics and the broader navy." Burke is clearly right at home in his new role, adding, "I was fortunate enough to find a job which was exactly what I was looking for. It's a place I can make a difference, I don't have throw out everything I've learned before and at the same time, there is much more for me learn."

A Job like Nothing Else

Chief Maritime Officer is a position like no other in the commercial maritime world. But Carnival, already with an arguably enviable safety record over time, nevertheless was looking to step up its environmental, safety and operating efficiency footprint up another notch. Burke told *MarPro* in February, "This is something that has been brewing for a while, and it was the board's wish that we have someone whose focus is driven solely by the commitment to safety and not necessarily influenced by other things." That sounds simple enough, but as Burke explained further, there are a lot of pieces to that effort. "Certainly, there was safety, security, environmental, health, but there's also the right kind of maintenance at the right time; it's about building ships that incorporate lessons learned and it is about how we train our people." The role is more operational than administrative and Burke has already spent time with the Executive Vice Presidents of each of the operating lines, outlining plans to improve performance in the broader safety, health, security

and maintenance areas. And, he's spent time at sea, watching the bridge teams interact with one another and with the pilot. "The job is very operational and I love getting to be able to get back to sea again," says Burke.

On the Job: Job ONE

Burke today reports to Carnival COO Alan Buckelew. In the new role, his performance will be benchmarked against several measurable criteria. And, Burke hit the ground running in December. "We're trying to make sure we don't have major fires. We're working hard on getting the right prevention and suppression systems in place. Part of that is training: teaching the crew how to use their gear, when to use it and not to be afraid to use it. Carnival instituted formal bridge resource management procedures a couple of years ago and from what I've seen, it is working very well. Part of that is getting away from the master who is autocratic and dictatorial and where his subordinates are unwilling to question what he does. The bridge officers need to work as a team and I see progress on that. Clearly, the company is focused on health, safety and the environmental issues – otherwise, they wouldn't have hired me for this position."

Cross Training & New Opportunities

Burke's value to his new employer runs far deeper than simple experience and/or skill sets. That's because the U.S. Navy and the global merchant fleets do things differently. Burke sees opportunities for his deck and engine crews to learn lessons from his military counterparts and, he says, there are more than a few things that the Navy could learn from the commercial sector. He explains, "Today, there's a far greater reliance on technology than you and I may have seen years ago. In both places, there are people who are reluctant to go to electronic chart system, but that's changing. One of the things the Navy does better than the cruise industry is train – in simulators, putting mariners in situations where

"It's more important to take care of the ships we have because we're going to have them for a long, long time. There's a big cost in buying those ships and a large cost in owning them."

they can learn about things without putting the ship in danger. They also train routinely on the ships. Navy personnel are usually very comfortable with high intensity, casualty situations on board navy ships." Conversely, he says, that can't be done on a cruise ship because you don't want to disturb the passengers, adding, "In the cruise industry, it will important that we rely on simulation. And we at Carnival have a pretty good program going in that regard. We recently made the decision that we would go to annual, reoccurring training for our bridge and technical officers. I can't emphasize enough how important that is – to be able to put people in situations that are not real but seem real. That's important training and I'm pleased to see that we are on that track here at Carnival. One of the things the Navy could do better is that – looking at the cruise industry – they don't have people walking all over each other. So, there's opportunity to learn from sides of the equation."

Drilling down even further, Burke says that the differences between the cruise line business model and that of the tanker and bulk sectors are, in some cases, even starker. Operating from the premise that 'mariners are mariners,' no matter what their role or sector, Burke insists that there are common skill sets that each of these professionals must have, in order to be successful. "We do not operate in a benign environment. So, we must keep the necessary precautions to keep our ship safe. Both navy and merchant ships operate complex equipment in a challenging environment. Things sometimes break and sometimes they break catastrophically. We need to stay ahead of that, we need to do the proper maintenance and we need to stand a proper watch. When bad things happen, we need to investigate, learn the root causes, fix them and get better. That's standard across all mariner missions – I think all mariners should feel the same way about that." Across the many fleet brands under the larger Carnival corporate structure, Burke reports that deck officers are comprised chiefly of European mariners; Dutch, UK, and Italian nationals. He clearly thinks a lot of the professionals at Carnival, but didn't rule out changes to that mix, saying, "I've been approached by some of the U.S. maritime academies and I think there is a good opportunity to get Americans into these roles. It's a great idea, and I hope we succeed in that effort."

Navigating the Regulatory Environment

As 2013 came to a close, the U.S. Coast Guard had nearly 70 regulatory efforts in play, with the IMO and numerous local U.S. states brewing up their own additions to the mix. Looming large for Carnival in terms of compliance issues, stack emissions are high on the list. To that end, Burke says, "We're working pretty hard on scrubber technology installations. If we get it right, it will allow us to operate around the world. Secondly, we're concerned about overboard discharges. We need to well in this area; if not, we're going to hinder our ability to operate in areas where we want to be. I will say that in military, we regulated ourselves very tightly so that no one could question what we did." And, he adds, Carnival will do the exact same thing.

Part of the Carnival environmental and safety strategy, going forward, include remote monitoring. Burke admits, "We're not doing much now, but we are looking into it. We want to see if the ships are doing the things they should be doing, and we're looking to create a culture that reduces the chance of untoward incidents." He says that doing 'the right amount of maintenance at the right time,' is also a key part of that journey, adding, "By monitoring those parameters and we are at the very beginning of that journey, we can achieve those goals."

Burke says that he has always been a champion of doing the right maintenance at the right time. "It's more important to take care of the ships we have because we're going to have them for a long, long time. There's a big cost in buying those ships and a large cost in owning them. If you want them to get to their expected life, you need to take care of them. And what we found in the navy is that 75 percent of what you spend on a ship, you need to spend whether you put it to sleep or not. You don't have to do too much maintenance, but you have to do it at the right time." Beyond the technology that is certainly coming, you get the distinct impress that Burke will monitor that situation closely, as well.

From a safety perspective, Burke says that the greater Carnival brand and its many fleets do have a good record. To that end, he says, "We're working hard to improve it. People assume that ships are going to be safe – that's a fair assumption. My goal in the near term would be to have (as much) installation complete on the fire prevention, suppression and detection equipment as we possibly can across the fleet."

Smart Thinking, Global Savvy

For Carnival and Bill Burke, the gleaming outward appearance of their collective, international fleets is meaningless without the back office resolve to commit every possible resource towards the safest, most efficient organization possible. At the heart of all of that, perhaps, is CSMART, the Center for Simulator Maritime Training, a facility located in Almere, Netherlands. A service mark of Carnival plc, CSMART operates as the Dutch branch of Carnival plc, which is part of the Carnival Corporation & plc group. There, the journey to the best possible Carnival Corporation has already begun. Burke says, "We've just made the decision to go to annual reoccurring training, which will require us to expand our facility." When that happens, says Burke, every single officer in the fleet will see simulation training, every year, preparing for every possible outcome at sea.

Training should, according to Burke, go far beyond simple simulation exercises. "One size does not fit all. There's a great opportunity for the 'commodore chief' to train those folks and recognize the differences. My time spent in Singapore was also quite valuable in that I participated in quite a few exercises with people from many nationalities that exposed me to different cultures that I worked with. That helps me a great deal with my work here at Carnival where, to a large extent, there many cultures because we are a large, multi-national corporation. We operate different lines, all over the world."

The multi-cultural, multi-faceted and diverse fleets of the Carnival Corporation now have a multi-talented, globally savvy and pressure-tested Chief Maritime Officer. By doing so, Carnival has redefined the business model of the modern cruise industry. What comes next might just surprise you. But as you get to know William Burke, it shouldn't.

The Changing Face of Piracy

Rich Energy Targets helps to keep Piracy in the Public Spotlight

John Barnwell, Global Head of Marine, Americas

The release of the Captain Phillips movie starring Tom Hanks in October 2013 and the hijacking of two Americans off the coast of Nigeria have brought more public attention to the oldest of all maritime risks: piracy. While piracy has been a concern in the maritime industry for centuries, a new hotspot has emerged off the coast of West Africa in the Gulf of Guinea. Specifically the industry is concerned about attacks occurring in the territorial waters of Benin, Nigeria, Togo and the Ivory Coast. Over the past years, there have been more widespread and violent accidents in this region of the world. In fact, over the summer of 2013, 22 West African states signed a code of conduct regarding piracy prevention and armed robbery against ships. United States Navy ships accompanying the EU Naval Force off Somalia have created an effective 'international recommended transit corridor.' Several West African leaders are calling for a similar floating police force in the Gulf of Guinea, one of the most active oil transport and energy hubs in the world today.

At the same time, shipping companies are continuing to report piracy incidents in the Gulf of Aden and the Strait of Malacca in Southeast Asia. Piracy attacks have dropped significantly off the coast of Somalia due to various factors, including active military action, land-based anti-piracy interventions and the increasing use of armed guards on board of ships. However, Allianz Global Corporate & Specialty (AGCS), a leading marine insurer, maintains that this region is still far from safe from pirate attacks. The industry sometimes likens the issue of piracy to a game of 'whack-a-mole'.

Once one area quiets down a little, there is another hotspot emerging. So overall, it continues to be of great concern to our clients and with that to us.

Changing business models of pirates

Types of piracy in different regions of the world vary. This is important since the management best practices issued by the International Maritime Organization are still focused on the type of piracy that prevailed off the coast of Somalia. Different types of piracy include:

- ***Opportunistic armed robbery*** occurs when a vessel is approaching or anchored off ports or when ship-to-ship

At a Glance

2013 Piracy Statistics

234 Worldwide Incidents 2013: 234 reported, including 12 hijackings.

13 Somali related incidents 2013: 13 reported incidents, including two hijackings.

30 Nigeria related incidents 2013: 30 reported incidents, including two hijackings.

(Updated on 25 November 2013) / Source: http://www.icc-ccs.org/piracy-reporting-centre/live-piracy-map

transfers take place (e.g. oil or gas cargo). Usually pirates are after valuables, IT equipment, personal belongings and the cash often kept by the ship's captain for conducting normal business in foreign countries.

- ***Cargo theft, mainly fuel oil theft,*** occurs when vessels are hijacked for several days and oil is transferred to a smaller vessel. This usually involves a criminal element and some maritime insider knowledge.
- ***Kidnapping*** is usually associated with the offshore oil industry and the instability of the Niger Delta. Typically, robbery is the main intent.

The main difference between traditional piracy in Somalia and the new wave of piracy emerging in West Africa is that the latter is usually more aggressive and violent and is aimed at obtaining valuables. The pirates often use poles, grapples and ladders and come with two to three skiffs or speedboats.

Piracy frequency numbers

Piracy is a major concern for the marine insurance industry. For instance, the West African territorial waters are excluded from the Hull War trading area and ship owners need to arrange insurance coverage for sailing into such areas in advance. A recent joint study by the International Criminal Police Organization, United Nations office on Drugs and Crime

"You have to address the causes and not just the symptoms. And while we are mainly dealing with the transport on water, we need to recognize that the long-term solutions lie on land – whether we are talking about Somalia, West Africa or any other piracy prone area of the world."

and the World Bank states that from 2005 to 2012, 179 ships were successfully hijacked off the Horn of Africa, primarily off the coast of Somalia. Another study, called 'Pirate Trails', using data and evidence from interviews with former pirates, government officials, bankers and others involved in piracy, explores the finances behind piracy and claims that over $339 million in ransom was paid during that period of time.

So what can shipping companies do to prepare for and mitigate the risk of piracy? Tim Donney, Global Head of Marine Risk Consulting at Allianz Global Corporate & Specialty, has some tips for operators shipping in piracy prone waters:

- ***Avoid using very high frequency (VHF) communication, but use secure satellite telephone or email instead***
- ***Vet all communications with external parties and take care when communicating information on cargo onboard to third parties***
- ***Avoid tendering while not immediately conducting cargo operations***
- ***Change routes up occasionally to avoid predictability when a vessel is in the region frequently and following a regular trade route.***
- ***Piracy risk is the greatest at night (the highest risks are between 2200-0300hrs and weekends, Friday to Sunday are the most common days) and increased vigilance is needed. (Operating only in day light hours is not an option for ships.)***
- ***Prior to transiting the Gulf of Aden, alert the Maritime Security Centre for the Horn of Africa (MSCHOA) and advise of your voyage plans. Travel in assigned Transit Groups and utilize the International Recommended Transit Corridor (IRTC), which will allow optimal coordination of naval warships that are operating in the Gulf of Aden.***
- ***Do not refuel in the piracy hotspot areas. For instance, try to refuel in Cape Town in South Africa instead of in the West African region***
- ***Follow the guidelines contained within IMO's Best Management Practices IV, such as 'hardening your vessel' by installing barbed wire to protect the hull and create an effective Citadel aboard ship.***
- ***For vessels transiting West Africa, follow the Guidelines for the Gulf of Guinea, which have been created by Intertanko, BIMCO, NATO and other maritime organizations.***

The Use of Armed Guards

The use of armed guard is a legal challenge. In contrast to the international waters off Somalia, coastal states in West Africa do not allow foreign armed guards to enter their territorial waters. Instead, the local navy or army must be used, a process bringing with it lots of uncertainty with respect to naval experience, being able to adapt to critical situations, training and reliability of people sent onboard.

Former US Assistant Secretary of State, Andrew Shapiro stated: "The ultimate security measure a commercial ship can adopt is the use of privately contracted armed security teams. The reason for this is simple: to date, no ship with an armed security team onboard has been successfully pirated." Yet, there have been instances where fishermen were mistaken for pirates and were inadvertently killed, such as the incident off the coast of India in 2012.

Generally, insurers like Allianz do not endorse or condemn the use of armed guards. If clients choose to use them, then insurers recommend using those that form part of the Security Association for the Maritime Industry (SAMI). This organization certifies maritime security providers worldwide and its members comprise more than 180 security providers, consultants, trainers and maritime security, hardware and technology manufacturers worldwide.

The Root Cause is on Land

Allianz Global Corporate & Specialty has already propagated that more nation building is required in Somalia back in 2011. In Somalia as well as West Africa, the root cause for piracy is the poverty on land and the socio-economic realities of some of the affected countries. One of the driving forces behind piracy in Nigerian waters has been the failure to address the rampant black oil market, making theft a lucrative business. Pirates have become more sophisticated converting fishing trawlers into makeshift oil tankers or bringing some of the captured vessels close enough to the shore in order to siphon the oil into barrels to be sold on the black market. The US obtains 15 percent of its oil supply from this region, so the pirates see ample opportunity for profit here.

Tim Donney stresses: "You have to address the causes and not just the symptoms. And while we are mainly dealing with the transport on water, we need to recognize that the long-

term solutions lie on land – whether we are talking about Somalia, West Africa or any other piracy prone area of the world."

Another contributing factor is the lack of a legal definition of Piracy and lack of legal jurisdiction for prosecution of piracy. The pirate ring leader Muse, who was captured by the US Navy in the Captain Phillips movie, was recently convicted in US federal court for Hijacking, Hostage Taking, & Armed Robbery, but not Piracy. This is because there is no legal definition of Piracy. Also, there is the lack of jurisdiction. Initially, pirates were being tried in Kenya, but the Kenyan government has since taken the position that these are Somali citizens, that attacked ships that are under foreign flags in international waters. So, how does Kenya have any jurisdiction or responsibility to prosecute these pirates? It is reported that over 1,500 pirates have been captured and released by naval ships because of the lack of any legal authority or jurisdiction for their detention or prosecution.

In short, Piracy is a highly complex international problem that continues to exist as long as large income inequalities, poverty and political instability continue to exist. Its face might be changing, but we are still talking about the age-old risk.

Allianz

The Author

John Barnwell is head of Allianz Global Corporate & Specialty's Global Marine Business in the Americas, which includes a team of more than 420 marine insurance professionals in the United States, Canada, Mexico and Brazil. Prior to joining AGCS, John was Vice President of Ocean Cargo Product at Fireman's Fund Insurance Company. He started his career at Aetna as a Property and Liability Underwriter before transferring to inland and ocean marine underwriting. He earned his undergraduate degree and MBA from St. John's University in New York. For more information: http://www.agcs.allianz.com/insights/white-papers-and-case-studies/piracy-report/

Strength in Numbers

100m gt strong, International Registries and the Republic of the Marshall Islands Registry prove that quality and safety are not mutually exclusive.

By Joseph Keefe

When International Registries, Inc. and its affiliates (IRI) and Republic of the Marshall Islands (RMI) Registry recently pushed through 100 million gross tons, the impressive number kept RMI firmly planted in the number three position within the ranks of global open registries. And, yet, that enviable market position obscures so many other metrics which are more important. With a world-leading average bluewater vessel age of just 7.9 years, IRI's safety and quality numbers – according to ICS, the U.S. Coast Guard and the IMO – are even more impressive. How they achieved those metrics is the real story.

Over time, IRI, who provides administrative and technical support to RMI, has perfected the decentralization of Registry services. According to William Gallagher, IRI President, one of the key competitive advantages of a quality flag state is the ability to provide competent and timely services to clients, anywhere in the world. He adds, "The backbone of the organization is truly the experienced maritime personnel positioned in our network of 25 worldwide offices. Shipowners are able to reach a Registry representative in their own time zone and language, using a 24/7 duty officer system that enables industry stakeholders to reach a representative in emergency situations." Beyond this, says Gallagher, "Our robust vetting process for ships entering and remaining in the Registry enables us to ensure that only quality owners and operators make up the fleet of the RMI Registry."

At local RMI offices, technical and marine safety status boards enable RMI personnel to ensure timely responses, even when an event crosses from one time zone to the next. These status boards also enable personnel to see all issues associated with a particular vessel.

Decentralization: The key to Quality and Safety

In most business models, when volume goes up, the quality correspondingly goes down. Not so with RMI. Growing from just 39 vessels and 2 million gross tons in 1990 to 100 million gross tons and more than 2,250 vessels today, fleet quality nevertheless remains at an enviously high level. And, the numbers simply don't lie.

RANK	Flag	Type	Age	# Vessels	m.GT	%Chng 2014
1	Panama	Open	16.2	8547	231	+ 2.3
2	Liberia	Open	9.5	3172	131	+ 2.7
3	RMI	Open	7.9	2252	93 (*)	+ 10.2
4	Hong Kong	Open	8.9	2326	84	+ 8.2
5	Singapore	Open	9.2	3535	68	+ 13.1
6	Bahamas	Open	14.2	1422	55	+ 1.3
7	China PR	National	15.8	3685	48	+ 6.6
8	Malta	Open	11.5	1794	47	+ 6.6
9	Greece	National	23.7	1534	44	+ 2.4
10	Cyprus	Open	11.1	1048	21	+ 1.9

Source: Clarkson Research Services / (*) RMI passed 100 million tons in late January 2014.

RMI's white list status on the Paris and Tokyo Memorandums of Understanding (MoUs) and being included on the United States Coast Guard's (USCG) Qualship 21 roster for nine consecutive years is unprecedented. Started in 2011 by the U.S. Coast Guard, QUALSHIP 21 recognizes high-quality vessels and their commitment to safety and quality. Bill Gallagher explains the ratings even further. "The scorecard from the port State control (PSC) jurisdictions is really a clear measurement of how a Registry is doing. While the RMI fleet has grown significantly on an annual basis, it has still been able to maintain the same level of quality on a global basis with the various MoUs."

Separately, the latest ICS "Flag State Performance Table" has the Marshall Islands with no less than 18 out of 18 "positive performance ratings" or Green indicators. Very few other flags can boast the same performance, still fewer in flag fleets as large as the Marshall Islands. The numbers did not come about by accident. That said; IRI is not sitting on its hands.

Improving IRI's unique, decentralized Registry model is an ongoing process that involves further refinement of internal systems through IT resources to enhance the ability to com-

(Photo courtesy of Fednav Limited)

municate, monitor and deliver the same quality services around the world, regardless of how big the RMI Registry becomes. As RMI builds up its own quality department, the decentralized model will be a big part of it. The Maritime Services Group (MSG), headed by COO John Radisch, operates out of London. Gallagher adds, "I like the fact that our COO is in London. He can catch up on everybody's day. He talks with Asia at the end of their day, Europe during his work day and in the afternoon, he's coordinating with headquarters."

Quarterly meetings of the MSG are aimed, in part, in improving the RMI duty officer system. In place since 1991 on a 24/7 basis, the program was, at one time, solely U.S. based. Not anymore. With offices in Asia, the Middle East, the U.S. and West Coasts, ship owners and classification societies can call at any time with any problem.

At RMI, business is business, but that doesn't get in the way of maintaining a quality registry. Gallagher is adamant: "Since we are a privately run maritime registry, I think the biggest challenge we have is in balancing commercial operations and our responsibility as a flag State Administration. The decision to further decentralize the RMI Registry's maritime operations was with a vision to more efficiently provide services wherever an RMI flagged ship may call and to show shipowners/operators that the RMI Registry does take its responsibilities as a flag State administration seriously. Providing timely registry related services to a growing global fleet from one location would have been impossible; a delayed response from the

"… we have a lot of technical help in house – here and overseas. It's an issue of resources. It's a collaborative process between flag state, class and the operator itself … You simply can't do it alone anymore."

William Gallagher, IRI President

Registry can mean additional time spent in port which can cost owners money."

Changing Roles: Increased Responsibilities

As the role of the flag State has changed during the past decade, participation at venues such as the International Maritime Organization (IMO) and the International Labour Organization (ILO) ensure balance in actual practice with regulation has become a critical part of the business. That's because even as the proliferation of maritime regulations impact the way a registry does business, Flag States themselves ratify important international conventions to ensure that a proactive approach is taken with respect to marine safety, security, environmental protection and social responsibility. Gallagher adds, "Flag States should, in turn, promptly inform shipowners/operators of such ratifications and provide them with a clear explanation in good time, with guidance on how to tackle new regulations so that their ships can continue to trade without delay or disruption. Our participation with the IMO and ILO, and our work with owners in implementing international conventions means that we are allocating more resources to this area."

That 'allocation' means developing the right personnel. In the last five years alone, RMI has hired personnel specialized in areas such as LNG, and offshore support and production vessels. Only in this way, explains Gallagher, can flag states provide timely support to ensure compliance and avoid unnecessarily port delays. "By learning to grow and change as the industry grows and changes, the RMI Registry is able to work with owners and PSC locally to quickly respond and resolve any issues. This has enabled us to continue to rank high in terms of flag State performance."

High Class: Partnering with IACS

At RMS, it is no accident that all bluewater tonnage is IACS classed. Bill Gallagher, for good reasons, wouldn't have it any other way. With more regulations in the pipeline and a corresponding increase in PSC inspections, the importance of working with a reputable 'class' society will increase. Cost is of course a major consideration, but ensuring that a ship is safe and compliant will in the long run save owners time and money.

For IRI and RMI, it simply comes down to the standards that IACS class societies maintain and the resources that they have. At RMI, Class does all the ISM and the MLC audits. Gallagher says, "The reason we take that approach is that they have so much experience, resources and training. Interestingly, we're the only 100 percent compliant group in terms of MLC and ISPS. We debated internally as to whether we could do some of these things internally and we decided that IACS class societies were in a better position to do that." Gallagher puts his money where his mouth is. "Understand that from a revenue standpoint, that's revenue we're leaving on the table. But, it's not about money; it's about doing the right thing. We had already been delegating ISM and ISPS to class at that point, and when MLC came along we decided to do the same thing. That doesn't mean that we don't get heavily involved – we've done MLC seminars around the world for our owners. It works well for us. The proof is in the pudding with the QUALSHIP ratings. If you look at our success, a lot of that has to do with IACS."

Vetting: A Two Way Street

If an owner/operator does not meet the standards of the RMI Registry, then that vessel may be turned away. At one time, RMI rejected one out of three vessels, but, says Gallagher, that has changed. "Owners/operators no longer apply for registration with the RMI Registry if they know that their vessel will not meet our standards. We politely tell them No."

IRI maintains that its intent has never been to be the largest Registry in the world, but instead the choice of flag for quality owners and operators. IRI defines a quality shipowner/operator as one that takes marine safety, security, environmen-

tal protection and social responsibility seriously. Gallagher insists, “We have owners who will lay up a ship even when there are commercial pressures as they look at those three elements and do the right thing.” In turn, though, he knows that owners are also vetting the Registry with their own criteria. The numbers say that they like what they see.

In a time of razor thin operating margins that translate into leaner and meaner operators with fewer back office staff, today’s owners and operators sometimes can’t keep a lot of in-house expertise. Gallagher says they often look to the flag state for help. “In turn, we have a lot of technical help in house – here and overseas. It’s an issue of resources. It’s a collaborative process between flag state, class and the operator itself. You simply can’t do it alone anymore.”

Accidents will happen. That said, and in its latest accounting report, ICS shows no recent Marshall Islands casualties. When something does occur, though, RMI has a strong, primarily in-house group that investigates casualties. Gallagher adds, “We rely a lot less on contract inspectors then we did just five years ago and we conduct worldwide training seminars for our people that last as long as two weeks. We strive for uniformity in our safety inspectors.”

RMI’s Modern Registry: Evolving, International and in it for the Long Haul

Bill Gallagher ticks off the metrics that epitomize the RMI business model, one by one, without hesitation. “We’ve been around since 1948. We’ve plowed the money back into the business and we’re in this for the long haul. We internationalize – but in one standard. Whatever answer you get in Europe or Asia is the same answer you’ll get in the United States. As you grow, you have to staff up to match the size of the fleet. Sometimes, I can’t believe that we have 170 folks working overseas, but we do. These aren’t contractors. In 2000, we had just five offices overseas and 30 employees.”

Pointing to the 25 RMI offices spanning the globe today, Gallagher summed it up for MarPro: “100 million tons is nice, but we’re not going to rest on our laurels. Because the business can’t be run exclusively from the United States anymore, our expertise is truly international. First and foremost, we’re a flag state administration and we’re not involved in any other ancillary businesses. Along the way, we’ve changed the type of people that you bring in to run a registry. You need banking, finance skills and legal savvy, just as much as you need the operational and technical expertise. We’ll keep innovating. A big job is to recruit people who have the expertise that can replace the current generation of flag state people. We’re doing that.

And, it appears to be working. There IS strength in numbers. Who knew?

THE CROWLEY WAY

Walk in the front door at Crowley Maritime Corporation HQ in Jacksonville, Fla., and you learn nearly everything you need to know about the company. With your visitor's badge, you are handed a "Safety and Evacuation" brochure, and the person you are there to meet – in our case Tom Crowley, Jr. – walks down to greet you personally. Safety and People; The Crowley Way. The rest is just details.

By Greg Trauthwein

In addition to its ATB fleet, Crowley has invested in tankers as a result of the shale oil and gas revolution. "We never expected crude to be moving. We are moving crude from Corpus Christi to the Louisiana Offshore Oil Port (LOOP)."

Crowley Maritime was founded in 1892 by Thomas Crowley in San Francisco. Its fleet: A single Whitehall rowboat purchased for $80, used to ferry people and supplies from shore to ships anchored in the Bay. From these humble beginnings has grown one of the strongest and recognizable maritime franchises in U.S. history. A diverse, privately held $2B plus per year U.S.-based transport and logistics organization with a fleet of more than 200 U.S.-flagged vessels, a company which is still held privately by the Crowley family, run today and for the past 20 years by Thomas B. Crowley, Jr., Chairman and CEO.

The Best Laid Plans

From an early age Tom Crowley, Jr. knew that the family business that bore his name would indeed be his destiny, too. "I don't know when it was exactly that I knew I wanted to work here, but with our last name attached to it, I felt that I would have something to do with the business," said Crowley. During his high school and college years, Crowley would work at the company in a variety of jobs.

A self-described "operations guy," he saw the diversity of the business and the operations, and saw ample opportunity for himself. Soon after joining the company upon graduating college, though, fate entered the picture, as Tom's father became ill, and the line of succession – which he had envisioned would take 10 to 15 years – was compressed to three years when his father passed away and Tom took the helm of the $1B per year company.

At the age of 26.

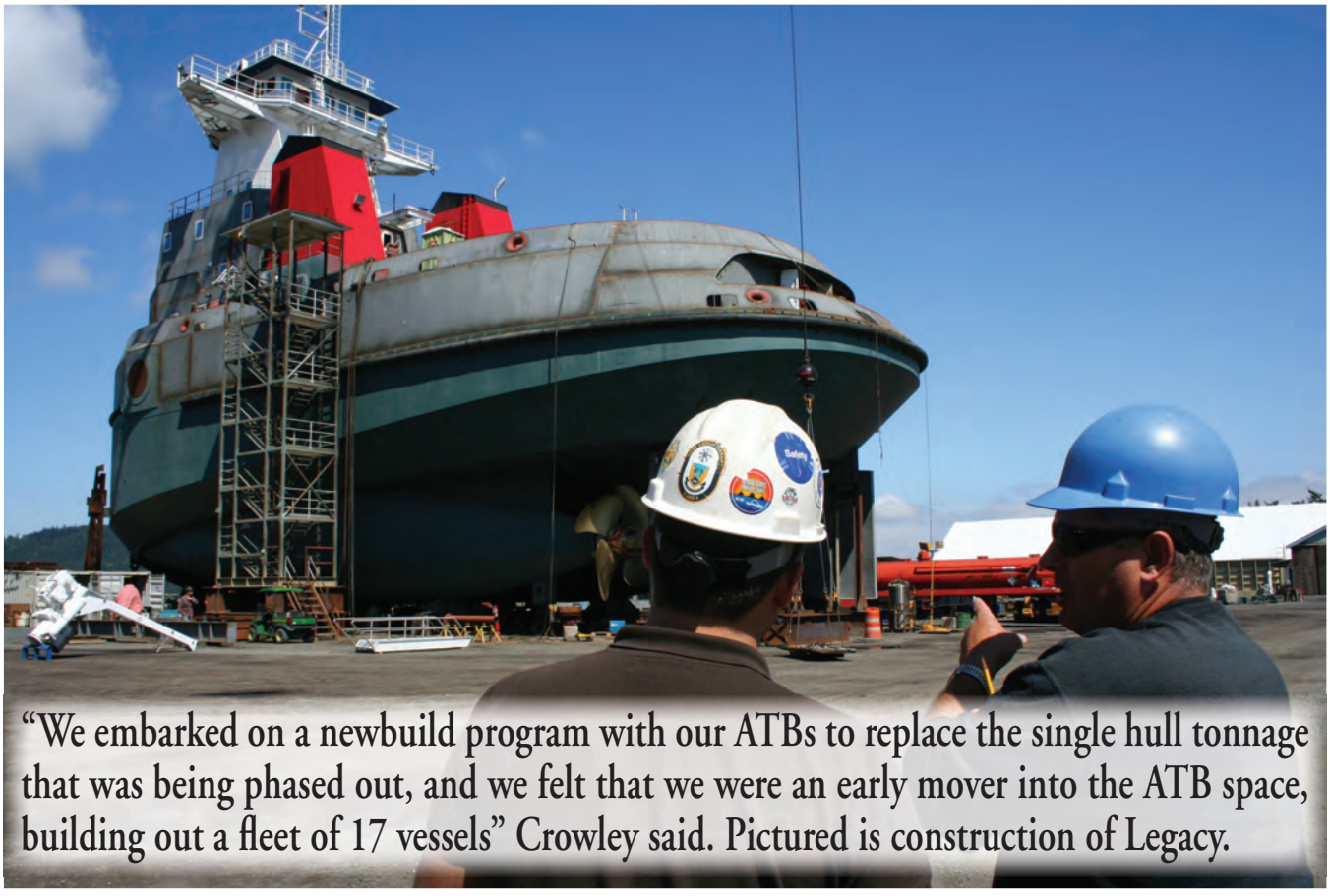
"I didn't have a lot of time to plan and think ahead of what was going to happen," Crowley said. "And there were many days when I sat there and thought 'is this even possible.' But I knew that if I didn't at least give it a try that 20 years later I would feel bad.

So I was running the company and my dad was dying at the same time, and the pressures were huge. My day-to-day strategy was 'one day at a time.' If I can get through this day, there will be a fresh day tomorrow," Crowley said. "Early in my career, it wasn't about 'where am I going to take this company,' or 'what type of leader do I want to be,' it was more about putting out fires and just trying to keep my head about me."

And keep his head about him he did. At the time of Crowley, Jr. taking the helm, the company was a $1B per year company with about 5,000 employees. Today the company is just about 5,300 employees, but it has doubled to more than $2B per year.

Diverse Operations

Today's Crowley Maritime is significantly changed from the



"We embarked on a newbuild program with our ATBs to replace the single hull tonnage that was being phased out, and we felt that we were an early mover into the ATB space, building out a fleet of 17 vessels" Crowley said. Pictured is construction of Legacy.

A few years back when we interviewed Tom Crowley, Jr. for the pages of Maritime Reporter & Engineering News, we asked him what he thought was the one technology that had the biggest impact on the safety and efficiency of his company's maritime operations. Surprisingly his answer was simple: *ROPE.*
The reasoning was simple too, as today's lighter, stronger synthetic strands have gone a long way in helping to reduce back and other related lifting injuries on deck. He stands by that answer today, as well, but in a discussion of "technology," he both praises and laments the modern marine electronics and the evolving wheelhouse. "There's a ton of stuff in the wheelhouse, but I don't think that anyone has done a really good job of making sense of all of that," said Crowley. "You have so many new things in the wheelhouse, yet we haven't gotten rid of a lot of things in the wheelhouse. It's really overload on the crew and we have to figure a way to make that more streamlined."

time Tom Jr. took the reins, change that started with its internal structure based on Tom's bias towards operations. Prior to him taking over, management was a traditional pyramid, with the CEO on top and all units reporting upward. Essentially Crowley turned that structure upside down and flattened the organization, streamlining the support services and building distinct business units and teams.

But the changes extended far beyond standard flow charts. As a private company, in Tom's estimation, Crowley is opportunistic in nature. "I think all family businesses tend to be more opportunistic, and that drives diversification. You can get into things that maybe a public company would consider non-core or too outside the scope of what they do," said Crowley. "Our family's single holding is this company, so we needed to diversify our interest (to deal with the cyclical nature), but you have to find a balance; you can't be too far flung. We've sold businesses that didn't fit our longer term strategy, and I'm sure that will continue. But we will maintain a diversification in our operations."

While the path to the top spot was not planned or easy, early on Tom figured his role as CEO was less about 'managing by numbers' and more about establishing and maintaining a consistent culture across all business lines, all locations. The goal: to extend its philosophies on people and safety across every Crowley office and employee so that no matter who or where you are, you get a similar experience in your interaction with Crowley.

"We want to build an organization of people that are able to solve problems, create solutions for our customers, and do it in such a way that we add value to the customer's needs and their business," said Crowley. "And we do it in a way that we treat people right, and we do things the right way. I think that carries across to all of our people and businesses that we are in."

While 'knowing your customers' and 'creating solutions' may seem cliché, properly deployed it can lead to significant

Quotable Crowley

Thomas B. Crowley, Jr., Chairman and CEO, Crowley Maritime Corporation, on:

The cyclical nature of this business:

"The challenge in our business is nothing moves very fast. We can certainly see things coming, but trying to get out of the way is a bit more challenging."

The shale oil and gas revolution:

"We were pretty in tune with what our customer base needed in terms of transportation, across the oil majors. None of them saw this (the amount of oil from U.S. shale) coming. We didn't see this coming."

Safety & Training:

"When you face tough economic times, a lot of people want to jump to cost cutting and saving. But you can't send mixed messages to your team. You can't demand performance then take away their tools. The perfect example is our safety performance. While it has cost us a lot, it has saved us a lot."

Evolving Environmental Regulation

"I think our industry has to take a more proactive role in cleaning ourselves up, instead of simply defending ourselves and trying to say it's not that bad. It is going to be expensive and the cost of transportation is going to increase, but I think the world understands that."

business opportunity. Take for example Crowley's recent energy sector venture: the transport of crude oil coming from the shale oil (and gas) revolution in the U.S.

Crowley has been a steady customer for several U.S. shipyards, making significant investments in new tonnage for the Jones Act trade, including the construction of its state-of-the-art tug fleet, ATBs and double hull equipment as well as a recent historic order for a series of new Con-Ros with VT Halter (see related story, page 38). But it is the shale oil and gas development that has come as perhaps the biggest surprise, and is a direct result of Crowley's close relationship to its oil major customers to know their needs in regards to transport.

"I think my dad and his management team found very unique designs of equipment, built a whole bunch and then they went and found opportunities," Crowley said. "We've taken a different tack in our recent newbuilding program, with costs being a lot higher than they were in the 1970s. We have to take a hard look at new technologies and the efficiencies they offer in terms of crewing and fuel. We have to look at the deployment of more specialized assets that have specific purposes instead of a more general vessel that can do a lot of things OK. You have to better understand your customer needs to know their requirements, instead of just going out and building something. Moving more toward partnering with our customers, understanding their needs and building a piece of equipment that fits those requirements."

The rapid development of the shale oil and gas business in the U.S. is a great example of a private company such as Crowley acting almost immediately to fill a void in the market, creating an interesting business opportunity while fulfilling a client need.

"We embarked on a newbuild program with our ATBs to replace the single hull tonnage that was being phased out, and we felt that we were an early mover into the ATB space, building out a fleet of 17 vessels," Crowley said. "So we were pretty in tune with what our customer base needed in terms of transportation, across the oil majors. None of them saw this coming. We didn't see this coming. When it happened we were in a fortunate situation where we were able to conclude a deal very quickly," to acquire a pair of tankers, Florida and Pennsylvania, built by Aker Philadelphia.

In a matter of weeks Crowley had commandeered a deal for the tanker to enter a business – the transport of U.S. crude – that previously was completely off of the company's radar. With the two tankers under the Crowley colors, it expanded quickly and committed to four more tankers, and Crowley said that there could be even more orders in the future.

(Continued on page 40)

Crowley's Commitment to Excellence
Starts with Better Understanding Their Mariners

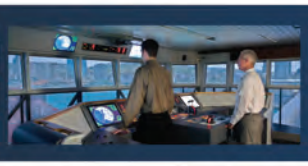
Photo: Tim Burdick Photography & Gallery | www.timburdickphotography.com

Over 700 Crowley mariners went through the MITAGS-PMI Navigation Skills Assessment Program.™

Crowley's completion of the **Navigation Skills Assessment Program™** has allowed them to better understand their mariner population and to target training dollars more effectively. This commitment is further evidence of its role as an industry leader in the implementation of innovative, structured assessment programs designed to enhance safety, regulatory compliance and environmental stewardship.

NSAP™
NAVIGATION SKILLS ASSESSMENT PROGRAM





MITAGS-PMI
MARITIME INSTITUTE OF TECHNOLOGY & GRADUATE STUDIES
PACIFIC MARITIME INSTITUTE

To learn more about how MITAGS-PMI can help develop the skills of your mariners please contact:

PMI Toll-Free: (888) 893-7829 | **MITAGS Toll-Free:** (866)-656-5569 | **www.mitags-pmi.org**

NEW SHIPS

Crowley's "Commitment"

Crowley Maritime last year ordered two LNG-powered combination container – Roll-On/Roll-Off (ConRo) ships with VT Halter Marine. The ships are designed to travel at speeds up to 22 knots and carry containers ranging in size from 20-ft. standard to 53-ft.-long, 102-in.-wide, high-capacity units, along with hundreds of vehicles in enclosed, weather-tight car decking. While LNG is the hot topic of the day, Tom Crowley, Jr., Chairman and CEO of Crowley Maritime, said that it was only a small part of the overall decision. When Crowley made the decision on these newbuilds, there were a couple of considerations. "One, there is a very large supply of natural gas in the United States, and second, there is ever increasing environmental regulations that we wanted to get a jump on," said Crowley. "So we have a large supply of cheap, clean fuel plus a lot of tough regulations coming down the pike; we thought let's just take the bite now and be done with it and have clean ships for the next 25 years."

The Commitment Class, Jones Act ships are scheduled for delivery in Q2 and Q4 2017 respectively, and replace Crowley's towed triple-deck barge fleet. The new ships will be named El Coquí (ko-kee) and Taíno (tahy-noh), both an ode to Puerto Rico. The vessel design has been brought to life by Wärstilä Ship Design in conjunction with Crowley subsidiary Jensen Maritime. The double-hulled ConRo ships will be 219.5 x 32.3m and have a deep draft of 10m, and an approximate deadweight capacity of 26,500 metric tons. Cargo capacity will be approximately 2,400 TEUs, with additional space for nearly 400 vehicles.

The main propulsion and auxiliary engines will be fueled with LNG.

While the design is done, the technology is proven and the order is in, there is one more small matter to consider: fueling the ships.

"We've already ordered the ships, we know we're going to need the fuel, so that's the next area of focus to ensure that we get that infrastructure built," Crowley said. "We have a lot of cheap gas but we have no infrastructure to get it to the market. But I think that we are in a really good spot in Jacksonville because there are a lot of options for us, and I think it's going to be a lot easier to develop that infrastructure here."

Overall, though, Crowley did admit that natural gas and LNG will have a tremendous impact on the

"So we have a large supply of cheap, clean fuel plus a lot of tough regulations coming down the pike; we thought let's just take the bite now and be done with it and have clean ships for the next 25 years."

Tom Crowley, Jr.

business of Crowley Maritime overall. "It is going to have a huge impact on a lot of different parts of our business," Crowley said. "What we're trying to do now is to compartmentalize it so that we can have some focus and put resources into the areas that are going to give to us the most benefit early. So Jensen, for example, the naval architecture group, is a part of our company that gets involved in things early on design and development, and that is a key market for them.

In addition to fueling its fleet with LNG, and perhaps helping to build infrastructure for LNG bunkering, Crowley sees opportunities to export LNG as fuel. "We see the opportunity in exporting (very small amounts) of LNG as fuel in containers throughout the Caribbean and Central American region," Crowley said. "We have an extensive network in the Caribbean basin to supply containership services to all of these markets, and they all have very high energy costs. We have a method of buying the LNG in the U.S. and supplying it to the factories or power plants at a fairly economical level. We are in discussions with a number of other companies to supply this service, and we're trying to get an export license to do this for other countries."

A UNIQUE VIEW FOR JENSEN MARITIME

Although owned by Crowley, Jensen Maritime's client base is wide and includes all sizes and types of tonnage. That said; Jensen Maritime Vice President Johan Sperling said that his firm has a unique view on the industry that, perhaps, some competitors do not. That window potentially provides a sharper look at what could come next. Ongoing in-house projects include the LNG bunker barge, the LNG-powered tug, LNG powered ATB designs and of course, the design work with the larger, faster and environmentally-friendly liquefied natural gas (LNG)-powered, combination container – Roll-On/Roll-Off (ConRo) ships. Already in the thick of LNG, Jensen will provide construction management and supervision in the shipyard throughout the building phase of the ConRo's. The LNG arena is new, exciting and bursting with great potential to transform the transportation and energy landscape forever here in North America. A lot of work remains to be done. But Johan Sperling said, "It's also not rocket science."

"Clearly it was not anticipated that our equipment would be moving crude," Crowley said. "We felt that the domestic fleet would be moving product from refinery to refinery. The other big trade for us was supplying Florida from the Gulf, but with gasoline and diesel, we never expected crude to be moving. We are moving crude from Corpus Christi to the Louisiana Offshore Oil Port (LOOP). Our tanker is so small, as I understand it, we only fill up the pipeline from the header to the shore. We don't even get enough crude in the pipeline to get it to land, but that's the most efficient way to move it" because there is no infrastructure yet in place.

Safety: Job One

In regards to safety, Crowley is somewhat fanatical, and given that half of its business is derived in and around the energy sector, it is understandable. Regarding the safety culture at Crowley, Tom said "You can't just put it in a policy manual and leave it at that, you have to have people always thinking about it. We have found that by keeping it ever-present in our heads, that's what gets safety performance moving."

Crowley often repeats the mantra of "the right people with the right tools" in describing his company, particularly in regards to safety and efficiency. From his experience, staying diligent is a cornerstone to grooming an effective safety culture. While the marine market is notoriously cyclical, a company's commitment to safety cannot.

"When you face tough economic times, a lot of people want to jump to cost cutting and saving," Crowley said. "But you can't send mixed messages to your team. You can't demand performance then take away their tools. The perfect example is our safety performance. While it has cost us a lot, it has saved us a lot, whether in terms of accidents or things we don't see. In the last five years we have had an 80% reduction in our Lost Time Incidents (LTIs), and I think if you looked at us five years ago, we were thought of as a really safe company. I think it goes to show if you put resources in, you will see results."

That's why every guest who enters a Crowley office receives a safety brochure, and why every meeting, every pre-project

Crowley has diversified its operations in recent years, a move to broaden its holdings and smooth some of the traditional peaks and troughs inherent in the maritime market. One move included the acquisition of **Titan Salvage, a company that came to global prominence via its work to raise the ill-fated Costa Concordia.**

gathering, starts with a safety message or tip. But the Crowley message on safety extends far beyond informational speech and brochure, and its commitment to safety from the top down is perhaps best illustrated in the running of its 630 masters and mates through the MITAGS-PMI Navigation Skills Assessment Program (NSAP), a decision made in the wake of "a string of incidents that caused us great concern."

The premise was a program – executed in three simulator centers including PMI, MITAGS and STAR Center – was to provide a uniform assessment program for captains. "There was no program that assesses our captains, so we created this environment within the simulator which is very controlled: 45 minutes at the bridge of a boat and it is a pressure cooker, presenting the captain with 22 decision points," Crowley said. It took 22 months to run all 630 captains through the program, and there was a simple 'pass / fail' determination at the end. After the first run through, there was a 72% successful completion rate. Those needing additional training were provided classes targeting their skill gaps, and were then reassessed.

Less than 1% of existing Deck Officers were unable to successfully complete the process and were offered non-navigating positions. Approximately 17% of Deck Officers applying for a position were unable to successfully complete the assessment and were not offered employment.

"I think it goes to show that you need a good combination of both academic and practical training, and it takes time and money to get that," Crowley said. "Our AB to Mate program will take high performing able body seamen and put them through a masters and mate program to make them a mate, and it costs about $100,000 per person."

It could be argued that the maritime industry is in a watershed period, with an aging and rapidly changing employee base, a radical shift in the level and amount of new technologies on board vessels of all shape and size, onerous new regulation on emissions from ships and boats and a foundation change of the business itself, powered by vast new amounts of oil and gas coming from domestic sources. Amidst all of that change, the Crowley name today remains a cornerstone.

The Evolution

The role of Classification societies is ever changing, with significant material impact on the maritime market. In this edition, MarPro helps set the stage to and through 2020, with insights from leaders in Class on the burning issues.

By Greg Trauthwein

What has been the biggest evolution of class in the past five years?

Roberto P. Cazzulo, RINA: Over the past years, there has been a big evolution of class rules into the new Goal Based Standards. The GBS are a way to establish a close link between class rules with goals and functional requirements established by the IMO. Nowadays we are establishing this link for design and construction of new bulk carriers and oil tankers, contracted for construction on or after 1 July 2016. The IACS Common Structural Rules, adopted in December 2013 and that will enter into force in July 2015, will be subject to GBS verification. Within IACS, we are also discussing the development of functional requirements for structural safety of post-Panamax containerships, focusing on hull girder strength and standard load case definitions. This will be another move towards the GBS philosophy in the near future. The GBS approach may also be expanded to look at machinery and automation systems in a holistic way, because they are fully integrated and cannot be seen in isolation, from ship's performance point of view.

Tim Protheroe, Lloyd's Register North America: The growth in consultancy is a significant evolution. We are seeing an increased focus on operational performance as well as our core safety role. There's no doubt that we had been providing this additional support to owners for a long time but now we are seeing the packaging of these services across the board – by class and by other consultants.

Now encompassing myriad roles, what is next for "class?"

Noboru Ueda, ClassNK: I think the biggest change for ClassNK has actually been the expansion of our role from working purely as a regulator, to being an innovator of new technology. The reality today is that we are developing more advanced and rational rules, that are leading to more robust, safer, and more efficient ships but at the same time new regulations and higher standards can also mean greater burdens for shipyards and operators. As organizations dedicated to supporting the maritime industry, it's not enough to just create better and stricter standards, we also need to proactively innovate new tools and best practices to make it easier for yards and owners to not just reach compliance, but also achieve higher levels and operations.

Philippe Donche-Gay, BV: Three things have changed for classification societies. The range and depth of services they

"It used to be said that LNG was a chicken or egg problem, but in the US we not only have the egg, but the chicken and the henhouse too."

Paal Johansen

Head of the Americas Region for DNV GL – Maritime

provide, the wider range of clients they provide services to, and the speed and global outreach they have to provide them with. We are delivering more services to more clients in more places more quickly. The logic of this market change means class has to invest more in powerful IT tools and systems and in a global network if they want to stay relevant.

Paal Johansen, DNV GL: Safety remains our priority. Fatality rates are ten times higher in the maritime industry than the norm the OECD (Organization for Economic Co-Operation and Development) applies to land-based industries. The industry has allocated more resources to mitigate individual accident risk than major accident risk. It is time for a change here. We believe that too much confidence on safety procedures excludes more holistic safety methodologies. For instance, the bridge remains mostly an autocratic work environment, one that hinders effective communication. If individuals are blamed for causing accidents, while the underlying causes are more difficult to address, we get the wrong actions. The most important underlying cause, according to statistics, is the interface between systems and humans.

What is the biggest development for so-called IACS quality classification societies in the past year. Are there any game changers looking large in the center porthole?

Donche-Gay, BV: For us the ongoing backwash from the Deepwater Horizon incident is driving more and more need for us to provide services in and grow our expertise in the offshore energy sector.

Ueda, ClassNK: I think by far biggest and most important development for IACS was the adoption of the new harmonized Common Structural Rules (CSR) in December 2013. The new rules not only unify and harmonize the technical requirements of the existing Common Structural Rules (CSR) for tankers and bulk carriers, but also incorporate new requirements for more comprehensive structural analysis at the design stage, as well as new criteria to enhance safety and reliability that will bring the rules in compliance with the IMO's new Goal Based Standards. The new rules will be applied to all bulk carriers over 90m and all oil tankers over 150m contracted on and after 1 July 2015, and will enable ship designers to work to one common standard applicable to both ship types, resulting in the further enhancement of safety and reliability of the structure. It represents a major step change in ship design that will ensure that new ships are safer and more robust than ever before.

Technology on board vessels is catching up with that ashore and the slowly declining price of bandwidth is making it more attractive and affordable for operators to use SATCOM to harness that technology. Where does class fit into all of that?

Tim Protheroe, Lloyd's Register North America: Class has to make sure that it understands technology and its implications. The increasing connectivity is very likely to lead to a wide range of implications for shipmanagement. Conversations about the potential for remotely controlled, unmanned ships are being held – is that really possible? Let's find out. We think class, as ever, has an important role in helping ensure that regulators, owners, designers and managers understand the risks involved with any innovation.

"Without a doubt, the biggest change we've seen has been the shift towards more efficient and greener ships."

ClassNK

Noboru Ueda

Chairman & President, ClassNK

Johansen, DNV GL: This is not directly class related, but we see a growing need for IT security standards, preventing hacking and fraud on a ship/shore IT network.

Donche-Gay, BV: The history of the way IT has changed industries teaches us that we can never predict what IT will do, but we know it will disrupt the existing practices and speed up or eliminate some ways of working. Faster broadband is doing that to lots of industries and it will do that in the marine field. Our role will be to allow that to happen efficiently, and above all, safely. That is what class is about, embracing technological change safely and allowing new developments to move forward with confidence.

Staying on the technology theme, as the industry has been faced with simultaneous regulatory and market pressures over the past five years, what do you consider to be the most influential changes to the vessel and why?

James Watson, ABS: Today, with the increasing emphasis on safety from the environmental perspective, the focus has shifted from structures to systems, looking at optimization of the hull form and of the equipment onboard. Traditional physical model testing remains an essential component of hull form development, but analytical techniques, such as Computational Fluid Dynamics (CFD), have come into their own software able to handle the complex calculations required.

Arriving at the most efficient vessel requires looking at the hull and the associated appendages – propeller, rudder, energy saving devices, bulbous bow (or no bulb) – as a complete and integrated system. This also extends inside the ship to the type of central power plant, efficiency of onboard systems and energy management, fuel choices and measures to reduce consumption, compliance with emission standards for SOX and NOx, ballast water and underwater noise.

This is increasingly facilitated through technologies utilized onboard to monitor, record and assess performance. This sharing of data is also laying the path for a shift in the near future, away from traditional prescriptive requirements towards more risk-based classification activities, such as annual surveys.

Ueda, ClassNK: Without a doubt, the biggest change we've seen has been the shift towards more efficient and greener ships. As you say, this is happening both as a result of market forces such as bunker prices, as well as new regulations such as the EEDI. It's only been a few years since the industry really started to work towards innovating more efficient vessels, but we're already seeing very impressive improvements in terms of improved fuel efficiency and EEDI scores. At the same time, new GHG reduction technologies like air lubrication, and new low friction paints are just now entering commercial use. We're now seeing the first fruits of efforts towards GHG reduction, and I think that we'll see even more impressive technology, and even greater benefits in the years to come.

LNG as Fuel continues to pick up support. Looking at the looming emission and fuel regulations to and through 2020, please comment on how you see "LNG as Fuel" evolving in the coming years?

Johansen, DNV GL: Considering the barriers to LNG as a fuel up until now, we believe that LNG as a fuel is an "all, or nothing at all" proposition. And we have reached the tipping point. It used to be said that LNG was a chicken or egg prob-

> "The decision to go 'all-in' on LNG must take into account the vessel design, how it is operated, where and for what length of time. There are multiple design issues associated with making LNG fuel the right solution."

ABS FOUNDED 1862

James Watson

President & COO, Americas Division, ABS

lem, but in the US we not only have the egg, but the chicken and the henhouse too. As a curiosity, the LNG fuelled ferry operating between Buenos Aires and Montevideo is the worlds´ fastest commercial ship at over 58 knots (classed by DNV GL), and I think this is a good indication also of how fast we will see a change in this field. The growing number of large LNG ready ships currently being built is also evidence of this.

We think North America and then Europe will be the first to get everything in place, soon followed by Singapore, China and Australia. So in 2020, we believe LNG is the standard for short sea shipping in North America and around the North Sea. For deep-sea shipping we believe that some routes between Asia, North America and the North Sea area will have the infrastructure in all ends to support bigger ships. With the infrastructure set to be widely available in 2025, we are already seeing a rush of investments to strengthen this trend.

Watson, ABS: Right now, we see a lot of excitement around LNG as fuel and for good reason. But while it is true to say we are past the initial tipping point, there is still a need for owners to be realistic about the decision to use LNG and the practicalities, once that decision is made. Certainly there is a drive to adopt LNG for reasons of regulatory compliance, primarily in the current ECAs to meet upcoming limits for SOx and NOx and this will radiate out as new ECAs are adopted.

Perhaps as important to shipowners is lifecycle cost in the context of the other solutions available to address the same issues. LNG as fuel is still a big bet, but attractive compared to some other alternatives because it provides a near-single solution. It will meet ECA sulfur emission requirements and depending on type of engine solution selected, may also meet NOx emission requirements.

The decision to go 'all-in' on LNG must take into account the vessel design, how it is operated, where and for what length of time. There are multiple design issues associated with mak-

"Over the past years, there has been a big evolution of class rules into the new Goal Based Standards. The GBS are a way to establish a close link between class rules with goals and functional requirements established by the IMO."

RINA SERVICES

Roberto Cazzulo

RINA

ing LNG fuel the right solution. In six years I would expect LNG to be available as a marine fuel in at least half a dozen US ports, because by then the ships will have been delivered that require it. Once that happens, I would expect orders for more LNG-fuelled vessels to increase rapidly.

Tim Protheroe, Lloyd's Register North America: We see an increasingly important future for LNG as a marine fuel and particularly in North America. Right now LNG is being taken up mainly by smaller ferries, by short-haul Jones Act containership operators, and OSVs. Lakes operators are likely to be next. Gas is relatively cheap and abundant in North America – we classed the first LNG carriers and with the largest share of LNG carrier classification we are well placed to offer the gas technology support and risk management that shipping needs as gas-as-fuel evolves. Today, we are involved in LNG-as-fuel projects in North America and around the world. Our work with the Port of Singapore is helping set a template for the development of LNG bunkering in major ports.

Cazzulo, RINA: The use of LNG as fuel is a fundamental matter that will further progress in the next years, in particular for short sea shipping and internal navigation. The NOx Tier III and SOx emission limits in designated ECAs (including North America and US Caribbean Sea) and SECAs (currently the Baltic and North Seas) will drop. Dedicated & reliable emission control technologies, such as exhaust gas recirculation, selective catalytic reduction, scrubbers are needed. Instead, LNG may be used as a viable alternative. However, a lot of issues are to be resolved, both on board, for LNK storage capacity, and ashore, in particular looking at ships' integration with regasification plants and bunkering stations.

The lines of demarcation between Class and the regulatory community are becoming blurred. Classification Societies now routinely perform many tasks heretofore the exclusive domain of the flag state and the Coast Guard. As this practice widens, how do you maintain your objectivity and more importantly, who is checking now to make sure the job is being done correctly?

Tim Protheroe, Lloyd's Register North America: LR prides itself on 254 years of Independent Third Party status and is ISO Certified (by BSI). We've been performing as RO for about 100 Countries around the globe—doing Statutory work for many decades. So, this is nothing new for us. USCG delegation to Class is a positive for industry safety due to our expertise and flexibility. LR adapts our Rules and Regulations with regularity throughout the year to keep pace with industry technological advances. On the other hand, the USCG admits that a Rulemaking takes at least two years. With delegation to Class, the agency can husband its resources' on higher priority issues.

Watson, ABS: The trend toward Flag Administrations delegating statutory certification functions to Recognized Organizations (ROs) is not really that new. In fact it began in earnest after the end of World War II and has continued over the years, becoming the norm rather than the exception. The global trend to authorization of ROs was driven by a number of factors, such as the growth in the number of Flag States over the years, driven by rapidly expanding world trade as well as by the classification societies' expanding global networks of skilled surveyors and engineers which few Flag States could afford to duplicate.

Port State Control (PSC) also plays a key role in checking that the ship has been properly certified by ROs and in so doing provides an indicator on the RO's performance which is used

> "We feel uncomfortable when we see class societies claiming to create a new design and then approve the same design wearing another hat."

Philippe Donche-Gay

Bureau Veritas

by many Flag States as a basis to determine their level of RO oversight and monitoring. Within the last decade. PSC regimes have increased in number and now include 10 regimes covering almost all of today's ports where maritime trade is conducted.

In the US, ABS has had significant authorization to act on behalf of the US Coast Guard since 1981 and this has been progressively expanded over the years. The USCG's Alternative Compliance Program has now been in place for nearly 20 years. This has always been accompanied by close communications and working relationships between USCG and ABS personnel at all levels, as well as USCG involvement in ABS Rule development, and a robust system of oversight and monitoring of ABS' activities by the Coast Guard.

Roberto P. Cazzulo, RINA: The job carried out by classification societies is closely scrutinized internally and by many external bodies, including flag Administrations, Port State Controls, the IMO, the European Maritime Safety Agency (EMSA), the EU Quality Assessment and Certification Entity (QACE) and Accredited Certification Bodies (ACBs). The US Coast Guard (USCG) verifies the compliance of its Recognized Organizations (RO), including RINA, as well as plays a leading role to verify vessels heading to US ports, both as Port State and as inspection body, for instance for cruise vessels built in Europe. Findings and recommendations arising from these audits, inspections and controls are carefully considered for continual improvement of our quality management systems. One of the requirements that is more carefully checked is how class societies are able to maintain objectivity and independence of third party assessments, carried out during construction and ship's survey. Frankly speaking, we are concerned on how to deal with this number of internal and external audits and controls, without undermining the quality of our services.

Consolidation within the classification society world has brought together great strengths, but also centered power and influence in fewer organizations. What are the positives for the maritime industry?

Donche-Gay, BV: Consolidation is both normal and desirable in classification. Only global companies can have the resources to invest in the IT and research needed to stay abreast and ahead of new needs for bigger and more efficient ships and more sophisticated offshore energy units. Only a global organization can deliver the services needed quickly wherever they are needed.

Johansen, DNV GL: Stronger companies, with a wider and denser network of stations can serve customers better, and develop distinct strengths and competence.

Ueda, ClassNK: As the maritime industry is truly global, I think the growth and consolidation of classification societies may be a good thing for the industry. A developed global infrastructure allows class societies to support the maritime industry around the world, and also provides the resources necessary to contribute to the entire maritime industry.

Are there roles that Class should not take on? If not, why not?

Johansen, DNV GL: We in DNV GL are very clear on this: We do not design, build or operate assets on behalf of our customers. We contribute with conceptual ideas to the whole industry, but we do not go into detailed design. Neither do we patent technology for commercial use. Instead, we contribute with ideas that we present to the entire industry, in line with our purpose of safeguarding life, property and the environment.

> "Class is class and needs to be seen as such. Classification should not be confused with consultancy services offered by organizations that also offer classification services."

Lloyd's Register

Tim Protheroe

President, Lloyd's Register North America, Inc.

Philippe Donche-Gay, BV: We feel uncomfortable when we see class societies claiming to create a new design and then approve the same design wearing another hat.

Noboru Ueda, ClassNK: One criteria of membership in IACS is that every member maintains "independence from ship-owning, ship-building and other commercial interests which could undermine the Classification Society's impartiality," and I think it is essential for class societies to maintain our independent and third party status in this regard. At the same time, however, for ourselves at ClassNK we believe that the very purpose of classification is to contribute to the development of the maritime industry, including not only ocean-going vessels, but also inland and coastal shipping, as well as the offshore sector. That is the basis for all of our work and development as an organization. Whether it be developing new services for shipyards or owners, improving our service and quality, or conducting R&D, everything we do is dedicated to protecting life and property at sea, protecting the marine environment and supporting the maritime industry, and I expect that to continue in the future.

Tim Protheroe, Lloyd's Register North America: Class is class and needs to be seen as such. Classification should not be confused with consultancy services offered by organizations that also offer classification services.

Looking globally, what do you consider to be the top two or three regulatory issues that will have the deepest impact on the maritime world, and why?

Johansen, DNV GL: First, the stricter environmental regulation that we have touched upon. Secondly, the Maritime Labour Convention of 2006 (MLC 2006). While not having much impact yet, we believe MLC 2006 will shape for instance the interface between systems and humans, and new ways of looking at human factors to increase safety.

Watson, ABS: Two regulatory issues which are particularly challenging for owners of existing ships are ballast water treatment and air emissions regulations. Another very challenging issue for operators of existing ships is in meeting the limits on SOx and NOx emissions in IMO Emission Control Areas (ECAs). For many ships, compliance with SOx emission limits will require the fitting of multiple fuel oil systems and adjustments to engine systems and lubricants, or the fitting of exhaust gas cleaning systems or most radically, conversion to the use of LNG as a fuel.

For new ships, constructed on or after 1 January 2016, meeting the Tier III engine requirements for NOx emissions, may also be a significant issue, though the implementation date for these controls may be extended by IMO. The Tier III requirements call for approximately an 80% reduction in emitted NOx in relation to Tier I engines and may require the use of specialized emission reduction technologies such as water injection/humid air engines, exhaust gas recirculation, or selective catalytic reduction systems. Compliance with SOx and NOx emission limits – not to mention the adoption of ballast water management practices - therefore present the prospect of considerable capital outlay and increased operational costs over the medium term.

Looking a bit further to the future, the progressive tightening of the Energy Efficiency Design Index (EEDI) requirements in phases over the next decade, will effectively require progressive reductions in CO2 emissions from new ships. This, the high cost of fuel and the possibility of future market-based measures to specifically limit emissions of greenhouse gases, are driving research and innovation to make ships ever more energy efficient.

The Contributors

James Watson, ABS
James Watson is currently serving as President and COO for the Americas Division of ABS. He is responsible for all operations of the American Bureau of Shipping in the Western Hemisphere. Prior to joining ABS, Watson served as Director of the Bureau of Safety and Environmental Enforcement at the US Department of Interior.

Paal Johansen, DNV GL – Maritime
Paal Johansen heads up the joint maritime operations in North and South America. His previous position was Director of Renewable Energy in DNV North America. Throughout his 32 years in DNV he has held management positions for the company's classification business in several countries including Korea and Japan.

Roberto P. Cazzulo, RINA
Roberto Cazzulo joined RINA R&D in 1981 as an expert in structural reliability, fracture mechanics and risk analysis. Since the '90s, he has been actively involved both in IMO and IACS rule-making activities. Among others, he chaired the IMO Working Group on Human Element and Formal Safety Assessment, and, on behalf of IACS, participated in the development of the International Safety Management Code and Goal Based Standards for ship construction. In 2003, he became member and he is currently Chairman of the IACS Council. He will keep this position until June 2014.

Philippe Donche-Gay, BV
Philippe Donche-Gay holds an Engineering Degree from the Ecole Polytechnique (France) and Masters of Science from Stanford University (California, USA). He joined Bureau Veritas in 2008 as Executive Vice President in charge of the Industry and Facilities Division. As of November 1, 2012, he was appointed Executive Vice President in charge of the Marine and Offshore Division, addressing both industry segments.

Noboru Ueda, ClassNK
Noboru Ueda is the Chairman and President of ClassNK, with 45 years experience in ship classification. He began his career doing plan approval of newbuildings in the ClassNK Hull Department and later worked as a Surveyor both in Japan and the U.S. heserved as the Chairman of IACS from 2010-11, and is the current Chairman of the Association of Asian Classification Societies (ACS).

Tim Protheroe, Lloyd's Register North America, Inc.
Tim Protheroe has been President at Lloyd's Register North America since June of 2007). As the Regional Marine Manager with overall executive P&L responsibility for all LR Marine activity in the Americas, he is also responsible and accountable for strategy compilation and execution for business protection and growth. Prior to that he has filled numerous executive roles with Lloyd's and also holds Master Mariner, Class 1 seagoing credentials.

Optimize Performance via
Data Analytics

Early adopters use performance monitoring and condition-based maintenance tools to cut costs, head off breakdowns, find efficiencies and ensure compliance.

By Patricia Keefe

The only thing harder than finding a needle in a haystack, is finding the sharpest points in a haystack full of needles, which is essentially the situation today on most vessels. Awash with hundreds or thousands of data sensors and data points, it's the rare ship master or management team that can be certain they are culling the right information needed to cut costs and increase efficiencies to the extent possible in order to stretch razor thin operating budgets and goose tight profit margins.

Whether they know it or not, this is exactly the position that shipping companies find themselves in these days. All those sensors on all those systems – collecting and recording hundreds or thousands of data points a second, per day, each month – are building ever bigger digital piles, filling virtual bottomless cargo holds with shiny points of data. It's just sitting there, an untapped resource going to waste instead of informing strategic business decisions and heading off expensive repairs and fines.

The problem isn't collecting the data; it's not even understanding what to do with it. It's twofold, really. First, is just figuring out how to assess and analyze what you've got in order to pull out and focus on the salient bits that will enable ship company management and vessel masters to meet objectives – be it better fuel efficiency, lower fuel costs, longer equipment life cycles, lower maintenance and replacement costs or better environmental compliance – by making the right decisions in a timely manner.

That's where ESRG Technology Group LLC of Virginia Beach, VA, comes in. Founded by former U.S. Navy engineers, it provides cloud-based, remote condition monitoring and data analytics to enable clients to address environmental, fuel, energy and maintenance issues at both the vessel and fleet level, while also providing ship managers with "actionable" information by automatically analyzing a broad swath of data using a variety of reporting and comparison tools and dashboards. ESRG's OstiaEdge monitoring suite supports users on ship and on shore, across multiple platforms and server options. The company also provides custom application and consulting services.

The second problem lies in convincing a conservative industry, one often described as being in the Stone Age technologically, to leap forward more fully into the digital age and invest in the tools needed to sift through all that data. "Shipping is an old industry that has been around for thousands of years, with shipping companies that have been around for hundreds of years. It's sometimes slow to jump on the next big thing. The marine industry in general has been burned by technology, hence they are very cautious. The required mindset to be able to leverage the cloud is more forward looking than that of the average ship owner or operator," says Rob Bradenham, ESRG's General Manager.

Current Maritime Market for Data Analytics

The market of ships well suited for remote monitoring or using the cloud to analyze data is about 30,000 out of 100,000 commercial class vessels globally. Bradenham expects to see the market double, if not triple, in the next 15 years or so, noting that the vast majority of new builds are prime candidates. The standard for new vessels is such that they have good sensoring on board, good automation and control systems and good communications structures.

In terms of dollar value, Bradenham said that if those 30,000 vessels were to adopt data analytics and remote monitoring, it would create a $20 billion value in terms of reductions in fuel consumption, downtime, maintenance expenses and environmental fines for those customers. He thinks that number could go to $50 billion by 2030. In terms of ESRG's potential market - it is approximately $1B today, although the adoption rate is extremely low, "definitely less than 1%."

For the handful of shipping companies to date that have decided to try navigation as an alternative to drowning in their rising ocean of data, it's not hard to find examples of what the right kinds of decisions can get you. For example, monitoring can mean the difference between a successful voyage and coming to a dead stop somewhere in the middle of the deep blue because you didn't know how to read the data points telling you over the last two weeks that an engine breakdown was imminent. (Heading off system failure is one of the two top reasons users are attracted to data analytics; cutting fuel costs and consumption is the other.)

Or, in the case of an offshore supply vessel, the decision to compare the difference in exhaust temperatures between cylinder banks at different operating modes. This led that company to make a simple, yet timely repair, which prevented a potential future failure that ESRG says could have cost $750,000 in repairs and downtime.

Then there's the kind of decisions that enabled Bernhard Schulte Shipmanagement (BSM) to achieve a 2% to 5% reduction in fuel consumption three years into its five-vessel ESRG real-time data analytic installation. It doesn't sound like much, but in actuality, it adds up to a lot more than chump change. As explained by project manager Romuald Wojtaszczyk, who held a variety of positions at BSM over a 24-year career, most recently as project manager for its ESRG install, before moving to Nordic Hamburg Shipmanagement to work on another ESRG project, "If consumption is 100 tons a day, and you are able to save 5%, and if the price is $500-$600 per ton, now you are saving $2,500 a day. If you calculate for the month, now it's $75,000. Money like that cannot be ignored."

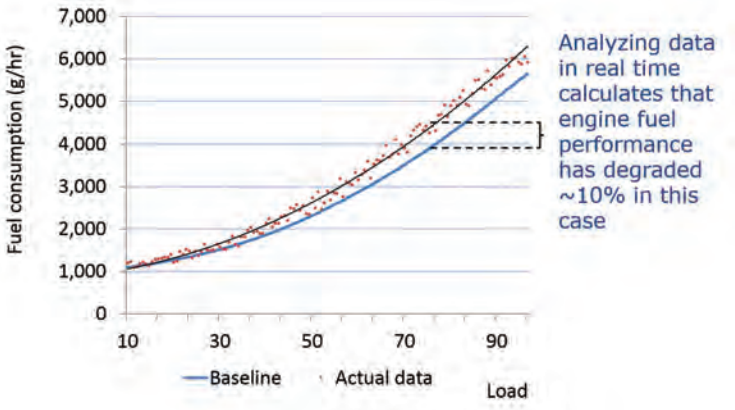
That's exactly the kind of fuel optimization and efficiencies-related savings that American Roll-on Roll-off Carrier (ARC) thinks is realistic, and hopes to achieve as it pilots ESRG's OstiaEdge package on a single vessel. If all goes well, ARC will expand the software to the rest of its seven-vessel fleet later this year.

"We are looking for a nominal improvement in fuel consumption – 2% to 4%," says Fred Finger, vice president & general manger, FLP and Vessel Operations at American Roll On Roll Off Carrier. "We'll be happy if we get an incremental increase in vessel reliability and reduce off-service time by 5% to 10%. Then as we see what the capabilities [of the system] are, we'll have a better idea of where to go beyond that. Right now, we are being very conservative in our expectations, but if the system works as we expect, our payback will be well less than a year."

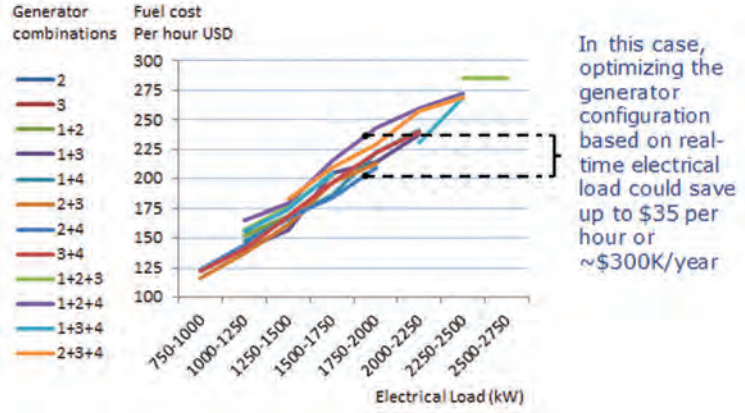
Condition-based maintenance is also paying off for companies like BSM. For example, Wojtaszczyk explains how something as simple as looking at the bearings on the shaft of an electrical motor can lead to savings. "The recommendation was to change them out every one and half years. We were finding that the bearings at that point were still very well conditioned. But if you take them out, you cannot put them back in. You have to install new ones." Using CBM, BSM discovered it could wait two and half years before replacing the bearings – saving time and money.

And in cases where equipment maintenance schedules are mandated by class rules, users can take the historical data from CBM to the classification society and request that it extend the maintenance intervals for that piece of equipment. The opposite situation is true as well. Companies can bring historical records that show underperforming equipment to manufacturers in a bid to seed corrections, and also use those records to make new equipment or maintenance allocation choices for their fleet.

It can be hard to compare equipment use across a fleet with vessels of different ages, running different routes, dealing with different environmental issues. But data analytics can nonetheless ferret out trends that show some brands or types of equipment are more problematic than others. "So when you make plans for



Understand equipment energy efficiency: Using actual engine performance and fuel consumption to target maintenance when and where needed.



Optimize Generator configuration: Using actual generator fuel performance to optimize the configuration based on the current electrical load.

"The market for data analytics will be forced by charterers, because if they have the choice, they want you to have the tools on board to operate the vessel in the best possible way for them and the owners. If you can offer the ship with the lower fuel cost, and you can prove it using ESRG's data, it absolutely helps a lot during contract negotiations."

Romuald Wojtaszczyk, project manager, Nordic Hamburg Shipmanagement

your next new builds, you say, 'ok, we'll eliminate this equipment because it costs more to maintain,' " says Wojtaszczyk.

The U.S. Navy – On Board from the Start

The potential for those kinds of results and more, are what captured the attention of the U.S. Navy, which has been working with ESRG since 2000, first to help develop the real-time analytics and monitoring software, and then to deploy the technology as the first user. Today, via its OstiaEdge platform, ESRG supports the remote condition monitoring of over 100 US Navy surface fleet ships, producing a wide array of performance reports for a range of vessels from aircraft carriers to container ships.

The predictive diagnostics capabilities of the software have proven their worth to the Navy on more than a few occasions. In one case, ESRG did an initial analysis of the equipment on a Navy destroyer preparing for an extended deployment. A generator was observed to have a similar anomaly during start-up as a recently failed generator for a sister ship. Combining the ESRG analytics and expert review with an in-person follow-up enabled the Navy to avoid suffering a catastrophic and expensive failure during deployment.

Environmental issues are big for everyone, and violations can mean stiff fines. Performance optimization and better equipment maintenance have trickle down impacts on environmental compliance, notes ARC's Andy Anantharam, an independent technical consultant who owns Maritime Consultancy Services, Inc. "Our main focus initially was on fuel consumption. But with impending new sulphur emissions regulations, fuel cost becomes a critical operation element for us and we need to manage it as best we can. If you reduce fuel consumption, you are in turn restricting these emissions to the atmosphere and then of course, the same for carbon monoxide and green gas emissions," he explained.

Data analytics not only helps ship owners catch potential issues early, but data automation and ship- to-shore exchanges of data and reports enables ship officers to provide on the spot documentation to port and regulatory agents.

Likewise, Nordic's Wojtaszczyk sees the potential for providing similar historical data in another context – in the event of a collision or other big damage on board ship, the ability to take data from the ESRG system and later prove to the insurance company that what happened was not the result of a crew mistake, but perhaps an indication that something else went wrong. If it did, it will be in the data, he says.

For now, early adopters like the U.S. Navy, BSM, Nordic and ARC are the savvy exceptions to the prevailing industry mood. Given that many consider today's economic environment to be one of the worst down cycles ever for shipping, the cautious, mostly shorter-term focus of many ship owners is not surprising. That said; getting a handle on big data and putting it to work is not only a strategic must, but more doable than they might think.

Data analytics: A Competitive Advantage

From a competitive standpoint, the ability to analyze data streams looking for patterns and early hints of problems, and the ability to do comparative analyzes – i.e., how does system A affect system B under X weather, speed and load levels – is critical to making the longer-term investments and business planning needed to enhance productivity and profitability.

Real-time analytics also allows users to "nowcast," or ascertain probabilities about more current and ongoing events, enabling companies to further better optimize performance and find efficiencies. "The whole ideas is to give the ship's crew, and via satellite transmission, the shore-based system, a condition-based program that will allow them to get really good, accurate information on the current condition of the equipment they operate - the main engine, generator and boiler – and pre-advance warnings of parameters that could

give earlier warnings of the likelihood of any failure risks," says ARC's Anantharam.

In short, sophisticated analytics can substantially improve decision-making, minimize risks, and unearth valuable insights that would otherwise remain hidden, according to the **McKinsey consultants who** authored a July 2012 paper, "Why Big Data is the new competitive advantage," published in the *Ivey Business Journal*.

Technical Obstacles to Installation

Of course, there are technological obstacles in general, and particular to shipping, that needs to be resolved before there is likely to be any mass adoption. These include communications costs, retrofitting aging ships, data storage and management, and the need in some cases to convert analog sensors to digital signals. One of the biggest causes for pause for many companies is the cost of satellite communications. Before you can analyze your data, you have to get it off the ship. But while ESRG's Bradenham insists satellite costs have fallen to less than $1 per megabyte, he also says connectivity doesn't have to be a sticking point. It's all a matter of how often the shore side office wants to get data feeds. For some companies – a couple of times a day is sufficient. Where companies have broadband, and crew connectivity is considered a priority, it's easier to send hourly or more frequent data streams.

ARC has broadband and sends updates every 2 minutes. "We are looking at having an essentially instantaneous import from the ship," says Anantharam. ARC has ambitious plans for taking advantage of its data stream. In addition to creating a proactive environment for maintaining equipment, from a risk management standpoint, "the ability to be able to manage and document activity, such as emissions monitoring, is something we've always wanted to do," says Finger.

The kind of documentation that Finger is talking about is very important, above and beyond maintenance and optimization issues, says Wojtaszczyk. In addition to helping document insurance claims and environmental issues, he says those reports can be used both to get charterer agreement to route or speed changes, as well as to sell them on claims of more efficient, lower fuel cost service.

Retrofitting may actually be a bigger issue for companies to get their heads around. New builds, like the two ships Nordic has under construction, will come pre-prepped with the necessary communications structure to handle data streams. But many ships in today's fleet are more apt to fall in the 10- to 20-year-old range, and lack the updates needed to take full advantage of monitoring and analysis packages like OstiaEdge.

At ARC, for instance, it was necessary to upgrade the shipboard alarm monitoring system to add serial port communications in order to use the OstiaEdge package. It took 6 months to get the system delivered, and four days in port to get it installed, during which ESRG installed its software. "Our ships are 15 to 20 years old. The equipment and alarm systems are not the most current, so we had to do some upgrading there," says ARC's Finger.

But first, they had ESRG come in and do a survey of their equipment and systems to analyze what they had, and what additional inputs (sensors) they'll need versus what is there today, based on the kinds of reports they want, and how they want to manipulate the data. "We have had to do several upgrades to take full advantage of the program," adds Finger.

Still, one of the reasons ARC and Wojtaszczyk choose Osti-

ESRG's OstiaEdge open software-based real-time data analytics modules runs across multiple platforms, including Windows and Linux PCs, smart phones, tablets and laptops.

aEdge is because of its flexibility, saying they are finding it relatively easy to use even with older systems and ships, in part because the OstiaEdge platform does not require replacement of current systems, but rather integrates existing data into its system.

However, ships with analog sensors will find they have to upgrade to digital to work with OstiaEdge, says Wojtaszczyk, which he notes, is significantly more expensive than having it installed as part of a new build. "But ESRG is the champion of modifications," he adds. Retrofitting BSM's first ship took three months, after that, most changes were installed in two weeks, while the ESRG software was installed and synchronized with ABS classification software, in three days.

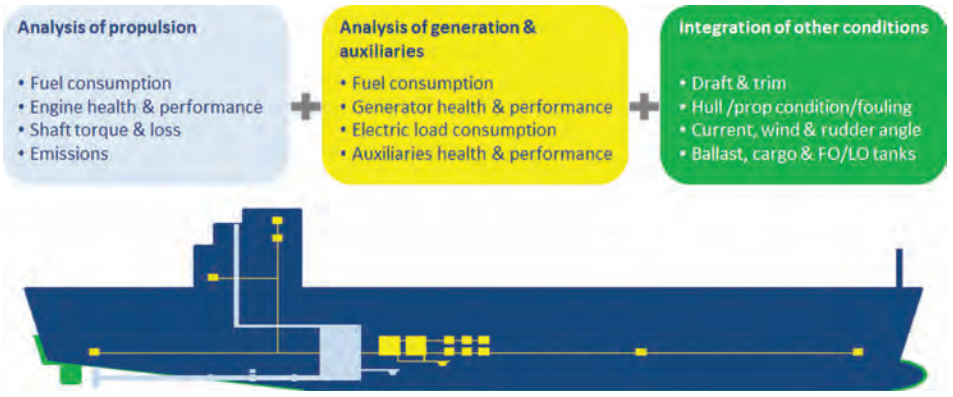
Nordic is launching its pilot with new builds, but plans to expand the application to the rest of its fleet of vessels, the oldest of which was built in 2008.

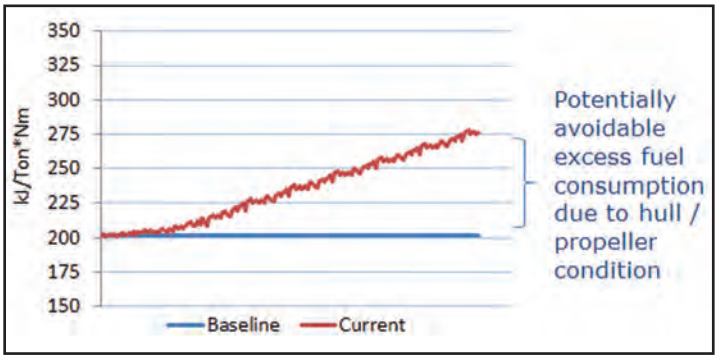
Besides their willingness to bring their operations into the digital era, one of the things that stands out about these early adopters is that they are so certain of the ROI of real-time data analysis that they are unfazed by retrofitting issues and costs. It's the same for communications costs. These users simply see plenty of evidence, in and out of their market sector, that control and analysis of their data is going to be the key to long-term success on so many levels. And they don't think most shipping companies will be able to hold out for long.

From an international perspective, Wojtaszczyk believes the market for data analytics will be forced by charterers. "If they have the choice, they want you to have the tools on board to operate the vessel in the best possible way for them and the owners. If you can offer the ship with the lower fuel cost, and you can prove it using ESRG's data, it absolutely helps a lot during contract negotiations."

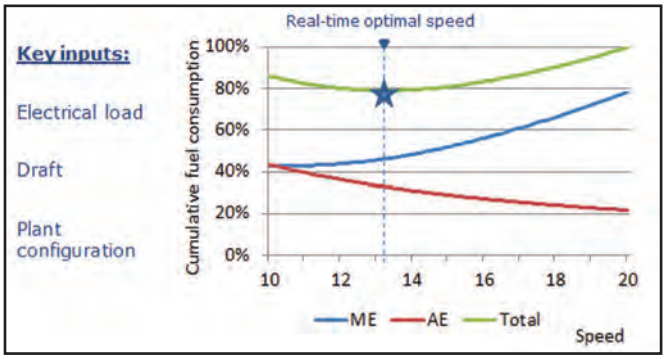
In the U.S., the drive is going to be more primal, believes Finger. "Depending on mortgage and types of ships, I don't think all will have to do it. However, if you are a U.S.-flagged vessel, with the cost structure we have here, the savings to be had are larger than what it might be for someone operating a non-U.S.-flagged ship. Our costs for crew and daily operating expenses are higher, so initial savings will be higher."

"The bottom line is improved performance, better risk management, and the ability to unearth insights that would otherwise remain hidden. As the price of sensors, communications devices, and analytic software continues to fall, more and more companies will be joining this managerial revolution," predicts the McKinsey report. It's not hard to see why. The ROI to be had, and the breadth and speed of that return on investment across the many layers of a shipping operation, should prove irresistible to anyone paying attention to the bottom line and all the factors affecting that number.





Hull & Propeller Condition Analysis: Combining real-time torque, engine power, draft and speed through water enables calculation of actual work required to overcome hull resistance.



Optimize Speed based on electrical load: Especially relevant when carrying refrigerated containers, increased electrical load will drive higher speed to optimize fuel consumption.

MLC Mandated Medical Management for Mariners

Managed medical care specialist Future Care is changing the way the maritime industry looks at mariner healthcare

By Joseph Keefe

The Maritime Labour Convention 2006 (MLC) has forever changed the way vessel operators look at healthcare for the world's 1.3 million mariners. For some, it means simple compliance with a minimum set of standards and managing the costs associated with that standard. For others, MLC is a call to arms for those who work to make sure that healthcare at sea means more than just emergency telemedicine services.

For Christina DeSimone, CEO of Future Care, Inc., managed healthcare means competent telemedicine for seafarers who suffer injuries or become ill hundreds of miles out to sea. It can also means following up on every case that they are call on to handle; managing cost, assignment of the right physician and ensuring that a seafarer gets the right treatment at the right facility. That attention continues through physical rehabilitation and the ultimate goal of returning the mariner to work as quickly as is possible. More than that, however, Future Care's managed healthcare solution means establishing a baseline history for every seafarer on the planet – before they ever step onto a vessel.

Studying Seafarer Health: a fulltime job

In May of last year, an ambitious effort to bring seafarer healthcare to a new, higher standard kicked off when the Yale University School of Medicine, in conjunction with managed healthcare solution provider Future Care, Inc., released a study entitled *Preliminary Evaluation of Seafarers Health Care and Determination of Predictors of Illness*. For perhaps the very first time, the effort to provide proactive as opposed to reactive healthcare to mariners was underway. Until now, very little research had been conducted on the health and general welfare of the world's 1.3 million seafarers who collectively spend their time traveling, living and working on vessels far away from their home countries.

Future Care's CEO, Christina DeSimone, determined that there was an immediate need for an analysis of the incidence of illness and injury among this singular group, with particular emphasis on their special risk factors. The ultimate goal is to draw conclusions that will assist in the development of

Martin D. Slade, Lecturer, Director of Research, Yale Occupational & Environmental Medicine and Dr. Rafael Y. Lefkowitz, MD MPH, Clinical Instructor, Yale Occupational and Environmental Medicine.

"We developed the program for primary healthcare; not just emergencies. We want them to able to call even if there is a small issue that they might otherwise ignore, because those are the problems that can turn into a big issue if not attended to quickly. We think that's what is different about our program is that it involves an active wellness program. It means that healthcare services have to be rendered at sea. Medical solutions at sea are not just about answering an SOS call."

– Christina DeSimone, CEO of Future Care, Inc.

improved programs for the prevention of illness and injury on board and the efficient treatment of seafarers' medical issues when these do occur.

The initial study did have its limitations. These included the absence of preliminary, initial health data associated with each mariner. Dr. Rafi Lefkowitz of the Yale School of Medicine told *MarPro* in February, "One of the things that is limiting in the preliminary study is that we don't have data on all the crew on the ship that have not yet been hurt or injured. So, we have statistics on the people that have experienced problems or had to call Future Care. The big lacking variable with seafarers is that people (shipowners / operators) don't know who is on the ships to begin with. We don't (yet) understand the population that is at risk and that's exactly what we are trying to develop."

According to Future Care's DeSimone, the shipowners themselves have to participate and share data. Manning agents will be important, as well. Recently, Future Care and Yale were fortunate to obtain additional medical statistics covering 10,000 Filipino seafarers to add to the data. Once collated and analyzed, newly secured conclusions will be released to industry.

Future Care in Action

Future Care's 24/7 First Response "Caring for the Crew" program provides the shipowner with opportunities for medical cost containment, throughout the world. Future Care CEO Christina DeSimone defines a managed care specialist as a company that uses medical expertise to manage a patient or injured worker back to maximum medical recovery with the best possible care in the right time frame. Future Care's maritime solutions mean providing the crewmember the best care in the right time frame. She adds, "We will arrange with the medical facility as to what that means and ensure that it happens by monitoring the care. We minimize the disability by maximizing the procedure. You get a worker that's viable to return to work."

Using the Future Care model, the point of managed care is to supervise, but not provide care that is given. A quick return to fit for duty status ultimately results in a reduction in maintenance and cure costs. That's because there is a medical professional managing and supervising the patient's treatment with the goal of getting the patient the best care which will reduce his time under a physicians care. This also includes making sure the patient is taking his medication, going to physical therapy. Future Care case management commences the moment the illness through the providing of maximum care. DeSimone adds, "In the case of a U.S. seaman who already has insurance, we will monitor the rehabilitation of that mariner."

As many as 25,000 crewmembers are under the Future Care umbrella at this time, with quality operators such as Teekay (120 vessels), Genco and General Maritime among their clients. As MLC talks about enhanced healthcare solutions, other shipowners are being encouraged to provide a medical first response plan. DeSimone wouldn't estimate how much the new rules could impact the business, except to say that it would probably increase as more owners look for ways to ramp up care for crewmembers and demonstrate compliance with the law.

Telemedicine Redefined

Telemedicine isn't a new concept. What's different about the Future Care approach is that it stresses prevention and primary healthcare, as well. Christina DeSimone says, "We developed the program for primary healthcare; not just emergencies. We want them to able to call even if there is a small issue that they might otherwise ignore, because those are the problems that can turn into a big issue if not attended to quickly. We think that's what is different about our program is that it involves an active wellness program. It means that healthcare services

have to be rendered at sea. Medical solutions at sea are not just about answering an SOS call."

Future Care's telemedical physician advisory service closes the risk gap for ship owner and the insurance company by providing a managed care service that starts within the first hour of a medical incident on board the vessel. DeSimone says, "We patch a physician advisor through to the Captain, using satellite communications to begin a process of treatment even before they reach port. We collectively have our doctors in a virtual call center, and call in the right doctor, on call at the right time for a given incident."

Future Care Managing Director Larry Jacobson explains the approach further. "People get caught up in the various technologies and video conferencing, all of which of course enhances the quality of the diagnostic procedure. But, when you strip away all the technology, what you have left is the quality of the physician on the other end. What separates us from the competition is the quality of our network physicians. Most if not all have been remotely treating seafarers on ships for many years, hence they are more adept at asking the appropriate questions."

And, telemedicine, says DeSimone, shouldn't end when the call is over. "Managed care means continuity of care. There are services that provide medical advice where the captain can call up and get advice. But, once the seaman gets to shore, they're not available anymore. The person who did the initial diagnosis isn't going to be involved any longer. Our physicians and medical personnel will be in touch and make contact and provide supervision all the way to the medical cure. Taking care of a case – from beginning to end – is where we bring value to the crewman and to the employer."

Preventative Medicine Starts with Data

Illnesses can't always be caught in pre-employment physicals. It can be age-related, degenerative, or sometimes, just another surprise. DeSimone explains, "That's why Yale is studying our statistics. We want to quantify what kind of illnesses are problems. This might involve more extensive pre-employment physicals, wellness programs on board the vessels. It's about preventative care."

To that end, Future Care has put out a collective message to the maritime community on how much value there will be in setting up preventative medicine programs for mariners. DeSimone says, "We need the cooperation of manning agents, because they're the ones who hire and place the people aboard the vessels and they keep the medical records and certificates. And, we need to put the study together that includes that data – a blind study about the total population of mariners, something that would reveal so much more for us."

Future Care hopes that the statistics will help them better manage the cases when they do happen. For example, two

months after seaman "a" gets on board, he experiences an illness. With the pre-employment medical data at hand, it becomes a tool to help better diagnose the problem and solve it before it becomes a bigger issue. And, that data would be de-identified until the moment it is actually needed. Larry Jacobson explains, "We are mindful of our responsibility to protect privacy. Original data is de-identified and is never released to anyone else. But, it is almost impossible to do a good job with their healthcare without being able to link the individual to his/her data."

The Bottom Line

Cost is a significant issue for shipowners and P&I Clubs. DeSimone addresses that issue, saying, "We have contracted rates with the hospitals – the same kind of rate that a preferred provider might have with a hospital or physician." Without a managed solution, foreign mariners might be brought into a U.S. facility and be charged retail rate which, as it is, might be 50 percent higher. "We look to get our clients the lower rates and ensure that unnecessary procedures and charges aren't a part of the final tally."

As good as the Future Care service might be, and discounting all the benefits it can bring to the mariners themselves, it still has to be sold to the shipowners, who look to the bottom line in everything that they do. Martin Slade underscored that point by saying, "We look at the economics, as well. It's clear to us that a healthier workforce is economically beneficial, but we want to be able to quantify that. If we can do that, we'll have more people buying in. We're starting to get data on who's getting on board, and very soon, we hope to have defining analytics on rates, as opposed to just who is injured." No doubt, when that happens, the bottom line will be therefore happier for everyone.

P

Profile

REGULATORY PROFILE

William P. Doyle

Commissioner of the Federal Maritime Commission

By Joseph Keefe

If the Federal Maritime Commission remains somewhat of an enigma to domestic maritime stakeholders, perhaps that's because its scope of oversight reaches many sectors of maritime business; some more obscure than others. In February, we caught up with FMC commissioner William P. Doyle, who provided the perfect primer on this important agency. What does it take to become a Federal Maritime Commissioner? As it turns out; plenty:

Doyle was sworn in on January 10, 2013 as Commissioner of the Federal Maritime Commission. All told, Doyle has over 20 years of experience in the transportation industry, including both the maritime and energy sectors and has held several senior executive positions. These include an executive role as the Director of Permits, Scheduling, and Compliance with the Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects. There, he managed and directed the permitting and regulatory coordination of 24 federal agencies, numerous State of Alaska agencies, and both federal and provincial agencies of Canada. A 1992 graduate of the Massachusetts Maritime Academy, Doyle's career path has taken him to sea as a marine engineer, into the shipyard and eventually, to law school. Doyle served over a decade as a merchant officer aboard numerous classes of vessels and he also spent as MEBA Deputy General Counsel, Director of Government & Legislative Affairs and later became Chief-of-Staff.

FMC Defined

According to Doyle, The FMC may not be widely known and/or understood, but it has a longstanding, important, and multifaceted role. He explains, "The Mission of the FMC is to foster a fair, efficient and reliable international ocean transportation system and to protect the public from unfair and deceptive practices. We strive to meet that goal in several ways," adding, "I really do enjoy being a Commissioner."

The FMC receives complaints and offers alternative dispute resolution services (ombuds assistance, mediation and arbitration) in attempt to reach a timely settlement and has administrative law judges (ALJs) who issue binding decisions. Doyle says, "We act as an appeals court per se, and rule on decisions made by the ALJs and consider appeals of ALJ decisions. Cases we decide include the shipment of goods by small business and disputes between and among marine terminal operators (MTOs) and common carriers."

High Energy

Of interest to energy stakeholders, Doyle, in a previous life, has served as Representative on the U.S. delegation for the United States on the bilateral trade delegation for the U.S. – Canada Energy Consultative Mechanism meetings, bilateral energy trade issue talks intended to strengthen the largest bilateral energy relationship in the world. Beyond that, he represented the U.S. in the annual coordination meeting between the U.S. Pipeline and Hazardous Materials Safety Administration and Canada's National Energy Board. And, he was selected by the U.S. Department of State to participate in an international shale gas workshop to assess international resources, supply options, and market conditions.

Cruise Bonding & Consumer Protection

The Commission's Bureau of Certification and Licensing (BCL) is responsible for Passenger Vessel Certification. The BCL includes the Office of Passenger Vessels and Information Processing (OPVIP). OPVIP receives and reviews applications from passenger vessel operators (PVOs) for Certificates (Performance) and Certificates (Casualty) and the associated coverage evidencing acceptable forms of financial responsibility. In this case, the Certificate (Performance) indicates that the PVO has filed acceptable evidence of financial responsibility with the Commission. The coverage is used to reimburse passengers when the PVO fails to perform cruises as contracted and has taken no further actions to refund passengers. The Certificate (Casualty) indicates that the PVO has filed acceptable evidence of financial responsibility with the Commission which can be used to pay claims for death or injury to passengers and other persons on voyages covered by the program.

Cruise lines typically require that prospective passengers provide a deposit in advance of a voyage. In the cruise industry the collection of deposits from consumers is known as unearned passenger revenue. Doyle says, "That's fine, but occasionally something goes awry: a scheduled cruise fails to sail or is not completed, or there is a casualty. Since the year 2000, 15 passenger vessel operators have gone out of business, one of which had collected $51 million in deposits from would-be passengers. So, to protect consumers, the FMC requires cruise lines to have proper financial backing to refund passenger deposits should a cruise line fail to perform on its contract."

Roots: Marad & FMC

FMC's history dates all the way back to its relationship with the U.S. Maritime Administration and subsequent separation. During World War I, Congress feared that collective liner pricing organizations (conferences) would use their market power to unreasonably raise rates or reduce services. Hence, the Federal Shipping Act of 1916 was enacted, thereby creating the United States Shipping Board. In those days, says Doyle, the United States Shipping Board and its immediate successor organization, the United States Maritime Commission, com-

bined the roles of regulatory policeman and promoter.

Later, the Merchant Marine Act charged the United States Shipping Board with monitoring and responding to foreign regulations that create conditions unfavorable to shipping in the foreign trade. In 1933, an executive order transferred the United States Shipping Board's functions to the U.S. Shipping Board Bureau in the Department of Commerce. In 1936, Congress separated the Board from the Commerce Department, creating the United States Maritime Commission. Joseph P. Kennedy served as its first Chairman.

In 1950, the regulatory programs of the United States Maritime Commission were transferred to the Federal Maritime Board at the Department of Commerce, where they resided until the FMC's creation in 1961. And, in 1961, the performance of regulatory and promotional functions were separated, resulting in the formation of the U.S. Maritime Administration and the Federal Maritime Commission.

Doyle explains, "Not just the name changed, the laws we administer are periodically modernized to adjust to the dynamic maritime industry. The Shipping Act of 1984 was enacted, which among other things introduced the concept of contract carriage with service contracts filed with the FMC. In 1998, after a study of the 1984 Act and review by an advisory commission, a second round of deregulatory liner legislation was enacted – The Ocean Shipping Reform Act of 1998."

Today, FMC works with the U.S. Department of Transportation and MARAD on the recently implemented Value Added Tax (VAT) by the People's Republic of China (China). The issue pertaining to the VAT is whether there is any unfairness in application of the tax. For the past several years, the United States and China have held annual U.S. Bilateral Maritime Consultations.

FMC also works with MARAD on the Maritime Security Program (MSP). Doyle explains, "I'm mindful that one purpose of the Shipping Act is to encourage development of an economically sound and efficient liner fleet of vessels that is capable of meeting national security needs. I have made it clear that I am a strong supporter of the U.S.-flag. And, in my role as a Commissioner, I make it my business to look after the U.S.-flag international fleet. There's a lot going on in the international flag fleet—proposed carrier alliances, proposed carrier expansions to vessel sharing agreements and the like—and as we know, major carriers in the MSP are parented by international owners. Some of the carriers who have proposals before the Commission have ships enrolled in the MSP."

As over-capacity in the international container trades persists, with fuel costs for ships remaining stubbornly high, spot container freight rates have remained low for a long period of time. Noting this, Doyle told *MarPro*, "Carriers are doing everything they can to cut costs and streamline operations that may include new and/or expanded alliances. That said; I don't want to see our U.S.-flag international fleet harmed during this period of transformation. The United States relies


William P. Doyle, FMC Commissioner

on these companies and their ships during times of conflict. That's why it has been so important for me to keep current on latest developments coming out of MARAD."

The Harbor Maintenance Tax and Trust Fund

In 2012, the FMC undertook a study of U.S. inland containerized cargo moving through ports in Canada and Mexico. At the time, some lawmakers were concerned about whether the Harbor Maintenance Tax (HMT) played a role in cargo being shifted from U.S. ports to ports in Canada and Mexico. While FMC does not have regulatory authority over the HMT, the Commission analyzed potential impacts HMT may have with respect to cargo diversion. FMC ultimately determined that the current HMT structure is just one of several issues shippers weigh in their cargo routing decisions. Doyle adds, "The FMC has communicated its findings to Congress. We will be guided by any legislation enacted by Congress and we continue to offer our comments and expertise when requested."

FMC and OTI's

The FMC regulates ocean transportation intermediaries (also known as OTIs). The term OTI encompasses Ocean Freight Forwarders (OFFs) and Non-vessel Operating Common Carriers (NVOCCs). For many, these "brokers" or middlemen are the only parties with which they will interact in moving goods. Doyle insists that businesses should only use FMC- licensed ocean transportation intermediaries for their movements. He adds, "Concurrent with licensed participants, there are unlicensed, rogue operators out there. These are the bad actors, if you will." To help the shipping public, Doyle explains, the FMC posts a list of licensed OTIs on its website where one can search by a company's name or by a location. There are approximately 4,000 licensed OTIs in the United States. U.S.-based companies or sole proprietors operating as either an OFFs or NVOCCs are required to obtain a license from the FMC. Non-U.S. based NVOCCs are not required to, but they may obtain an FMC-issued license. Doyle adds, "The general difference between OFFs and NVOCCs is that an NVOCC acts as the carrier of the

cargo being sent." The Commission is currently reviewing comments as a result of an advanced notice of proposed rulemaking that could affect OTIs, with the ultimate goal of balancing the needs of consumers with those of the industry.

The Commission's Area Representatives also participate in investigations of potential violations of the Shipping Act and Commission regulations, working with Bureau of Enforcement (BOE), which is the prosecutorial arm of the Commission. BOE attorneys also negotiate settlements and informal compromises of civil penalties, and may act as investigative offices in formal fact-finding investigations. During the first 10 months of 2013, the FMC completed seven compromise agreements from companies that violated the Shipping Act. The recovery totaled of $617,500 in civil penalties. The alleged violations include providing service that was not in accordance with the rates or charges contained in their tariffs, failure to be properly bonded and falsifying cargo declarations related to service contracts.

FMC: Fairness, Transparency & Justice for All

Vessel sharing agreements and proposed carrier alliances are another area of FMC oversight. Under the Shipping Act, carriers are allowed limited antitrust immunity. The FMC is currently considering what the trade-press has dubbed "mega alliances" involving the world's top International container lines interested in expanding or forming vessel sharing arrangements. In reviewing agreements filed with the FMC, the Commission's regulatory role is to determine whether the agreement is likely, by a reduction in competition, to produce an unreasonable decrease in transportation service or an unreasonable increase in transportation cost.

In December of 2013, the Commission reached compromise agreements with two international-flag car carriers with penalties totaling $2.3 Million. The carriers were found to have acted in concert with other ocean common carriers with respect to the shipment of automobiles and other motorized vehicles by car carrier vessels, where such agreement(s) had not been filed with the Commission or become effective under the Shipping Act. Commission staff alleged that these practices persisted over a period of several years and involved numerous U.S. international trade lanes.

William Doyle says, "It is important that common carriers follow the law. The FMC takes seriously carriers' obligation to file with the Commission any agreement with other carriers affecting working relationships in the U.S. trades, both for import and export traffic. The shipping public has a right to know the subject matter and scope of any such agreement, and the Commission is charged by Congress to oversee the parties' operations and conduct under such agreements."

The Cost of Mariner Healthcare

Seafarers are a vulnerable population, working far from home under stressful and dangerous working conditions, putting them at risk for a different range of illness and injury than land-based employees. In May 2013, the Yale University School of Medicine and Future Care published a preliminary study based on data obtained from six years of medical incidents managed under Future Care, Inc.'s "Caring for the Crew Program." Goals of the study included characterization of medical events and services provided, cataloguing and analyzing medical expenses, determining risk factors for the development of medical events and developing intervention strategies to reduce injury and illness.

6 years of the Future Care Database:

106 companies	6,724 on-board inquiries
1,500 ships	3,537 independent claims (injury, illness)
>5,600 seafarers	16,711 billed events

Data Delivered, Conclusions Made: The preliminary study revealed interesting trends. Overall, 54.4% of the Future Care cases were due to illness, 32.6% were the result of injury, and 13.0% were dental issues. Age, gender and nationality stratified distributions of diagnoses, along with their associated costs, were calculated. Results of these analyses revealed that Asians accounted for the greatest percentage of medical events (46.3%) and, not surprisingly (the vast majority of mariners are male), 97.5% of all medical events occurred to males.

The vast majority (76.7%) of medical claims were incurred by seafarers 50 years of age or less. Injury and musculoskeletal claims accounted for more than half of all medical events (50.3%) with an associated direct cost of almost 14 million dollars. Cardiovascular disease, while accounting for only 4.8% of claims, had an associated direct cost of well over 5 million dollars. With regard to point of service, inpatient services accounted for only 2.4% of bills, but 40% of all charges. Among older seafarers (aged 51 through 60 years of age), cardiovascular disease predictably accounted for a much greater percentage than it did among younger seafarers (under 30 years of age).

FUTURE CARE

CARING FOR THE CREW PROGRAM
www.futurecareinc.com

Various Shipowners: Average Cost Per Case Report:

Shipowner	A Shipowner	B Shipowner	C Shipowner	D Shipowner	E Shipowner	Total
Total Number of Vessels enlisted in program	74	120	54	54	11	**313**
Average Case Management fee per case	$ 530.79	$ 470.62	$ 332.70	$ 719.04	$ 287.21	**$ 499.49**
Total Number of Crewmember medical requests	575	750	183	234	81	**1823**
Number of Male medical requests	574	742	182	234	81	1813
Number of Female medical requests	1	8	1	0	0	10
Mean Age of Crewmember	39.11	39	41.08	39.58	38.1	**39.37**
Predominant Nationality	Indian	Filipino	Indian	US	Ukrainian	**Indian**

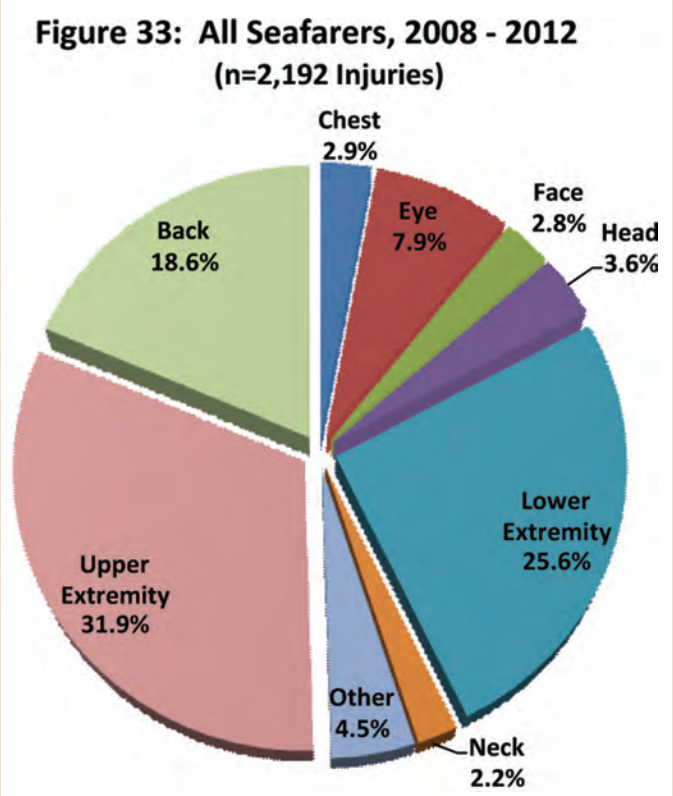


Figure 33: All Seafarers, 2008 - 2012
(n=2,192 Injuries)
Chest 2.9%
Eye 7.9%
Face 2.8%
Head 3.6%
Back 18.6%
Lower Extremity 25.6%
Upper Extremity 31.9%
Other 4.5%
Neck 2.2%

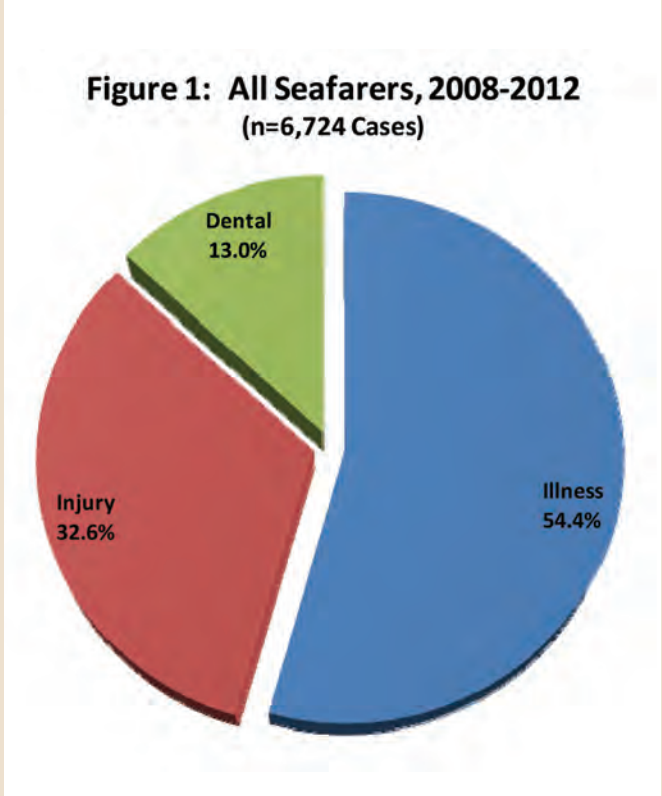


Figure 1: All Seafarers, 2008-2012
(n=6,724 Cases)
Dental 13.0%
Injury 32.6%
Illness 54.4%

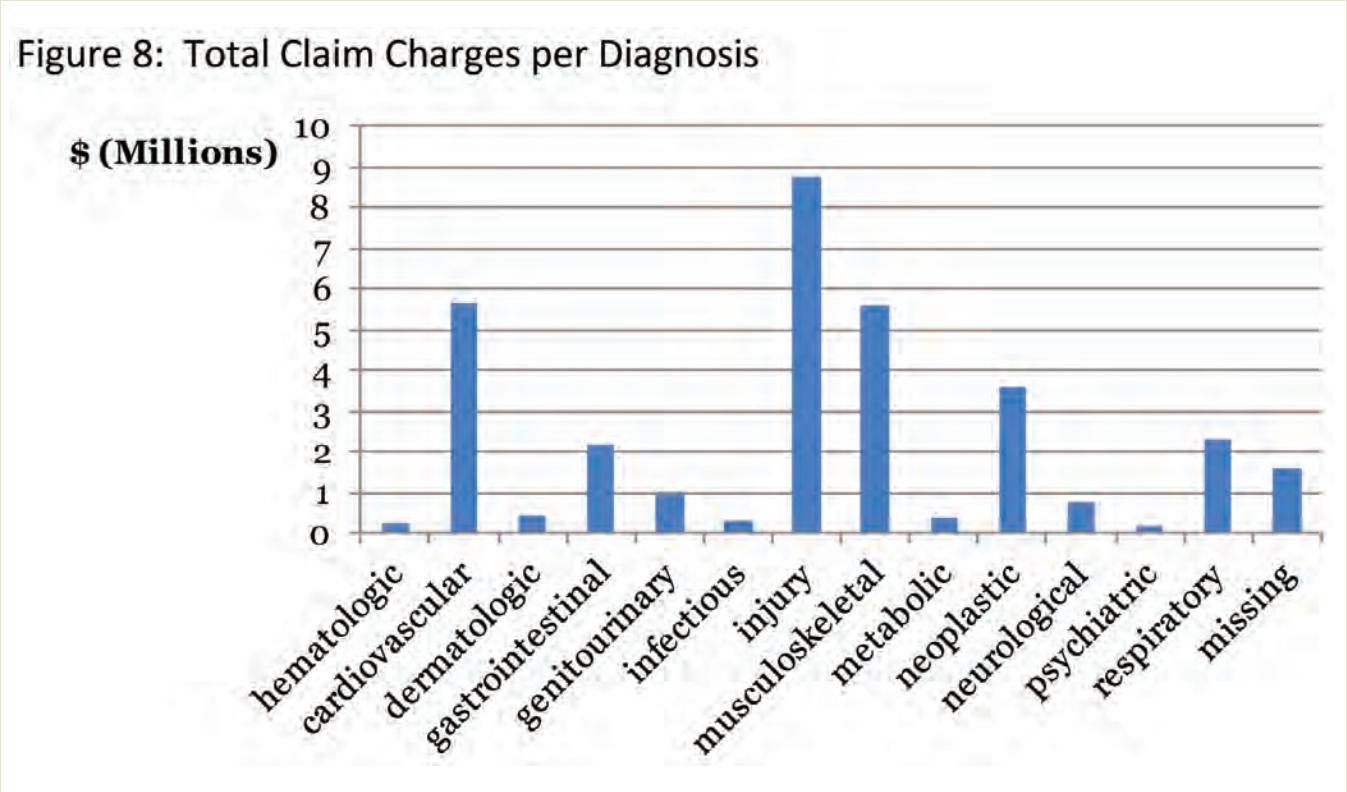
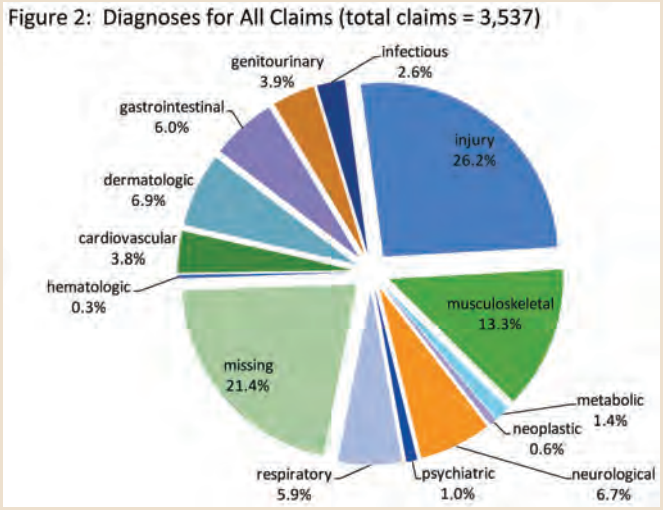


Figure 8: Total Claim Charges per Diagnosis
$ (Millions)
10
9
8
7
6
5
4
3
2
1
0
hematologic
cardiovascular
dermatologic
gastrointestinal
genitourinary
infectious
injury
musculoskeletal
metabolic
neoplastic
neurological
psychiatric
respiratory
missing

Figure 2: Diagnoses for All Claims (total claims = 3,537)



Fine Tuning the Data: and finding more: The study, owing to the lack of complete numbers for all crew, before and after they boarded the vessel, had its limitations. For example, assuming that 50 percent (a fictitious number) of the mariners who experience medical alerts are Filipino, the study could not determine whether that number or percentage represents the workforce. That's because if a ship or fleet is populated to 70 percent of all mariners being Filipino, and only 50 percent of injuries / illnesses are Filipino, then they are probably doing better than other groups. On the other hand, if Filipinos represent just 30 percent of the total crew but account for 50 percent of injuries, then perhaps we have a problematic trend that we can point to. So far, the preliminary studies haven't been able to find significant differences between the nationalities in terms of illness or injury. In terms of job types, certain job descriptions experienced more bodily injuries and clearly, different kinds and levels of risk are associated with different kinds of on board jobs. With more study, and incorporating an occupational background and preventative medicine approach, both Future Care and Yale believe that they will be able to prevent some of these things from happening.

The study's release preceded last year's ratification of the 2006 Maritime Labour Convention (MLC). The report, as good as it was, was only the first step. That's because while it included a treasure trove of data taken from a wide cross-section of mariners, it lacked underlying data typically only available to shipowners and P&I Clubs that would provide clues about pre-employment health and predictors of future events. Recently, Future Care and Yale were fortunate to obtain additional medical statistics covering 10,000 Filipino seafarers to add to the data. Once collated and analyzed, new conclusions will be released to industry.

FUTURE CARE

Read the Report on the Web:
www.Futurecareinc.com

Advertiser Index

Page	Company	Website	Phone#
21	ABS	www.eagle.org	Please visit us online
25	Baier Marine Company Inc.	www.baiermarine.com	(800) 455-3917
29	Blank Rome	www.blankrome.com	Visit our website
27	Boll Filter Corporation	www.bollfilter.com	(284) 773-8200
C2	Catlin	www.catlinus.com	Please visit us online
60	CMA Shipping 2014	www.shipping2014.com	(203) 406-0109
9	Continental Underwriters, Ltd.	www.cultd.com	(985) 898-5300
21	Creative Systems	www.GHSport.com	(360) 385-6212
27	Delgado	fireschool@dcc.edu	(504) 671-5498
25	DNV-GL	www.dnvgl.com	Please visit us online
5	Future Care, Inc	www.futurecareinc.com	(212) 207-3590
17	Gibbs and Cox	www.gibbscox.com	Visit our website
13	Imtech Marine B.V.	www.imtechmarine.com	+31 10 487 19 11
23	International Registries Inc	www.Register-IRI.com	(703) 620-4880
3	KVH	www.kvh.com	(401) 847-3327
1	LNG Americas	www.lngamerica.com	(281) 448-1114
7	MAN DIESEL & TURBO	www.mandieselturbo.com	Please visit our website
C4	Maritime Professional Training	www.mptusa.com	(954) 525-1014
37	MITAGS/PMI	www.mitags-pmi.org	(866) 656-5569
45	OIC Run-Off Limited	Give us a call at	+44 (0) 20 7382 2020
39	Patterson Company	www.pattersonmfg.com	(800) 322-2018
17	Senesco Marine	www.senescomarine.com	(401) 295-0373
63	Shipping Insight 2014	www.shippinginsight.com	(434) 296-6642
39	Smith Berger marine Inc.	www.smithberger.com	Please visit us online
C3	SMM-Media Barter	www.smm-hamburg.com	Visit us online
15	SNAME	www.sname.org	Please visit our website
31	Society of Accredited Marine Surveyors	www.marinesurvey.org	(800) 344-9077
31	The McLean Group	www.mcleanllc.com	(703) 827-0200
19	US Coast Guard Academy	www.uscga.edu	(860) 701-6782
15	Wilhelmsen Ship Services	www.wilhelmsen.com/shipservice	Visit our website
23	Worley Parsons	www.worleyparsons.com	Please visit us online


SMM
smm-hamburg.com
53° 33' 47" N, 9° 58' 33" E
hamburg
keeping the course
9 – 12 september 2014
hamburg
the leading international
maritime trade fair
new in 2014:
the SMM
theme days
8 sept
finance day
9 sept
environmental protection day
10 sept
security and defence day
11 sept
offshore day
12 sept
recruiting day
scan the QR code and view the trailer
or visit smm-hamburg.com/trailer
Hamburg Messe
ufi
Approved
Event

Discover The Many Faces of MPT.

From captains to stewards, engineers to deckhands, thousands of commercial mariners have chosen to advance their careers with the help of **MPT**. That's because our success-driven instructors, equipment and programs deliver the most complete, career-oriented maritime training in the country. **MPT** offers:

- 30 years of training the industry
- Over 45,000 square feet of modern classrooms
- SMART simulation for an extraordinary level of realism
- Over 100 approved courses
- Lab with latest ECDIS hardware for real world training
- State-of-the-art fully integrated Dynamic Positioning Lab
- Fast Rescue Boat training
- Complimentary career counseling

To navigate your future with confidence, discover the school that provides a clear path to rewarding careers at sea. Make your next stop **MPT**.

EST. 1983

MPT

MARITIME PROFESSIONAL TRAINING
Fort Lauderdale, Florida

One School. Unlimited Possibilities.

1915 S Andrews Ave | Ft Lauderdale, FL 33316 | Ph: +1.954.525.1014 +1.888.839.5025

info@MPTusa.com | www.MPTusa.com

Approved for Veterans Training