October 2020

MARITIME REPORTER AND ENGINEERING NEWS

marinelink.com

PORTS & SHIPPING

THE SHIPS, THE TECH, THE PORTS, THE POLICY THAT KEEP GLOBAL COMMERCE FLOWING

Since 1939

Number 10 Volume 82

LOGISTICS

"THE FIRST MILE IS EVERYTHING"

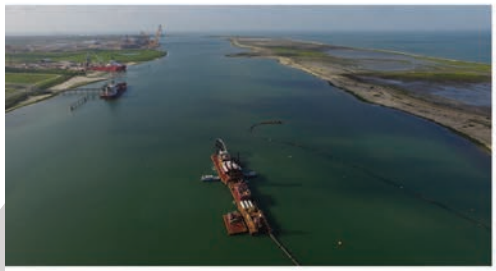
SECURITY

AUTONOMOUS ANTX

FUTURE FUEL

2050 IS DEAD AHEAD





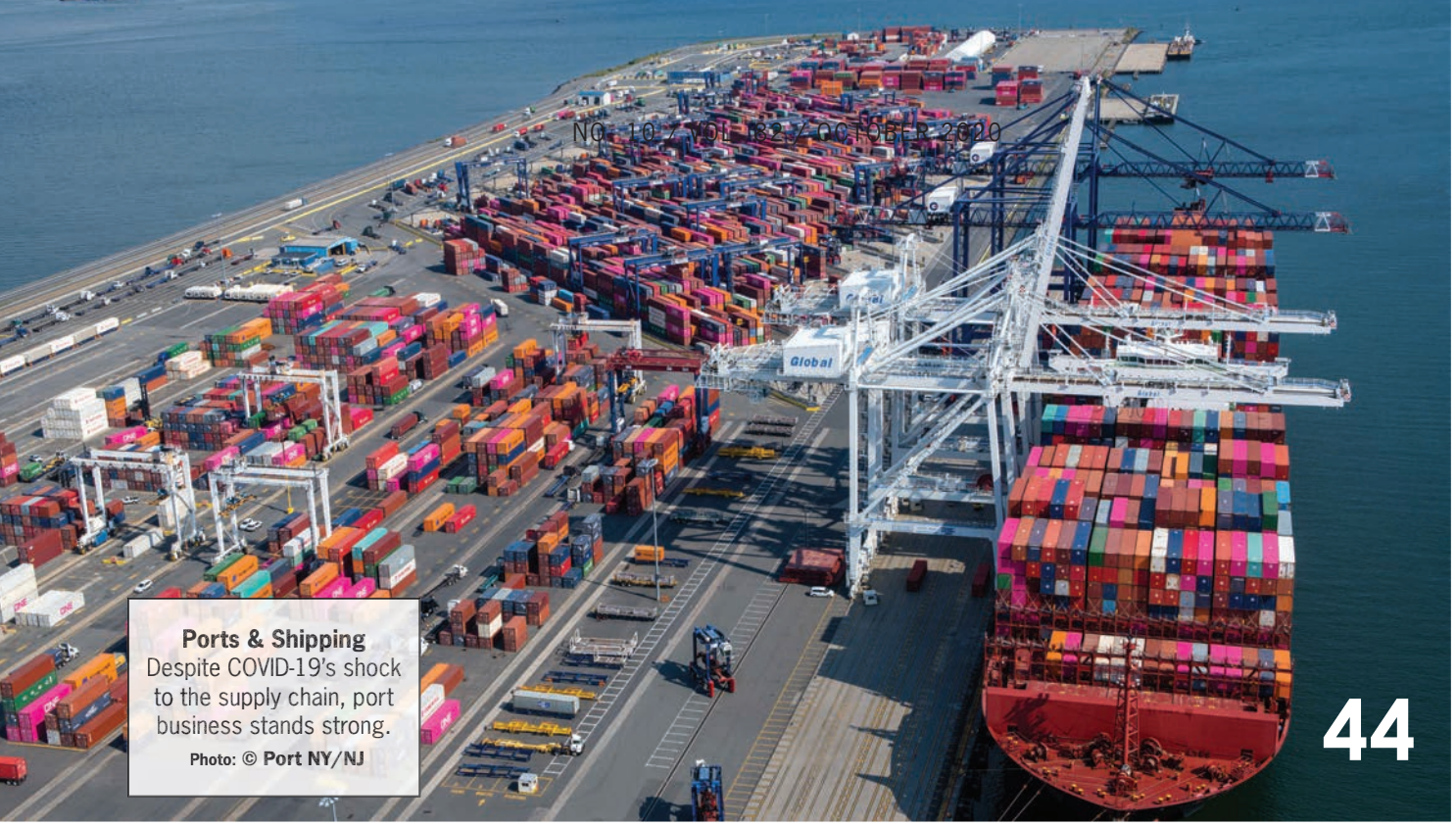

ECONOMIC GROWTH, COASTAL RESILIENCE
& NATURAL INFRASTRUCTURE

IT ALL STARTS WITH DREDGING®

GLDD.COM

GREAT LAKES DREDGE & DOCK COMPANY, LLC


At Hyde Marine, the soul of our company is in every ballast water treatment system we make.
Learn more about what Hyde Marine puts into manufacturing the highest quality ballast water treatment systems in the world.
WITH US, IT'S WHAT'S
INSIDE THAT COUNTS.
Hyde Marine
Ballast Water Management Technology
A CALGON CARBON COMPANY
+1.724.218.7001 | www.hydemarine.com



Ports & Shipping
Despite COVID-19's shock to the supply chain, port business stands strong.
Photo: © Port NY/NJ

44

Features

Departments

smm-hamburg.com /trailer

the leading international maritime trade fair

SMM

driving the maritime transition

2 – 5 feb 2021
hamburg

SMM fuels change in the maritime industry by bringing together its most influential players and presenting solutions that make shipping greener, smarter and safer. Be part of it and see what's technologically possible, connect with peers and get fresh impetus for your business:

- 2,200+ exhibitors from the entire maritime value chain
- 50,000 industry professionals from 120+ countries
- Top-notch conferences and first-class networking events

SMM rescheduled for 2 – 5 feb 2021

save the date

Hamburg Messe + Congress

ufi Approved International Event

smm-hamburg.com/news | linkedin.com/company/smmfair | twitter.com/SMMfair #SMMfair | facebook.com/SMMfair | youtube.com/SMMfair

Authors


Bonnar


Bryant


Connor


Fischer


Goldberg


Keefe


Hoffman


Khouri


MacLennan


Maslin


McDonald


Patterson


van Hemmen


Vats


Zatwarnicki

Bonnar
Captain Todd Bonnar, M.S.C., CD from Canada heads the Warfare Analysis Team at Combined Joint Operations from the Sea Center of Excellence.

Bryant
Dennis Bryant is with Bryant's Maritime Consulting.

Connor
Christopher J. Connor is President and CEO of AAPA.

Fischer
Lars Fischer is Managing Director, Softship Data Processing.

Goldberg
Murray Goldberg is CEO of Marine Learning Systems, maker of MarineLMS.

Keefe
Joseph Keefe is a 1980 (Deck) graduate of the Massachusetts Maritime Academy and lead commentator of MaritimeProfessional.com.

Hoffman
Will Hoffman is Pipe Sealing Solution Specialist at Roxtec International AB.

Khouri
Michael A. Khouri is Chairman, Federal Maritime Commission (FMC).

MacLennan
Rod MacLennan is North P&I Loss Prevention Executive.

Maslin
Elaine Maslin is an offshore upstream and renewables focused journalist, based in Scotland.

McDonald
Matt McDonald is the director of offroad business development at the Propane Education & Research Council.

Patterson
David Patterson is a Loss Prevention Executive at North P&I Club.

van Hemmen
Rik van Hemmen is the President of Martin & Ottaway, a marine consulting firm that specializes in the resolution of technical, operational and financial issues in maritime.

Vats
Capt. Harvinder Vats heads the department of Operations, Auditing and Training at Darya Shipping Private Ltd.

Zatwarnicki
Capt. James Zatwarnicki Jr. actively sailed on his license from June of 2002 until he began working at the US Merchant Marine Academy in 2018 as an Assistant Professor of Nautical Science.

MARITIME REPORTER AND ENGINEERING NEWS

MARINELINK.COM

ISSN-0025-3448
USPS-016-750
No. 10 Vol. 82

Maritime Reporter/Engineering News (ISSN # 0025-3448) is published monthly (twelve issues) by Maritime Activity Reports, Inc., 118 East 25th St., New York, NY 10010-1062. Periodicals Postage Paid at New York, NY and additional mailing offices.

POSTMASTER:

Send all UAA to CFS. NON-POSTAL AND MILITARY FACILITIES send address corrections to Maritime Reporter, 850 Montauk Hwy., #867, Bayport, NY 11705.

SUBSCRIPTION INFORMATION

In U.S.:
One full year (12 issues) $110.00;
Two years (24 issues) $190.00

Rest of the World:
One full year (12 issues) $189.00;
two years $228.00 (24 issues)
including postage and handling.

CONTACT INFORMATION:

Email: mrcirc@marinelink.com
Web: www.marinelink.com
t: (212) 477-6700
f: (212) 254-6271

Member BPA WORLDWIDE BRAND REPORT

Business Publications Audit of Circulation, Inc.

OFFSHORE WIND
POWER

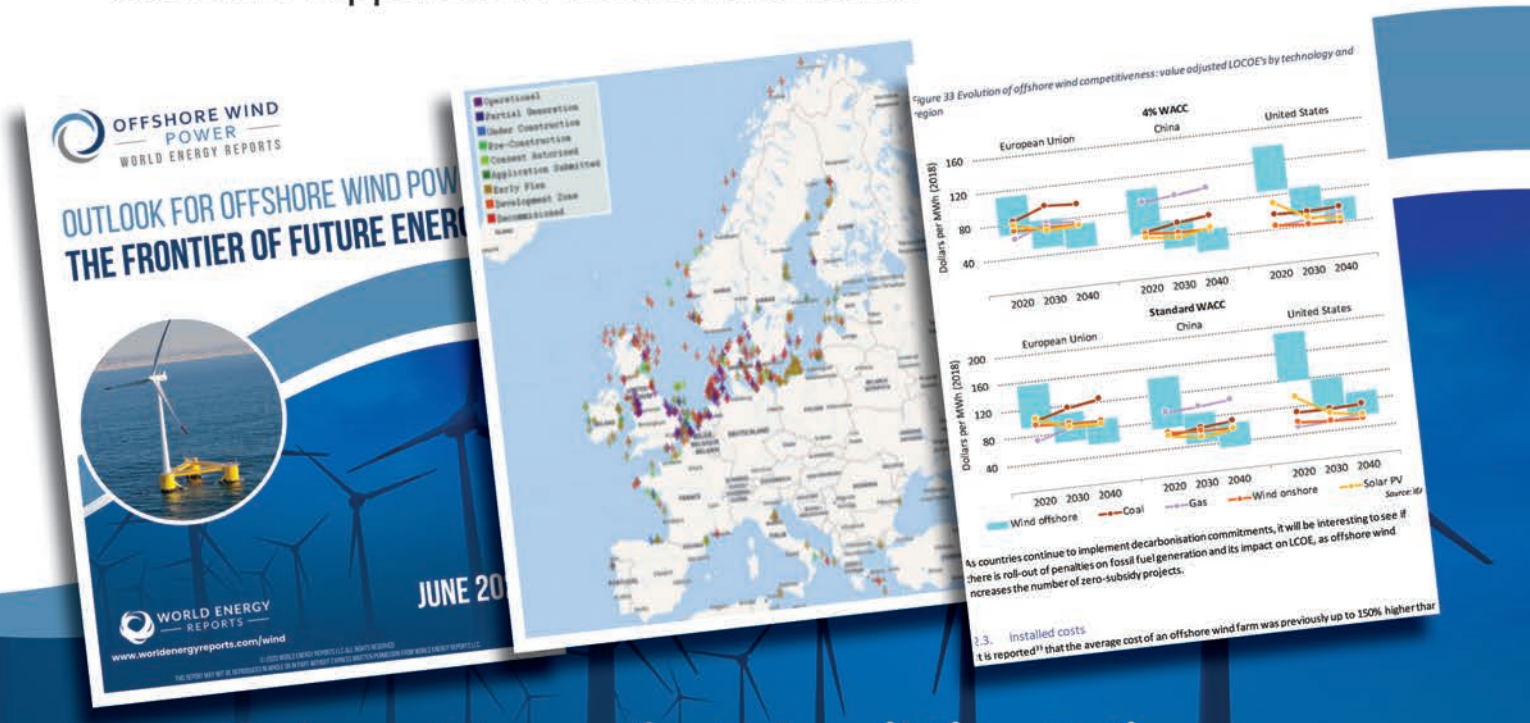
OUTLOOK FOR OFFSHORE WIND POWER

THE FRONTIER OF FUTURE ENERGY

OFFSHORE WIND MARKET INTELLIGENCE PACAKGE

The Offshore Wind Market Intelligence Package from World Energy Reports is a turn-key solution to analytics, forecasts and industry data for the offshore wind market. Each intelligence pacakge includes:

- A comprehensive and in-depth market research report
- Interactive on-line database
- Customer support and research assistance



To Learn More or for Subscribtion Options

Call +1-212-477-6700 xt 6920
or email: info@worldenergyreports.com
www.worldenergyreports.com/wind

MARITIME REPORTER AND ENGINEERING NEWS

MARINELINK.COM

Ports and Shipping consumes the bulk of this October 2020 edition, a leap inside the technology, the ports and the policy that are instrumental to deliver commodities and finished product from point of origin to final destination. Having served in the publishing business for more than three decades, I certainly can attest to more than a few times that a word or catch phrase has become trite, and I know that the shelf life on the word '*digitalization*' has long ago expired. But in looking at the maritime, shipping and logistics industry, there simply is no better, comprehensive word to accurately describe what's happening on the street, in your offices – or more accurately, your home offices

I had a great conversation last month with **Sam Ruda**, Director, Port of NY/NJ, a ZOOM video interview from my home office to his, to discuss activities and outlook for the port and facilities under his guise, a regional hub that serves 46 million people in a four-hour radius, an economic engine for the region packing a cumulative economic wallop of $135 billion in personal and business income. It's funny to me to think that this was the first interview that Ruda and I had, despite the fact that during normal times, our offices sit only about two miles apart in Manhattan. The interview was telling in that I assumed that a port of this size – moving 7.5 million TEU of containers, 578,00 vehicles, 50 million tons of bulk cargo and nearly one million cruise passengers annually – would be plugged in on the leading edge of digitalization as it applies to efficiently moving cargo through the intermodal chain.

I was wrong.

Ruda noted that the pandemic has effectively forced the port to become more efficient, with the systemwide adoption of e-Signatures in lieu of pushing paper! Ruda provided some great insight into the port's plans for 2021 and ahead, including the prospect of dredging the shipping channels again to accommodate containerships in the 18,000 TEU range. His interview starts on page 44.

The Ports and Shipping coverage spans 30 pages starting on page 21, and we are grateful for some exclusive insights from the likes of **Michael Khouri**, Chairman, Federal Maritime Commission, who writes on ocean shipping challenges; **Christopher Connor**, President and CEO of the American Association of Port Authorities, who writes on challenges to U.S. ports, the 30.8 million jobs and $5.4 trillion in annual economic activity it cumulatively supports; and **David Patterson** and **Rod MacLennan**, both from North P&I, who discuss COVID-19 and challenges to bulk and liquid cargo markets, respectively. I'd also like to welcome back a familiar face, **Joe Keefe**, who I cajoled out of retirement for one article on a topic and style he has mastered, the deep dive into a company and technology that has promise to transform the shipping business.

Gregory R. Trauthwein
Editor & Associate Publisher
trauthwein@marinelink.com

HQ
118 E. 25th St., 2nd Floor
New York, NY 10010 USA
T +1 212 477 6700; F +1 212 254 6271

FL Office
215 NW 3rd St
Boynton Beach, FL 33435-4009
T +1 561 732 4368; F +1 561 732 6984

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

Associate Publisher/Editorial Director
Greg Trauthwein
trauthwein@marinelink.com

Vice President, Sales
Rob Howard
howard@marinelink.com

Editorial Contributors
Tom Mulligan - UK
Claudio Paschoa - Brazil
William Stoichevski - Scandinavia

Production
Irina Vasilets
vasilets@marinelink.com

Nicole Ventimiglia
nicole@marinelink.com

Corporate Staff
Mark O'Malley, Marketing Manager
Esther Rothenberger, Accounting

Information Technology
Vladimir Bibik

Subscriptions
Kathleen Hickey k.hickey@marinelink.com

Sales
Lucia Annunziata
annunziata@marinelink.com

Terry Breese
breese@marinelink.com; +1 561 732 1185

John Cagni
cagni@marinelink.com; +1 631-472-2715

Frank Covella
covella@marinelink.com; +1 561 732 1659

Mike Kozlowski
kozlowski@marinelink.com; +1 561 733 2477

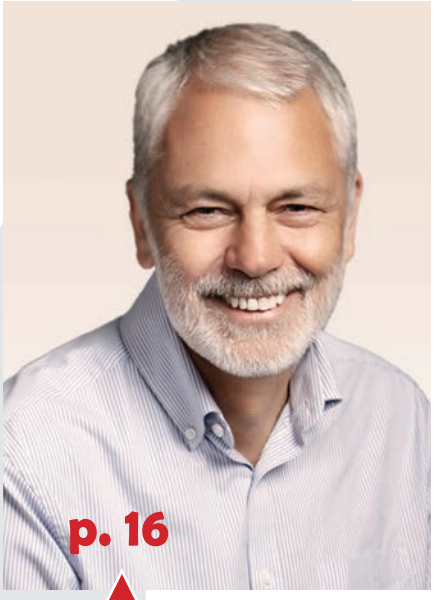
International Sales
Scandinavia & Germany
Roland Persson
Orn Marketing AB, Box 184 , S-271 24
Ystad, Sweden
roland@orn.nu; +46 411-184 00

Germany, Austria & Switzerland
Tony Stein
tony.r.stein@btinternet.com
+44 1892 512777

United Kingdom
Paul Barrett
Hallmark House, 25 Downham Road, Ramsden
Health, Essex CM11 1PU UK
ieaco@aol.com; +44 7778 357722

Classified Sales +1 212 477 6700

Founder:
John J. O'Malley [1905 - 1980]
Charles P. O'Malley [1928 - 2000]
John E. O'Malley [1930 - 2019]



p. 16

"So if someone is spending an inordinate amount of time on Candy Crush, or some other wasteful app, then it can just be cut out. Twenty to 25% of the traffic we see on ships at sea is rubbish."

Gregory Darling
Group MD, AST

p. 12

"As we move toward 2050, ammonia and methanol are emerging as quite promising, but it's still too early to say that they will be the fuels of choice; but according to our research they are promising."

Knut Ørbeck-Nilssen
CEO, DNV GL – Maritime

"AAPA is urging Congress to provide a modest $1.5 billion in direct grants to help ports cover operations, equipment, and infrastructure costs, and debt service expenses."

Christopher J. Connor
President & CEO, AAPA

p. 26

Tip #17

Getting Serious About Assessing Skills

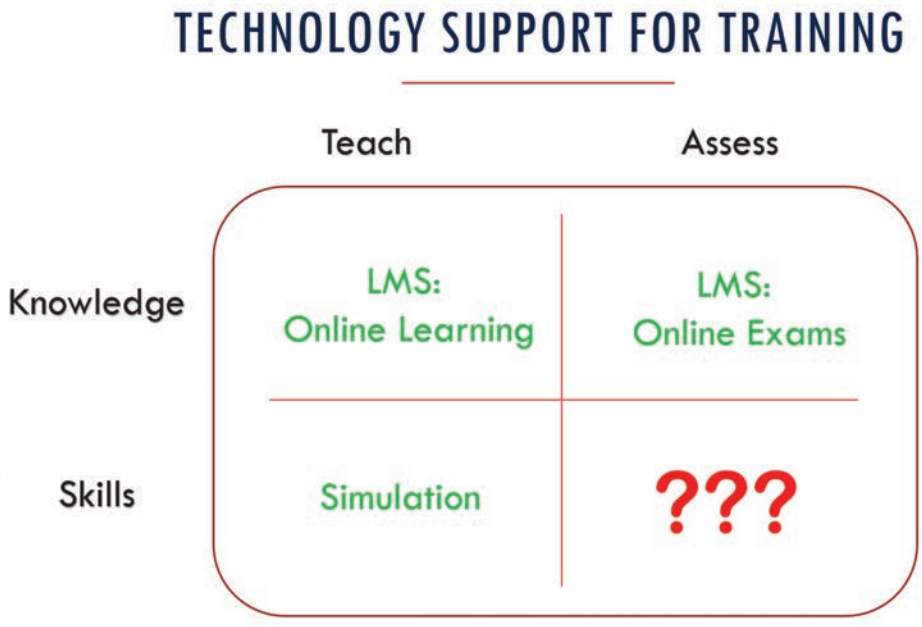
Ours is both a knowledge-based and skill-based industry. We know this. Yet our training does not address both aspects equally. And until it does, we are needlessly sacrificing safety and performance. There is more we can do.

Maritime workers require a high degree of both knowledge and skills to perform efficiently and safely. Knowledge enables officers and crew to react intelligently to novel situations and to operate safely in challenging environments. Yet knowledge, while necessary, is not sufficient for safe and performant operations. In addition to knowledge, nearly every position on board requires officers and crew to possess and demonstrate a high degree of skill.

Given the above, there are four components required for comprehensive and effective training in the maritime industry: Knowledge learning, knowledge assessment, skill training, and skill assessment. It turns out that one of these four components has been left behind.

In the last decade or so, we have become highly proficient at knowledge learning and assessment. Technology has helped significantly making knowledge acquisition available online, both on land and on board. Likewise, technology has provided the ability to assess knowledge and, more importantly, use the data from those assessments to pinpoint gaps in knowledge, as well as strengths and weaknesses in our training programs.

Similarly, simulation technology has advanced the state of the art in skill training. Simulated environments allow learners to experience and respond to an immense variety of situations, over and over, helping to perfect their skills in a way that is highly complimentary to actual on-board experience. And while simulation technologies to have mostly been reserved for the top ranks in the deck and engine departments, virtual and augmented reality technology is becoming more affordable, making it available to a progressively broader range of officers and crew.



But what about skill assessment? Assessing skill proficiency for individuals and teams is critically important in maritime. Yet skill assessment is rarely done, and when it is done (for example as part of simulation training), the process is typically paper-based and highly subjective, limiting our ability to utilize the data to identify workforce trends or risks. Additionally, it requires significant expertise on behalf of the assessor which limits opportunities for assessment. For the vast majority of other skill-demonstrations such as drills, training exercises and on-the-job performance, the skills demonstrated are often barely assessed or not assessed at all. This is a glaring gap in our (and many other) industries. This needs to change, and

Marine Learning Systems

fortunately new technologies are starting to close the gap. The first example I am aware of for the maritime industry is the "SkillGrader".

The Skill Grader was initially developed as a collaboration between Marine Learning Systems and the training and assessment experts at our largest customer, the Carnival Group of cruise lines. The original goal was to support a sophisticated competency framework and performance-related training. This required a way to simply, objectively and deeply assess skills for teams and individuals, and to generate skill performance metrics for the workforce as a whole. The use of early prototypes at Carnival proved that obtaining deep and objective metrics on skill performance was indeed possible. Simplifying the process also greatly expanded opportunities for assessment helping to shed light on what is arguably the most important question of safety and performance: does our workforce perform their duties according to company best-practice?

The end result is a tablet-based app that is used to simply and objectively assess the performance of skills by teams and individuals. It can be used to assess simulation training, drills, or on-the-job performance. It reports on the proficiency of the team (for team-based skills) and each individual's contribution to the team performance. All results are stored in a database providing access to broad workforce skill insights as assessment data accumulates over time. Overall, it is meant to greatly increase opportunities for the assessment of skills, and to produce both immediate and long-term actionable reports.

There is no question that the maritime industry is deeply dependant on the skills of our officers and crew. Therefore, whether it is using technologies like the SkillGrader or using more traditional techniques such as paper-based forms, it is time to get serious about making skill assessment a central part of our training.

Until next time, keep healthy and sail safely.

The Author

Goldberg

Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators. Murray@MarineLS.com

Women and the U.S. Coast Guard

The U.S. Coast Guard and its predecessor agencies have had a long and mostly outstanding relationship with women. But there have been missteps recently.

The U.S. Coast Guard and its predecessor agencies have had a long and mostly outstanding relationship with women. But there have been missteps, particularly recently. When the U.S. Lighthouse Service was formed in 1790 by the first Congress, all of the lighthouse keepers were men. Most, though, were married and many had families living with them at the lighthouses. Frequently the men were away, and the women operated the lights. When the husbands died, their widows sometimes took over as the lighthouse keepers. Initially, such transitions were informal, but in the 1830s the Lighthouse Service commenced making such transitions official. In 1881, Keeper Ida Lewis of the Lime Rock Lighthouse in Newport Harbor, Rhode Island became the first woman to be awarded a Gold Lifesaving Medal. The USCGC Ida Lewis (WLM-551) is named in her honor and is the lead cutter of the Keeper Class of Coastal Buoy Tenders.

Women enlisted in the U.S. Coast Guard during World War I. There was no statutory authority for such enlistments, but then there was also no statutory prohibition against it. Elizebeth Smith Friedman, a pioneer cryptanalyst, was hired in 1924 by the Federal Prohibition Bureau and then detailed for duty with the Coast Guard to decode messages used by liquor smugglers to coordinate their activities. In that effort she was quite successful and is credited with "breaking" the code of over 12,000 different encoded radio messages. She was also a star government witness at a number of smugglers' trials, including the famous I'm Alone case.

The Women's Reserve of the U.S. Coast Guard Reserve program (officially nicknamed the "SPARs"), was first established in 1942. LCDR Dorothy Stratton transferred from the Navy WAVES to serve as the director of the SPARs. A total of 978 women officers and 11,868 enlisted women served in the SPARs during World War II. It's recruiting motto was 'Release a Man to Fight at Sea'. The program was demobilized in 1947 but was reinstituted on a much smaller scale beginning in 1949.

In 1951, with the onset of the Korean War, Eleanor C. L'Ecuyer rejoined the Coast Guard after serving in as a SPAR during World War II. Prior to her rejoining, she earned a law degree, and was commissioned as an ensign upon her reentry into the Coast Guard Women's Reserve. She was assigned to Washington, D.C., and became the first female attorney hired by the Coast Guard, although she did not directly serve in that role. Her legal training served her – and future generations of female Coast Guardsmen – very well. She wrote successful challenges to several policies that would increase career potential for women in the Coast Guard. One was her determination that being pregnant was not a disabling condition and therefore, should not be grounds for discharging women. Another was that couples should be allowed to co-locate. Another challenge she filed questioned the policy limiting women to serving only 20 years. She served until 1971, rising to the rank of captain. She holds the distinction of being the longest serving SPAR.

On 10 April 1972, the USCG Commandant, Admiral Chester Bender, established an official board "to determine the need for permanent women officers in the regular Coast Guard." The board concluded in their report submitted in May 1972 that: "Planning and execution of a women officer program in the Coast Guard is overdue."

Congressional legislation ended the Women's Reserve and women were first officially integrated into the active-duty Coast Guard and the Coast Guard Reserve. Female reservists then serving on active duty were given the choice of enlisting in the regular Coast Guard or completing their reserve enlistments. In February 1973, the first women since 1945 were admitted to Officer Candidate School. On November 1, 1973 enlistment of women was first authorized for four-year tours of active duty. The ratings to be held by these women were limited to yeoman (YN), storekeeper (SK), hospital corpsman (HM), photo-journalist (PA), dental technician (DT), and musician (MU). On December 5, 1973 Public Law 93-174 was approved. The Act eliminated the separate Coast Guard Women's Reserve and integrated those personnel into the Coast Guard Reserve. On December 7, 1973 the first female enlistees were sworn into the regular U.S. Coast Guard.

On August 11, 1975 a Department of Transportation press release noted that the Commandant, ADM Owen Siler, announced "that women will join the Corps of Cadets at New London. . .Admiral Siler said his decision to admit women to the Academy was based on the many contributions he expected women to make in the peace-time missions of the Coast Guard. He noted that current statutes do not bar the admission of women to the Coast Guard Academy and that action by Congress will not be required. This decision is also in keeping with the strong commitment of the leadership of the Department of Transportation to assure equal rights for women." Thus the Coast Guard Academy became the first

of the armed forces to open its doors to women." (It should be noted that the first female midshipman arrived at the U.S. Merchant Marine Academy before the first female cadet arrived at the US Coast Guard Academy). In November 1975, the Commandant approved a new uniform for women in the Coast Guard. Edith Head, a celebrated Hollywood fashion expert, designed the uniform.

On May 24, 1977, the Coast Guard issued a request for female volunteers to "FILL WOMEN AFLOAT AND LORAN STATION ASSIGNMENTS." Beginning in late-September of that year the first of 24 women chosen for afloat assignments began reporting on board the CGCs Gallatin and Morgenthau as members of their permanent crew. Twelve women – two officers and 10 enlisted – erved on board each cutter.

Janna Lambine became the first woman designated as a Coast Guard aviator. She was so designated on March 4, 1977. Viivien Crea became the second when she was designated on April 29, 1977 and Colleen Cain was the third, when she was designated on June 8, 1979.

In August 1978, the Commandant announced that "all personnel restrictions based solely on sex would be lifted." Thereafter all officer career fields and enlisted ratings were open to women. The next year, LT Beverly Kelley became the first female commanding officer afloat in U.S. history when she took command of the CGC Cape Newagen and LT Kay Hartzell became the first female commanding officer of an isolated duty station when she took command of LORAN Station Lampedusa, Italy. In 1980, 14 women graduated from the Coast Guard Academy. In 1983, the official Coast Guard policy on women in combat was established. The Coast Guard Chief of Staff, RADM Paul A. Yost, noted, "the men and women on our vessels are trained and function as a team. Removal of women during wartime would degrade operational readiness while replacement personnel are trained and acquire experience."

In 1985, Denise Matthews became the first woman to graduate first in her class at the Coast Guard Academy. In 1992, Lane I. McClelland became the first active duty woman since SPARs promoted to the rank of captain and the following year was assigned as Chief Judge of the Coast Guard. In 2000, Vivien Crea became the first woman promoted to the Flag corps. The first active-duty Coast Guard women to serve in a combat zone were crew members of USCGC Boutwell when it served in the Northern-Arabian Gulf in support of Operations Enduring Freedom and Iraqi Freedom from January 2003 to June 2003. Also in 2003, LT Holly Harrison became the first Coast Guard woman to command a cutter in a combat zone. She was also the first Coast Guard woman to be awarded the Bronze Star Medal. In 2006, Vice Admiral Vivien Crea was confirmed by the Senate as the first female Vice Commandant of the U.S. Coast Guard, the second highest position in the service. These are just a few of the many accomplishments of women in the Coast Guard. The path for women, though, has not been even. There have been missteps. Like the other military services and organizations nationwide, there have been sexual discrimination, sexual harassment, and sexual assaults. Usually, these matters have been handled in accordance with established procedures, but there have been exceptions. In 2014, the Coast Guard asked the RAND Corporation to examine sexual assault and sexual harassment in the service. The report stated that an estimated 180 to 390 of the Coast Guard's 39,000 active duty members had experienced one or more sexual assaults in the previous year and far more experienced sexual harassment. The report recommended, among other things, additional prevention and enforcement efforts, enhancement of training and instructional material, and development of monitoring systems. I would further recommend institution of a formal mentoring system with carefully selected mentors at each unit where a female member reports to a male member in the chain of command.

In 2019, a House Committee released a report entitled 'Righting the Ship', examining the handling of allegations of harassment and bullying at the Coast Guard Academy. The report found that the Coast Guard failed to conduct prompt, thorough, and impartial investigations of such allegations; hold officials accountable for deficient and incomplete investigations; and take corrective action to address retaliation against individuals who report harassment and bullying. As with the RAND report, the Committee stated that significant improvements in policies and procedures were needed to ensure that prompt, thorough, and impartial investigation, and resolution of such allegations was necessary to instill faith in the system. A bill has been introduced in the Senate to tackle sexual misconduct in the Coast Guard.

Such a bill should be unnecessary. Sexual misconduct is already illegal by statute and Coast Guard policy. What is actually needed is strong and visible commitment from all levels of command to put a stop to this. The time for throwing policy statements over the transom and expecting that everyone in the chain of command down to the lowest levels will fully comply is long past. If the Coast Guard wants to fully integrate women into the service, it must ensure by all available means that they are treated equally and respected for their contributions.

The Author

Bryant

Dennis L. Bryant is with Bryant's Maritime Consulting, a regular contributor to *Maritime Reporter & Engineering News.*

Maritime Forecast to 2050

Decarbonization is maritime's central theme for the coming generation. While the 'fuel of the future' is still to be decided, Knut Ørbeck-Nilssen, CEO, DNV GL - Maritime, discusses prudent moves shipowners should make now.

by Greg Trauthwein

The marine industry is in the early stages of transition from more than a century-long reliance on fossil-based fuels, primarily diesel fuel. Prodded by societal pressure, regulators continue to ratchet up the pressure on the marine industry with increasingly strict emission guidelines, with 2050 and a 50% reduction in Greenhouse Gas (GHG) emissions starting to loom large in the porthole. With this as a backdrop, DNV GL released its much-anticipated Maritime Forecast to 2050, as fuel choice is the essential decision as "shipping charts a generational path to decarbonization."

Those seeking 100% clarity in guidance as to the maritime fuel of the future will not find the answer here – or for that matter anywhere – today. First and foremost, the industry is highly fragmented and fuel choice are driven by a myriad of factors, from type of vessel to route to geographic location and availability of fuel. But the uncertainty surrounding fuel choice will effectively stir the creativity of today's and tomorrow's generation, according to Ørbeck-Nilssen. "We have to develop the next generation of carbon neutral ships. Creativity and innovation are what's needed to solve this grand challenge."

While exact answers are elusive, DNV GL provides salient guidance. "We are very firm from now into the 2030s it will be a really good choice to go to a dual-fuel LNG engine for oceangoing vessels. That is a firm recommendation, and in most – if not all – of the scenarios it has emerged as the preferred option," said Ørbeck-Nilssen. "As we move toward 2050, ammonia and methanol are emerging as quite promising, but it's still too early to say that they will be the fuels of choice; but according to our research they are promising."

While the capital investment in new equipment is a tall task in the best of times, Ørbeck-Nilssen said that the current COVID-19 pandemic crisis will eventually pass, and shipowners that are in the market for the long-term need to look beyond the present and to the future. Inaction is not an option, as failing to evolve could ultimately impact a vessel's ability to trade, and negatively impact a ship's value and earning potential.

Fuel Transition: Just the Start

The industry is at the beginning of a transition phase, with many potential options emerging alongside conventional fuels. This increasingly diverse fuel environment means that engine and fuel choice now represent potential risks that could lead to a stranded asset. Factoring in the impacts of availability, prices and policy on different fuels makes the choice even more complex, DNV GL – Maritime says in the fourth edition of its forecast. To capture this complexity and help make this picture clearer, the Maritime Forecast offers a wide range of scenarios, outlining the potential risks of a particular fuel choice. To make the ramifications concrete, alongside the pathways, the Maritime Forecast includes detailed analysis of a Panamax bulk carrier newbuilding. By stress-testing technology decisions under the various pathways and scenarios, the forecast presents potential performance and the carbon robustness of the various design choices.

The 32 scenarios result in widely different outcomes for the fuel mix in the fleet. In the scenarios with no decarbonization ambitions, very low sulfur fuel oil, marine gas oil and LNG dominate. While under the decarbonization pathways, in 2050 a variety of carbon-neutral fuels hold between 60% and 100% market share. Under the decarbonization scenarios it is hard to identify clear winners among the many different fuel options. Fossil LNG gains a significant share until regulations tighten in 2030 or 2040. Bio-MGO, e-MGO, bio-LNG and e-LNG emerge as drop-in fuels for existing ships. By 2050, E-ammonia, blue ammonia and bio-methanol frequently end up

> "As we move toward 2050, ammonia and methanol are emerging as quite promising, but it's still too early to say that they will be the fuels of choice; but according to our research they are promising."

Knut Ørbeck-Nilssen
CEO, DNV GL – Maritime

DNV GL

Watch Knut Ørbeck-Nilssen on MR TV: bit.ly/34vd6fN

with a strong share of the market and are the most promising carbon-neutral fuels in the long run.

A surprising result from the model is the relative limited uptake of hydrogen as a ship fuel, as a result of both the estimated price of the fuel and the investment costs for the engine and fuel systems. Hydrogen, however, plays an integral role as a building block in the production of several carbon-neutral fuels such as e-ammonia, blue ammonia and e-methanol, all of which gain significant uptake under the decarbonization pathways. It may also find niche applications in some vessel types, such as ferries and cruise vessels, as well as in specific regions where investments have been made into local production and distribution.

New Challenges, New Opportunities

When new technology mandates enter industry, the initial conversation immediately, naturally, turns first to cost. This is particularly understandable in the maritime industry, a fragmented market dominated by a large number of smaller ship owners who own assets designed to last for 30 years, capital intensive assets to build and operate. But the market has been in evolution for decades, driven by digitalization and automation trends throughout the logistics chain, and shipowners that rise to the challenge could find an abundance of opportunities. "This will be a shipowner's chance to differentiate, and enter a new age of transparency," said Ørbeck-Nilssen. "Those that can leverage scale, leverage innovation, leverage transparency will have an advantage. Cargo owners, financers, investors, shareholders – they all are looking for these characteristics."

While critical, the fuel discussion is just a part of what Ørbeck-Nilssen sees as a maritime renaissance. "The concept of a maritime renaissance is really inspiring. It has the potential to release a lot of creativity within the industry," he said. "I think we're at a stage where everything can be challenged, and we're open to look for new solutions … and that's a prerequisite for a maritime renaissance."

"The grand challenge of our time is finding a pathway toward decarbonization. Reducing GHG emissions is rapidly becoming the defining decision-making factor for the future of the shipping industry. The pressure to act decisively is mounting. Perfect is the enemy of good, and so we mustn't wait for an ideal solution to arrive and risk making no progress at all. Using a wide range of scenarios involving different fuel types and technologies, and varying degrees of regulatory pressure, our new report helps to map a way forward, offering shipowners clear insights on how to meet the challenges and opportunities ahead."

Ultimately Ørbeck-Nilssen sees class as an integrator for the present and future of maritime. "I think we have the possibility to bring different entities together. In the past it would be a shipyard, a shipowner, an engine manufacturer. Today, with the fuel issue, we have an opportunity to expand that in a larger scale and integrate with regulators, flags and academia. I think (academia) is an untapped potential resource."

Get a copy of DNV GL's Maritime Forecast to 2050: https://eto.dnvgl.com/2018/maritime

Engineering Ethics & Ship Design

We all know that maritime can be perfectly safe, as long as we all know it is very dangerous. Knowing something is dangerous may not be as easy to figure as we like to think.

Recently we came across an RFP for a ferry company that is essentially owned by the public. The ferry company was looking for engineering consultants (Professional Engineers) who would update a 2008 ferry design concept based on a 2008 Master Plan. The intent was to develop the design for construction and to eventually build two of these vessels.

The RFP was somewhat confusing since it clearly focused on detail design of the 2008 concept and, more or less as an aside, mentioned that the 2008 Master Plan may require some updating. We were interested in bidding and were trying to develop a technical approach, and that required some background research. My first alarm bell related to the fact that a ferry company is interested in developing a 2008 design that was based on 2008 research. 2008 is a long time ago by any standard, and in today's maritime climate, with technical innovations raging through the system, it is a very long time ago. What made technical sense in 2008 certainly will not make technical sense today with LNG, and hybrid systems and electric propulsors. Furthermore, in 2008, we were just about to be hit by a monster recession and ferry operations in 2020 are vastly different from ferry operations in 2008.

The 2008 Master Plan was available and we reviewed it to see what may need to be updated. For this particular system, the ridership had been in a gradual decline for decades and our research indicated that since 2008 ridership had declined a further 30%. This ferry system was inherently difficult to analyze since it provided an optional route to various destination rather than an essential routes (such as occurs when only ferries service an island). The 2008 study was carefully put together, but simply did not take into account many variables that ferry operators need to take into account today, such as the emergence of autonomous driving, the shift in ferry operations from transportation to recreation, the integration of ferry routes into routing software such as Google Maps and drastic changes in economic dynamics in the service area.

The 2008 Master Plan could function as a template for a study update, but the data within it was no longer useful. Based on this, we contacted the ferry operator, noted the Master Plan needed updating and asked them to clarify the need to update the Master Plan. The response was puzzling, since the operator confirmed that while there may be some minor changes to the Master Plan they were primarily trying to secure Professional Engineers for the refinement of the 2008 concept.

This poses a strange conundrum for a licensed Professional Engineer. Professional Engineers (and also members of engineering professional organizations like SNAME) function under a Code of Ethics. The Code is long and has been variously interpreted (and has some strange weaknesses), but it has certain basic canons:

Engineers, in the fulfillment of their professional duties, shall:

1. *Hold paramount the safety, health and welfare of the public.*
2. *Perform services only in areas of their competence.*
3. *Issue public statements only in an objective and truthful manner.*
4. *Act for each employer or client as faithful agents or trustees.*
5. *Avoid deceptive acts.*
6. *Conduct themselves honorably, responsibly, ethically and lawfully so as to enhance the honor, reputation, and usefulness of the profession.*

So, if I am asked to bid on a project for a public entity for which I would take fees that inherently are bound to result in an ineffective solution, am I violating those Fundamental Canons?

That is not an easy question to answer. We decided not to bid on the project because we felt that it became a no win situation. We could speak the truth and provide a bid that focused on the Master Plan update and be rated as not responsive, or we could ignore our own data and opinions and simply bid as boat designers who would decide on inward or outward turning propellers on a 2008 concept that was bound to cost the public more than it should.

If we chose to do the latter, and simply proceeded with blinders, we would not be providing the client with the best possible service. In theory we would be able to win as boat designers, and then charge our fees on convincing the client that starting with a 2008 ship concept is not an optimal approach, but then we simply responded to the RFP in an

untruthful fashion hoping to be able to pull off a switch after winning the bid.

Cycling back to the six canons, it becomes clear that something is rotten in the state of engineering design services. This is not a new frustration, and undoubtedly honorable engineers will be bidding on this project knowing that this is not the first time that a client does not really know what they really need and do not take a hint. Once on the job, the engineers will probably conduct themselves honorably, but what this whole thing ignores is that engineers are asked to provide an untruthful proposal to later be able to act truthfully and that is a drag on the system, the Code and the Profession.

And in this case completely unnecessary if the response to our question had been slightly different. We essentially asked the client if they were sure the tasks in their RFP were realistic. The answer to our question was, "We want what we wrote in the RFP". Instead, a much smarter response would have been, "This is what we think we want, but if you can convince us in the proposal that there is a more effective approach we will consider it."

There is no guarantee that the client will accept the more effective approach, but it prevents bidding engineers from having to play around with the truth.

There is nothing pretty about compelling engineers to skirt the profession's ethics and to inefficiently act on work paid for by the public. Public entities have to be mindful of that, and need to configure their bidding systems such that it selects the most suitable engineers, not the engineers who know how to push the premarked buttons.

For each column I write, MREN has agreed to make a small donation to an organization of my choice. For this column I nominate the Society of Naval Architects and Marine Engineers. www.sname.org. The National Code of Engineering Ethics resides with NSPE, but SNAME's code is better.

"My first alarm bell related to the fact that a ferry company is interested in developing a 2008 design that was based on 2008 research. 2008 is a long time ago by any standard, and in today's maritime climate, with technical innovations raging through the system, it is a very long time ago."

The Author

van Hemmen

Rik van Hemmen is the President of Martin & Ottaway, a marine consulting firm.

AST helps to jettison the Digital Rubbish

Gregory Darling and Applied Satellite Technology (AST) works with shipowners to help them use their bandwidth more efficiently for ship business and crew needs.

Image Courtesy AST

by Greg Trauthwein

When Gregory Darling, Group MD, AST, worked in the marine industry in the 1980s with a marine survey company, he needed to get word to one of his ships off of West Africa to recalibrate its course and head off to a new job. But the ship had left port, and radio calls to the ship went unanswered, resulting in two days of lost time and revenue.

"That was frustrating and costly," Darling said, who then tasked himself with buying a satellite connection. "I bought a Magnavox 2400 that cost $35,000. That was just a phone so that we could better manager our ship in West Africa. But I found it to be expensive, I found it difficult to use and we were even billed in 'SDR's,' which were 'Special Drawing Rights' … I didn't even know what Special Drawing Rights were. So I was confused, and I surmised that if I was confused, there was an opportunity." That was when the seeds were sown, and in 1992 he started AST to apply satellite technology to help maritime solve problems.

Making the Connection; Enhancing the Service

There are many satellite communication providers, and the key differentiator is not necessarily the connection, rather the products and services offered to help make ship operations more efficient and cost effective. AST's flagship Integra suite of services offers a complete satellite communication solution that delivers real-time application control for satellite communications, designed for easy on-board traffic management, both on-board and shoreside.

According to Darling, the number of potential solutions runs in parallel with the number of shipping companies.

"It's not just the equipment, it's not just the connectivity, it's also what we call our value-added services," said Darling. "The way in which the data is delivered is becoming increasingly important. Very simply, we are a remote internet company and 70% of our business is in the marine sector," which in itself generates a turnover between $60-$70 million per year. Those solutions depend on the client's need. "It depends on priorities; we have developed a number of tools that help us deliver the operational efficiency that ship owners and managers need, from crew welfare to the digitalization of ships," said Darling. "There are a whole new (and ever changing) range of new needs that require resolution."

To deliver the service, AST enhanced its own pipeline with a terrestrial network to augment the satellite-based connections, giving AST better control, end-to-end, of its service and solutions. "On top of that, we need to see what's going on and intelligently control it," said Darling. AST helps its customers maintain control via its software solution, Integra See. Recently one of AST's customer's vessels was experiencing slower than expected speeds to and from its on-board communications systems.

Many vessel owners are unaware that mobile devices automatically download updates to programs/operating systems and auto-sync photos/videos in the background; a convenient feature at home when connected to an unlimited 'SuperFiber'

> "So if someone is spending an inordinate amount of time on Candy Crush, or some other wasteful app, then it can just be cut out. 20-25% of the traffic we see on ships at sea is rubbish; if you can cut the rubbish, you'll save money because you won't need so much bandwidth."
>
> **Gregory Darling**
> Group MD, AST

AST

broadband package, but not efficient when offshore using satellite. The vessel operator logged into myastportal and via the INTEGRA See service, was able to pinpoint a singular encrypted application which was consuming unusually high amounts of bandwidth. INTEGRA's deep packet inspection enabled Apple Photo Stream to be recognized as the culprit and using the INTEGRA Control service, the vessel operator was able to block the application and restore normality to the vessel's satellite communications. "So if someone is spending an inordinate amount of time on Candy Crush, or some other wasteful app, then it can just be cut out," said Darling. "Twenty to 25% of the traffic we see on ships at sea is rubbish; if you can cut the rubbish, you'll save money because you won't need so much bandwidth."

Different Budgets, Different Needs

Darling is not one to mince words, and in discussing the differing needs across the maritime spectrum he references a client that had the requirement to provide communications to its Far East based fleet of 700 shipping vessels. "This was the bottom end, but they wanted the lowest cost to provide communications amongst themselves, so we provided Iridium handsets and some sticky tape!"

At the other end of the spectrum are the large modern fleets, and AST has a full set of solutions to provide creative set hardware and service solutions which includes VSAT, VSAT fail over, GSM integration, voice service, a range of technology to meet their specific needs. "We're small but beautifully formed," Darling said. "Our target market is vessel owners that need tailored solutions to meet a particular need. No two companies have the same need, and in fact you can't just say 'marine' because marine can be a canoe, it can be a cruise ship and everything in between. We are looking for companies that want to improve their efficiency, companies that want to understand how they can benefit from digitalization, how they can from good crew communications to how they can monitor their cargo and machinery. That's where the opportunity is for us, as we have many tools in the toolbox. Our job is to match capabilities with needs."

The current COVID-19 pandemic has provided a number of challenges, as many companies put a hard-stop on spending from the outset to evaluate the market and its direction. From a company perspective, Darling said his team was prepared in advance to work remotely and deliver service, which he says has been done 24/7 without a hiccup.

While this business (and life) interruption event has caused pain and disruption that transcend geographic and industry boundaries, Darling sees some trends, including increased uptake in digital solutions, that could provide the theoretical 'silver lining.' "I think remote monitoring to inspect equipment, rather than sending in a tech, that will happen more and more, saving cost and increasing the efficiency of connectivity," said Darling. "Also the crew will expect more connectivity to home."

Teaching with Simulation in Maritime

By Capt. James R. Zatwarnicki Jr., Assistant Professor of Nautical Science, USMMA

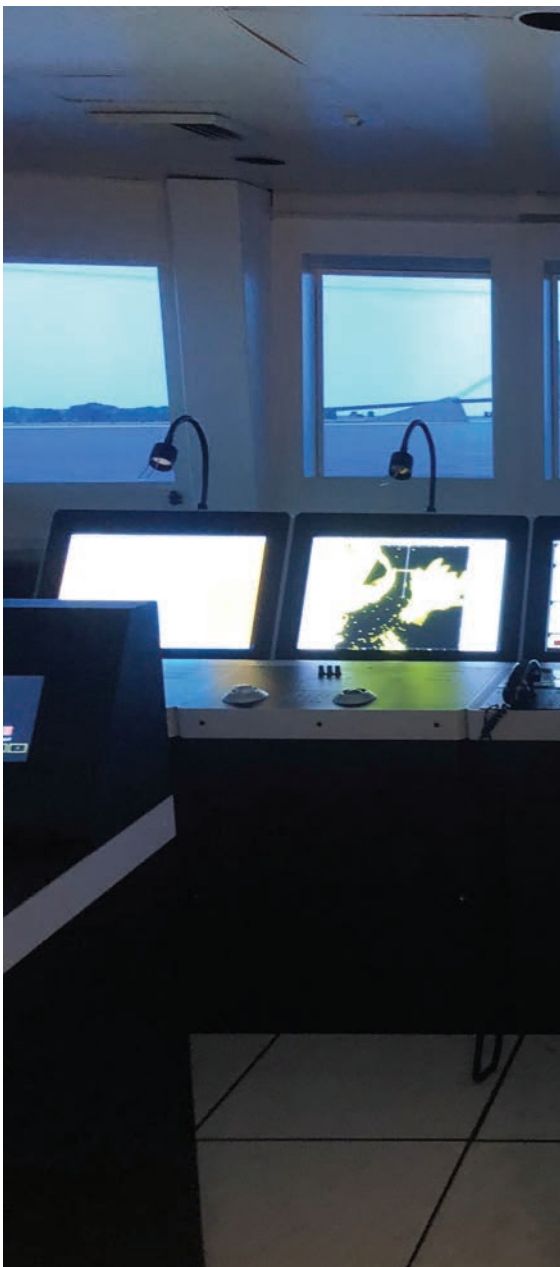
A great deal of research related to student learning styles has emerged in recent years. Through that research strong arguments have been made that more kinesthetic learning methods, such as hands-on or experiential learning, are more effective than more traditional methods like the lecture. In the maritime field, technology such as simulation, has provided us with tools to harness the power of experiential learning; however, those tools alone cannot ensure students are learning effectively.

Studies by the National Training Laboratory have found methods such as lecturing and reading result in only 5%-10% of knowledge retention; whereas, immersive learning can yield knowledge retention rates of 75% or better. These beliefs have become even more deeply rooted given wide variety of tools that technology has afforded the classroom. Many professional disciplines, including the medical, airline, and maritime fields, have adopted technologies like simulation for this reason. Simulation provides an immersive learning environment that can place students in virtual real-life experiences. It is a popular belief that this greatly improves knowledge retention, and makes the learning experience more enjoyable and engaging.

Despite such beliefs there has been contradictory evidence to the relative effectiveness of different learning styles. Some studies have found that, although a student might "prefer"' a particular type of learning method over another, it does not necessarily mean that any one is a more effective than another. One study conducted at Indiana University with 400 students found that, although students had "preferred" learning styles which included visual, auditory, reading/writing, and kinesthetic (or VARK) there wasn't a significant difference in outcomes for any particular style or combination of styles. Moreover, almost 70% of the students in the study chose not to use their reported preferred learning style when given the option and those that did utilize their preferred learning style did not show better outcomes. Therefore, it is imperative to recognize that simulation is a tool in the learning process that must be supported by other teaching techniques in order to be effective and is not just a better learning method. A comprehensive course design that utilizes multiple learning methods in combination with technology should best prepare students to achieve desired outcomes.

Before we enter into any learning environment we must first have an understanding of our learning outcomes and objectives, though. Learning outcomes define what the student should know or be able to do at the end of the course. Because of this, outcomes must be specific and measurable in order to determine whether or not learning has been successful. Objectives, on the other hand, are more aspirational and define what we intend to do when we set out at the beginning of a course. For example, an outcome for a Bridge Resource Management course might be to "demonstrate proper implementation of the rules of the road"; whereas the objective might be to "encounter vessels with risk of collision while standing a watch". Together, learning outcomes and objectives give both the instructor and student a clear indication of why they are engaging in learning and what the student can expect to be able to do at the end of that learning.

In my professional career as a mariner, I often said that the best time I ever spent in any class was in a simulator. That is a broad statement, though, as not all simulation courses have the



same objectives. Objectives in a Bridge Resource Management course might be to "develop teamwork, improve the cognitive function of the watch officer, and develop skills for managing stress on the bridge"; whereas, the objective for a Shiphandling course might be to "execute proper anchoring techniques, develop an understanding of bank effect and interaction with other vessels, or demonstrate the proper use of azipod propulsion". Although the objectives are different for each of these courses, they use a common technological component and could have a similar course structure supported by that technology. The benefit of simulation as a technique in each of these courses is the ability to place the student in specific scenarios that mimic real life situations and allow them to actually apply learned skills to achieve a desired result. This is one of the reasons I found simulation to be such a valuable experience in my professional learning: it offered validation and reinforcement to what I had already learned. Consequently, just as simulation can effectively reinforce the skills we need to be competent professionals, it can also reinforce bad habits or improper skills. As the saying goes, practice can make perfect, but imperfect practice will lead to imperfect performance. This is why course outcomes and objectives must be supported by sound course design, reliable content, and competent instructors; not simply be dependent upon the simulation technology. Before simulation can be incorporated as a tool in a course, one of the first things that must be considered is the student's level of experience and understanding of the course material. For example, if the student is a novice and the desired outcome is to demonstrate proper techniques as a helmsman, the outcome would align to their skill level; however, they might not have the knowledge or skills to perform tasks in a more advanced course like Bridge Resource Management (maneuvering in accordance with COLREGS). In the same respect, a junior officer like a Third Mate could not be expected to have the same level of skills or knowledge that a seasoned ship's Master would. In order to ensure that the student has the required knowledge or skills that they need to effectively perform the simulation there will have to be some level of instruction prior to engaging in the simulation. For a shiphandling course, this instruction may be new information presented as part of the course itself; whereas for a course like Bridge Resource Management, which ties together multiple skillsets like navigation and collision avoidance, the skills may have been learned in prior courses in the student's career.

Full mission bridge simulator at USMMA.

Photo: USMMA

Regardless of when the skills being performed in the simulation are learned, the student must also have a clear understanding of exactly what skills they are going to be expected to apply and what objectives they are expected to pursue before going into the simulation. For this reason, a pre-brief is a very important component of any simulation. This is where the instructor sits and discusses with the students what they are going to be doing in the simulation and what is expected of them before they

enter the simulator. The pre-brief need not take very long, but by setting this foundation, we answer the question of "why are we here?" and put the student in the right frame of mind to focus on the objectives that they are trying to achieve through the exercise.

Once there is a clear understanding of the learning objectives and it is established that the student possesses the requisite skills and knowledge to achieve the desired outcomes, we can proceed with the actual simulation. There are two integral parts to the simulation: the simulation exercise and the physical simulator itself. Although the simulator itself is usually the most prominent and impressive part of a course, even the most advanced, expensive simulator would not be effective without well-designed simulation exercises. For this reason, even very basic computer-based simulators can be powerful tools when used with well-designed simulation exercises. The simulation exercises themselves are the key to effectively achieving the course objectives and assessing the learning outcomes. That is not to say, however that the simulation equipment is not an important component of the overall course design. One of the most important roles the simulator itself plays, particularly in a course such as Bridge Resource Management, is to lend a degree of realism to the simulation exercise. Simulators range from full mission simulators to multi-task, part task, or special purpose simulators; each provides a certain level of realism, and each has its place in different types of learning. The degree of realism required in a simulation is dependent upon the overall course learning objectives, though. For example, for a Radar Observer course, a full mission bridge simulator would be more complex than required to achieve the course learning outcome. Likewise, for a Bridge Resource Management course, a part task simulator might not provide the necessary level of complexity to achieve the various objectives or required level of realism to keep students engaged. Regardless of the type of simulation equipment used, well designed exercises are imperative for students to be successful, recognize the value in what they are learning, and can compensate for any shortfalls in the technology itself.

At the conclusion of the simulation it is critical to conduct a debrief. The debrief is one of the most important parts of the simulation and should be given the same amount of time as the simulation exercise itself. The pre-brief and debrief together act as book ends to the simulation exercise but, where the pre-brief is often instructor driven, it is important for the debrief to be an active discussion that engages the students. The debrief provides the opportunity to review how the student performed in the simulation exercise as it relates to the pre-defined objectives. It is always best to engage the students by having them talk through areas where they might have fallen short of the desired performance in the exercise rather than simply telling them what they did wrong. This helps them have a better understanding and appreciation for what they did and how they might improve future performance. It is also just as important to reiterate the aspects they performed well in the exercise. This helps to build confidence in the student and encourage them to continue to refine their skills and knowledge.

The students' performance and level of proficiency in meeting the objectives of the exercise will directly relate to whether or not they met the required overall learning outcomes; this is determined through an assessment process. Conducting an assessment and determining the students' performance could be very subjective in some simulation based courses and in many cases reflective of the instructor's own experience and beliefs, though. Having clearly defined outcomes can go a long way to reducing this subjectivity, as would utilizing a specific, unambiguous, assessment criteria or well-designed rubrics. Inevitably, there will always be room for an instructor to critique aspects of the student's performance outside of the specific predefined outcomes, but assessment must strive to limit itself to the specific predetermined outcomes to be effective.

Although it cannot be conclusively proven that one learning style is fundamentally superior to another, it goes without saying that there are many benefits to experiential learning like simulation. A course that effectively uses simulation as a teaching technique very often includes more than one learning style to meet learning objectives and outcomes. For the course to be effective, simulation exercises need to be designed around those objectives and outcomes, as does the overall assessment process. By taking the approach of seeing simulation not as a stand-alone experiential based teaching technique, but rather incorporating it as a one of multiple teaching techniques in the overall course design, the instructor can utilize the best aspects of each technique to complement each other and better recognize the desired learning outcomes.

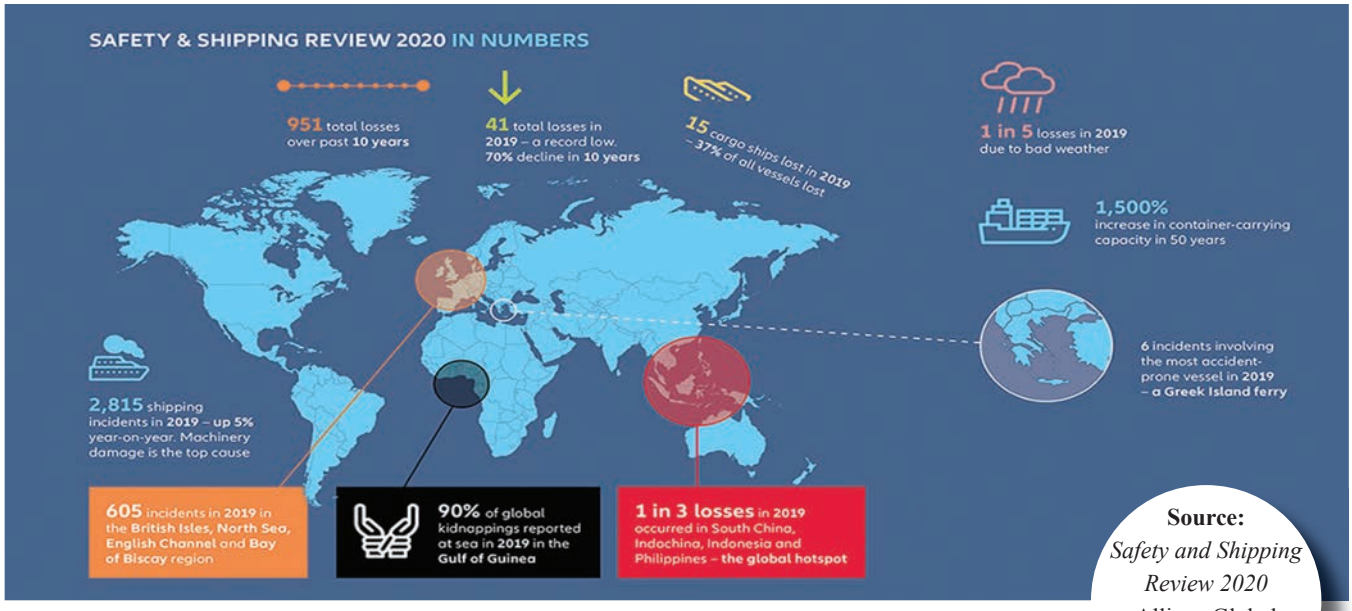
References

- Anonymous. "8 Top Benefits of Training Simulations in the Workplace." Lindenburger Group, 9 Nov 2017, https://lindenbergergroup.com/8-top-benefits-training-simulations-workplace/
- Anonymous. "The Learning Pyramid." Education Corner, 2020, https://www.educationcorner.com/the-learning-pyramid.html
- Lateef, Fatimah. "Simulation Based Learning- Just Like the Real Thing." Journal of Emergencies, Trauma, and Shock, Wolters Kluwer- Medknow Publications, Oct 2010, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2966567/
- May, Cindi. "The Problem with 'Learning Styles." Scientific American, 29 May 2018, www.scientificamerican.com/article/the-problem-with-learning-styles/.
- National Research Council. "Chapter 3- Effective Training with Simulation: The Instructional Design process." Simulated Voyages: Using Simulation Technology to Train and License Mariners, The National Academies Press, 1996, https://www.nap.edu/read/5065/chapter/5
- Patersfield, Kate. "The Rise of Immersive Learning." Training Industry, Nov-Dec 2017, https://trainingindustry.com/magazine/nov-dec-2017/the-rise-of-immersive-learning/

MARITIME LOGISTICS PROFESSIONAL

Shipping & Port Annual 2020

Photo: AAPA



Source:
Safety and Shipping Review 2020
Allianz Global Corporate & Specialty

PURPOSE-BUILT
FROM THE GROUND UP

What if YOUR material handler's purpose is a little different from the OTHER material handler's purpose?

When you want purpose-built, only SENNEBOGEN purpose-builds one machine at a time to meet your goals.

Think of the possibilities!

- Diesel and/or electric-drive
- 44,000 to 900,000 lbs.
- Rubber tired, tracked or stationary
- Custom boom & stick configurations

See how SENNEBOGEN can purpose-build the right machine for you

www.sennebogen-na.com | **+1-704-347-4910**

SENNEBOGEN®

FMC: Ocean Shipping Challenges Abound

By Michael A. Khouri, Chairman, Federal Maritime Commission

Since early Spring 2020, American consumers have received a practical education in supply chain operations. One lesson is that it takes more than simply going online and clicking a "Buy Now" button for goods to show-up on our front porches. While the networks and systems that deliver commodities from around the globe might have been stretched as a result of COVID-19 related impacts, the men and women who move the freight have worked selflessly and tirelessly to meet consumer and manufacturing demand.

Early on in the response to COVID-19, I asked my fellow Commissioners and Federal Maritime Commission (FMC) staff to identify any regulatory relief our agency could grant that might make a difference to American shippers and consumers, ocean carriers, non-vessel operating common carriers, freight forwarders, and marine terminal operators. In April, the FMC voted to allow parties to file service contracts up to 30 days after they take effect. The Commission instituted this relief through December 31 as response to information developed in Fact Finding 29, which is focused on COVID-19 related impacts on the ocean supply chain.

The FMC is currently considering a proposal to make this temporary 30-day contract filing exemption a permanent part of our agency regulations. Such regulatory relief, if and when enacted, would benefit our import and export shipper community by increasing freight fluidity. It would also be another meaningful step in response to a prior World Shipping Council petition seeking regulatory relief from service contract filing requirements. The National Industrial Transportation League, a major trade association representing American shipper interests, filed their support for the WSC petition.

Since Fact Finding 29's launch in March, Commissioner Dye assembled Supply Chain Innovation Teams in Los Angeles/Long Beach, New York/New Jersey and New Orleans. In the earliest phase of this Fact Finding, Commissioner Dye and the industry stakeholder teams developed recommendations that would benefit the management of cargo flows through marine gateways. The focus of Fact Finding 29 has turned to exploring actions that can lay the best foundations to prepare the ocean supply chain for the regular volumes of trade that we are accustomed to seeing at our ports.

While the FMC is more commonly associated with maintaining the commercial integrity of the marketplace for containerized ocean cargo, our agency also has regulatory oversight related to passenger vessel operators regarding cases of cruise non-performance and onboard injuries or deaths. Commissioner Louis Sola was appointed to lead Fact Finding 30 to examine COVID-19 related impacts to the cruise industry.

Over the past months, Commissioner Sola has documented how COVID-19 and the cessation of passenger cruises has impacted not only cruise vessel operators, but also ocean ports and related industries that support the cruise industry. He has engaged in outreach to senior levels of other federal agencies, including the Departments of Transportation and Homeland Security, to share the Fact Finding's assessments and interim conclusions – all focused on facilitating conversations about next steps to safely restart cruise operations, getting cruise industry people back to work, and allowing American cruise vessel patrons to again enjoy the services of the cruise vessel industry.

The FMC's attention has not been solely focused on COVID. In addition to the two Fact Findings, we have maintained attention on ongoing ocean carrier competition monitoring and we continually work to refine our operations to meet changes in industry operations.

The FMC responded to impacts on the ocean supply chain via several initiatives. Overarching all agency missions is our commitment to the close monitoring of ocean carrier coopera-

"The mis-declaration of hazardous materials is an area where we work in cooperation with Customs and Border Protection and the U.S. Coast Guard. The FMC's Shipping Act concern is the market fraud when a shipper declares to a common carrier in its shipping documents that the tendered cargo is some innocuous variety, when the cargo is properly categorized as hazardous; thereby receiving a lower freight rate."

– Michael A. Khouri, Chairman, Federal Maritime Commission (FMC)

Photo: FMC

tion agreements filed at our agency. We monitor more than 300 ocean carrier agreements; however, we assign staff to give particular focus and scrutiny to the three global carrier alliances. These global alliance agreements receive the highest and most frequent levels of monitoring given their potential to facilitate or result in adverse market conditions. We have redoubled our efforts to be on guard for any ocean carrier behaviors that violates the Shipping Act. If prohibited anticompetitive activity is detected, our agency will not hesitate to act to restore competition and integrity in America's ocean supply chain.

Concerning other agency operations, we are in the process of updating our enforcement priorities by identifying areas where a strategic focusing of resources will make the most difference in protecting the public and the integrity of the marketplace. FMC enforcement activities also focus on the Ocean Transportation Intermediaries (OTI) sector of the shipping industry. FMC Enforcement personnel will prioritize identification of individuals and companies who improperly hold themselves out to the public as providing ocean transportation services while not holding a required FMC license, maintaining a bond to provide shippers with financial security, and otherwise not operating in compliance with Shipping Act provisions.

We continue our efforts to bring commonality both within the FMC and with other federal enforcement agencies concerning the definition of "Co-Loading". It is timely for the FMC to revisit the co-loading rules in light of modern commercial practices and the continuing evolution of the shipping industry, including the important effects of FMC regulatory reforms following passage of the Ocean Shipping Reform Act in 1998.

The mis-declaration of hazardous materials is an area where we work in cooperation with Customs and Border Protection and the U.S. Coast Guard. The FMC's Shipping Act concern is the market fraud when a shipper declares to a common carrier in its shipping documents that the tendered cargo is some innocuous variety, when the cargo is properly categorized as hazardous; thereby receiving a lower freight rate. A parallel concern is the danger to ship safety and life that mis-declared hazardous cargoes represent. Parties that knowingly engage in masquerading such commodities as anything other than what they are must be held accountable. The FMC has information resources and expertise that can benefit a coordinated multiagency effort to target such bad actors. In addition to the interest expressed by partner federal agencies, I applaud those carriers and OTIs who recognize the role and responsibility they have in contributing to the maintenance of a safe and secure ocean supply chain.

America's Ports Need COVID-19 **Fiscal Relief**

Photo: AAPA

By Christopher J. Connor

For most of 2020, COVID-19 has profoundly altered our ways of life. While many aspects of our daily routines have been severely restricted to slow the virus' spread, our freight networks are still running around the clock, supporting our daily existence while ensuring public health and safety.

Take America's ports for example. During the pandemic, they've helped ensure our shelves remain stocked and commerce continues to flow. Due to the supply chain in which ports are a central link, people have been able to safely navigate through their daily activities with the knowledge that critical medical supplies, consumer goods, personal protection equipment (PPE), energy commodities and raw materials used in U.S. exports continue to move.

Last year, the American Association of Port Authorities (AAPA) reported cargo activities at U.S. seaports were responsible for $5.4 trillion in annual economic activity, supporting 30.8 million jobs and providing $378.1 billion in tax revenue to federal, state, and local governments.

However, the economic downturn we're facing this year has caused significant economic damage to our ports, with an estimated decline of 20% to 30% of their total annual receipts, despite recent news that some ports are beginning to see a slowdown in the downward cargo volume spiral they experienced during the first half of 2020. On top of lost income related to reduced cargo volume and ship calls this year – the cruise industry at U.S. ports has come to a standstill, which in 2018 contributed an additional $53 billion to the U.S. economy.

As a result, direct job losses at America's seaports this year are estimated to reach 130,000. That's 20% of the U.S. maritime workforce at full employment.

According to the American Society of Civil Engineers' 2017 Infrastructure Report Card, the nation's ports earned a mediocre 'C+'. The Report Card cites impacts of natural disasters and other crises at ports that result in billions of dollars in damage a year and the loss of long-term economic activity, and that was prior to the COVID-19 pandemic.

Consequently, some ports are postponing plans for and investment in capital improvement projects, putting the readiness, capacity and capability of our nation's trade infrastructure at risk. In the third iteration of its every-five-year Port Planned Infrastructure Investment Survey, AAPA in the latter part of 2019 asked its U.S. member ports how much they and their port property tenants planned to invest in port-related infrastructure over the next five years. The answer was $163.1 billion. If those investment plans are realized, it would repre-

"AAPA strongly supports both the THUD funding and MTSERA authorization bills and is concurrently urging Congress to provide a modest $1.5 billion in direct grants to help ports cover operations, equipment, and infrastructure costs, and debt service expenses."

– Christopher J. Connor, President and CEO, American Association of Port Authorities (AAPA)

Photo: AAPA

sent a 5.4 percent increase over AAPA's 2016 survey in which U.S. public ports and their private-sector partners planned spending $154.8 billion on port capital projects through the end of 2020. However, because the survey was conducted prior to the COVID-19 contagion, ports are now concerned that many of their planned investments will be delayed or significantly downsized without assistance from federal, state and local government entities in the form of grants, loans, guarantees and other forms of relief. These are typical ways that governments attract local public and private-sector equity investment to jump-start infrastructure development.

An April 2020 report prepared for the U.S. Committee on the Marine Transportation System shows that increasing port-related transportation infrastructure investments above a "business-as-usual" scenario will help the nation recover from a long pattern of infrastructure underspending. It notes that greater infrastructure investments will enable higher growth, improved trade performance, expanded employment opportunities and enhanced value of household incomes.

Some members of Congress are aware and have begun to act on the plight of our ports. On July 7, the House Appropriations Committee released its draft FY2021 Transportation-Housing and Urban Development (THUD) funding bill. That legislation includes an additional $1 billion next year for the USDOT Maritime Administration's Port Infrastructure Development Program to invest in our nation's ports and spur the national economy.

To provide near-term pandemic relief for the marine sector, Congressmen Peter DeFazio (D-OR) and Sean Patrick Maloney (D-NY) introduced the Maritime Transportation System Emergency Relief Act (MTSERA) in the U.S. House on July 9, while Senator Jeff Merkley (D-OR) and Senate Commerce Committee Security Subcommittee Chairman Dan Sullivan (R-AK) on July 30 introduced an identical companion bill to help America's ports weather the coronavirus pandemic and future disasters.

Recognizing that ports are facing significant cargo and passenger declines this year, in addition to added costs for cleaning, sanitation, PPE and related supplies, the MTSERA authorization bills seek to establish a program to provide dedicated maritime assistance and emergency relief grant funds for emergency response, cleaning and sanitization, staffing, workforce retention and paid leave, procurement and use of personal protective equipment, debt service payments and for infrastructure repair.

AAPA strongly supports both the THUD funding and MTSERA authorization bills and is concurrently urging Congress to provide a modest $1.5 billion in direct grants to help ports cover operations, equipment and infrastructure costs, and debt service expenses. Every day, America's seaports are delivering critical goods and materials to the front line of the COVID-19 battlegrounds. Essential port workers, who aren't able to work remotely, are also ensuring consumer goods get to the doorsteps of countless millions of Americans who are safely working from home.

Policymakers must ensure our nation's seaports aren't overlooked while funding other critical transportation needs, such as those of airports, passenger rail and transit systems.

The relief our seaports seek isn't about replacing lost carrier, cargo and cruise passenger revenue. It's about ensuring they're able to keep pace with the accelerating costs of protecting their workers while keeping their workforce employed, making timely bond and debt instrument payments, and maintaining a state of readiness so ports can significantly aid in the nation's eventual economic recovery.

Clearing the Air on Fumigation

By David Patterson, Loss Prevention Executive North P&I Club

Anyone for a top-up? Fumigating cargoes at sea during the COVID-19 pandemic

The recent explosion in Beirut provides a harrowing example of what can happen if proper measures are not taken in the storage of volatile substances but, for goods in transit, fumigation is common practice.

Guidance on fumigating bulk cargoes on vessels is provided in the IMO Circular MSC.1/Circ.1264 – Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds. These extensive guidelines require fumigation to be conducted by qualified operators and state that the crew should not handle fumigants.

Fumigation in transit

To meet requirements, designated crew receive basic training from the 'fumigator-in-charge', who also initiates fumigation and remains on board long enough to allow the gas concentrations to build up to a level where testing for leaks can be carried out. Once it has been confirmed that the vessel is safe and no leaks are present, then the fumigator-in-charge will formally hand over the operation to the Master.

However, particular trades sometimes require 'top-up' fumigation to be carried out during the voyage. This is most typical with the carriage of logs, and ordinarily the fumigators will sail with the vessel to apply the top-up fumigant. But what happens when fumigators cannot sail with the vessel because of travel restrictions caused by COVID-19?

Leave it to the crew?

If qualified fumigators are not permitted to sail with the vessel and topping up is required, it is likely that the crew will be requested to carry out this task.

This may be at odds with the IMO guidance, which recommends against crew handling fumigants. But there have been reported instances where topping up has been carried out successfully and safely by the crew after they received specialist training from the fumigation company.

Getting approval

The vessel and the fumigation company should together develop a plan which is then presented to the vessel's flag state and the relevant port states for approval. The plan should provide details of how the operation will be conducted (based on a thorough risk assessment), address what training will be given to the selected crew members and propose contingency plans.

Crew training

The training requirements for the crew to be able to safely apply top-up fumigant are far more comprehensive than the basic safety training for in-transit fumigation, where the crew only monitor the process that is already underway. Envirofume, a fumigation company in New Zealand, has developed a two-day course for crew on the safe use of aluminium phosphide fumigant, and have kindly shared with us an outline of their training programme.

The training is delivered to an officer and a rating as a minimum, and they must ensure language is not a barrier. In the case of New Zealand, the crew under training must have a high standard of English.

Shutterstock

Training covers the following aspects:

- ***Fumigant properties***
- ***Safety protocols***
- ***Actions required in the event of an incident***
- ***Fumigation-related tasks covering all aspects of the fumigation process, including application, gas monitoring and leak tests***
- ***Necessary documentation***
- ***The crew undergo a final assessment before they are deemed competent by the fumigation company.***

Learn in port

The topping-up procedure to be carried out during the voyage by the trained crew members should be the same as the procedure followed by the specialist fumigators during initial fumigation at the load port. Therefore, the crew can run through the entire process with a technician before they conduct the fumigation themselves during the voyage.

Once the vessel departs the load port, the trained crew liaise closely with the fumigation company, including sending daily the results of safety checks.

Topping up safely

On a set date during the voyage, the trained crew can then carry out the top-up fumigation in accordance with the fumigation company's step-by-step procedure.

Take great care: ensure there is a suitable weather window, carry out a pre-fumigation briefing, know how to safely handle the fumigants, and know the actions to take after applying the fumigant such as handling used PPE and cleaning.

The fumigation company should always be available to offer any additional guidance if the crew encounter any issues during the operation or subsequent monitoring.

Find out more about safe fumigation with our briefing at: **hwww.nepia.com/publications/fumigation-briefings/**

The Practicalities of **Liquid Cargo** Storage

By Rod MacLennan, Loss Prevention Executive, North P&I

Low oil prices have encouraged many owners to use vessels for medium- to long-term floating storage. There are issues arising.

In general, a more refined product has a shorter shelf life than crude oil. However, due to a vast range of characteristics, compositions and potential additives, it is difficult to exactly determine the shelf life of a particular cargo. So how can a vessel owner and crew help protect themselves against a potential claim?

Good vapor management

From a basic operational perspective, careful vapor management is key. Excessive venting through PV valves can result not only in cargo losses but also a change in the quality or specification of the cargo.

If venting is required, it is important to check that local regulations permit this. Some areas, such as California, do not permit tank vapor venting even as a means of controlling tank pressures arising from an increase in pressure due to diurnal variation.

Risk of decomposition

From a more complex perspective, the rate of decomposition of a refined cargo depends on many factors. These include the nature of the original crude, the distilling process, water content, additives used (anti-stat, antioxidant, etc.) and vessel-related factors such as tank coating condition.

A certificate of analysis and quality should be provided on loading and used as a reference for composition, additives and water content.

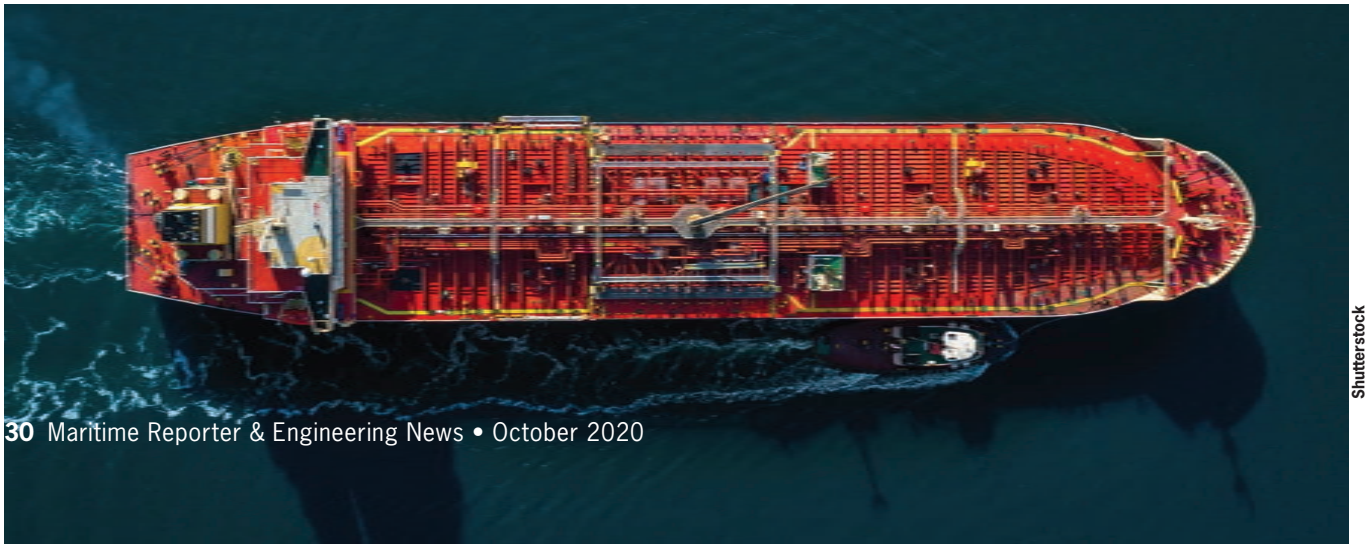
Monitoring the cargo

Monitoring by analysis may be the only way to truly know how well a cargo is surviving storage.

Where liquids are concerned, before the vessel goes into storage mode, take samples of the cargo and have them tested in the presence of an independent surveyor. When in storage mode, take regular samples and analyse them to determine the quality of the cargo. However, this level of analysis may be reliant on laboratories being located close by and is not always an option. If this is the case, the vessel's crew should continue to regularly take samples and check them visually for color, viscosity and sediments as well as noting the odor.

In addition, take regular ullages and record them along with cargo temperatures, bottom soundings (such as free water and sediments), inert gas readings and external temperatures.

It is also important to record any controlled or uncontrolled venting and, if required, operation of the inert gas plant.



Shutterstock

Untrustworthy Certificates?
Blockchain Technology is the Solution

By Capt. Harvinder Vats, Superintendent - Darya Shipping Pvt. Ltd.

Seafarers possess countless certificates in their bag. To reach master competency level, I have been to various maritime institutes almost every year of my career, for competency courses at 2nd mate, chief mate and master level, or for modular STCW courses, various value-added courses and even in-house company courses.

With amendments in the STCW convention, these numbers grow exponentially. Logically, these certificates define us, our competence and our fitness for joining a ship. Many times ships have faced penalties or detentions if any of their crew do not possess the required certificates. My complete professional journey of 16 years in shipping can be portrayed by a bunch of these certificates. Sometimes I consider them my identity, my hard-earned assets.

With all of the time and money that can go into the acquisition of certificates, they can be jeapordized in an instant if, for examle, an institute is charged for malpractices and all the seafarers who have completed courses there come under the scrutiny. Though most seafarers may be innocent. Their entire professional carrier is at stake now. This event has created chaos among the seafarer on the authenticity of the institutes and the certificates they carry. There is a sign of lacking in self-assurance with this traditional system of certification at the institutes. The certificates generation and issuance are still manual hard copy which does not guarantee it to be tamper-proof. We have to look to technologies for solutions.

Blockchain technology is one solution to the question of the genuineness of the certificates. Blockchain is considered to be a highly secure system due to its digital signature and encryption. The information is stored as an encrypted hash on a block that has its own identity and linked to the previous block, thus making a chain of blocks that are interconnected. The encrypted hash is a complicated string of mathematical numbers that is impossible to be altered. The alteration in any block will be identified and rejected by the other blocks in the chain as this alteration will not qualify the encrypted hash of linked blocks. The system is specially designed to be secure, convenient, and tamper-proof. This immutable and incorruptible nature of block-chain makes it safe from falsified information and hacks. The blockchain data is often stored in thousands of devices on a distributed network of nodes. This decentralized nature makes this technology immune to temper. It is not that easy to access, and if so, any piece of information can be easily recovered. Blockchain-based issued certificates from institutes are trusted as they are temper proof and simplifying the process of document verification whenever required during the third-party inspections.

Darya Shipping has generated a blockchain based certification platform to secure issued certificates and to issue new secured digital certificates.

Blockchain Technology driven Digital Certification

Organized certificate management where you can securely upload, view and share Original Certificates through a link / QR code.

Darya Shipping

When it Comes to Supply Chain: "The First Mile is Everything"

Shippers who fail to plan are planning to fail.

By Joseph Keefe

Commercial marine paint contractors tell us that coatings involve 99% preparation and 1% paint. That same tenet applies to global shipping markets. With this in mind, Mercado Labs is quietly transforming a mature intermodal transportation market by tackling its final frontier with a disruptive platform that focuses on the most important shipment details in a manner that's never been attempted before.

What you won't hear coming out of Dallas-based Mercado Labs are words like blockchain and other mysteriously abstract buzz words. Instead, this young firm focuses tightly on the first mile of every deal, with controls on virtually every aspect of those critical days that define everything that follows.

According to Rob Garrison, CEO and Founder of Mercado Labs, the 'first mile' encompasses planning and buying products. On average it takes one month to plan purchases and another 90 days to execute. He explains, "Introducing workflow, automation, and process during that first mile provides the highest point of leverage throughout the International Supply Chain."

The Mercado platform is fully threaded into the shipping contract, married to the PO and all communications. That's because once a product is loaded onto a boxship, problems with the order will also sail with it. If shippers don't get the first part right, nothing that follows will make much of a difference to the bottom line.

The Last Mile

Global commerce stakeholders are familiar with the concept of the 'last mile.' The supply chain has done a good job addressing what was once the Achilles Heel of the intermodal equation, especially here in North America. It wasn't always that way.

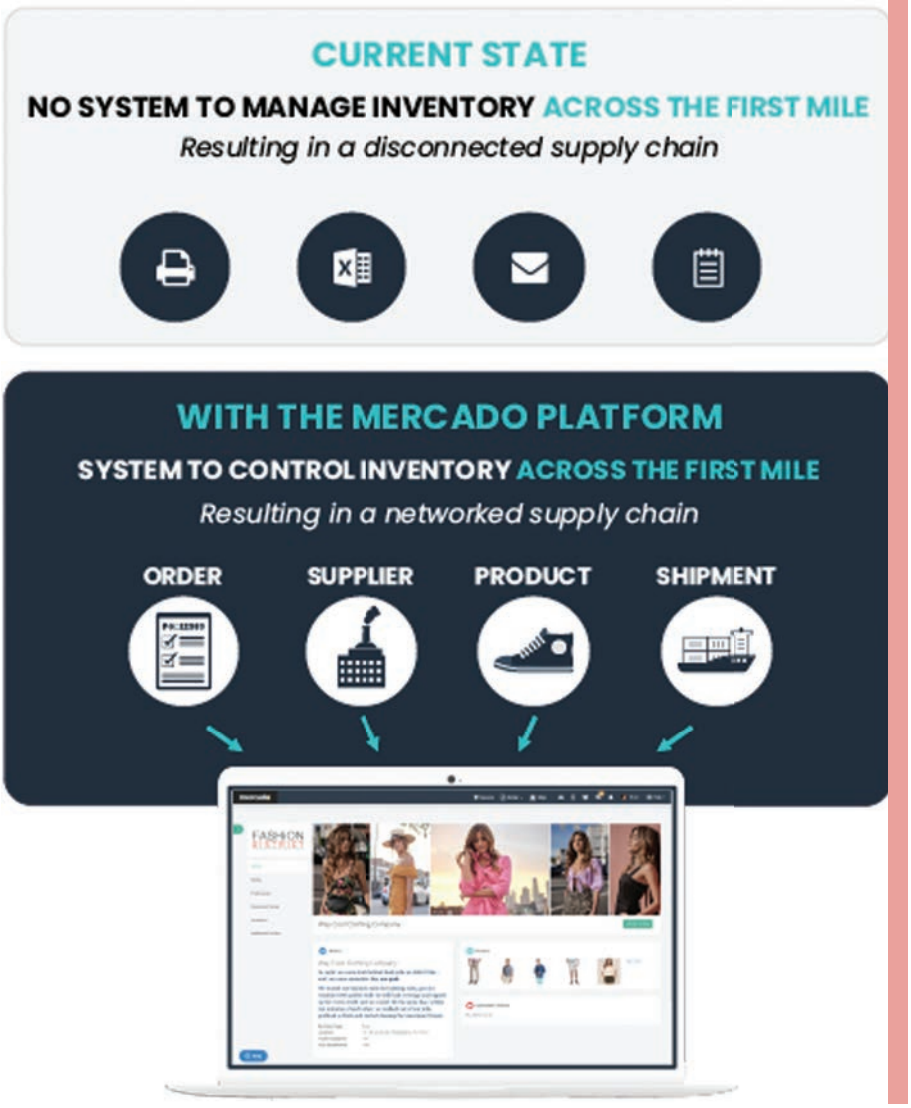
In the wake of the 9/11 terrorist attacks, port authorities rushed to shore up holes in their security arrangements. This addressed the obvious threats to commerce, but neglected the need to connect the ocean piece with the rail and trucking sectors. Often, enhanced security protocols slowed the movement of cargo, especially as it passed across the docks shoreside.

In recent years, U.S. ports – Charleston, SC and the Port of Virginia, for example – initiated effective rail and trucking intermodal connections, with an eye on reducing emissions and road congestion. Charleston's rail connections to inland foreign trade zones and Virginia's use of both rail and container-on-barge modes represent that region's more successful intermodal streamlining of the 'final mile.' Each ends with a short drayage run where the driver goes home at night.

Defining the First Mile

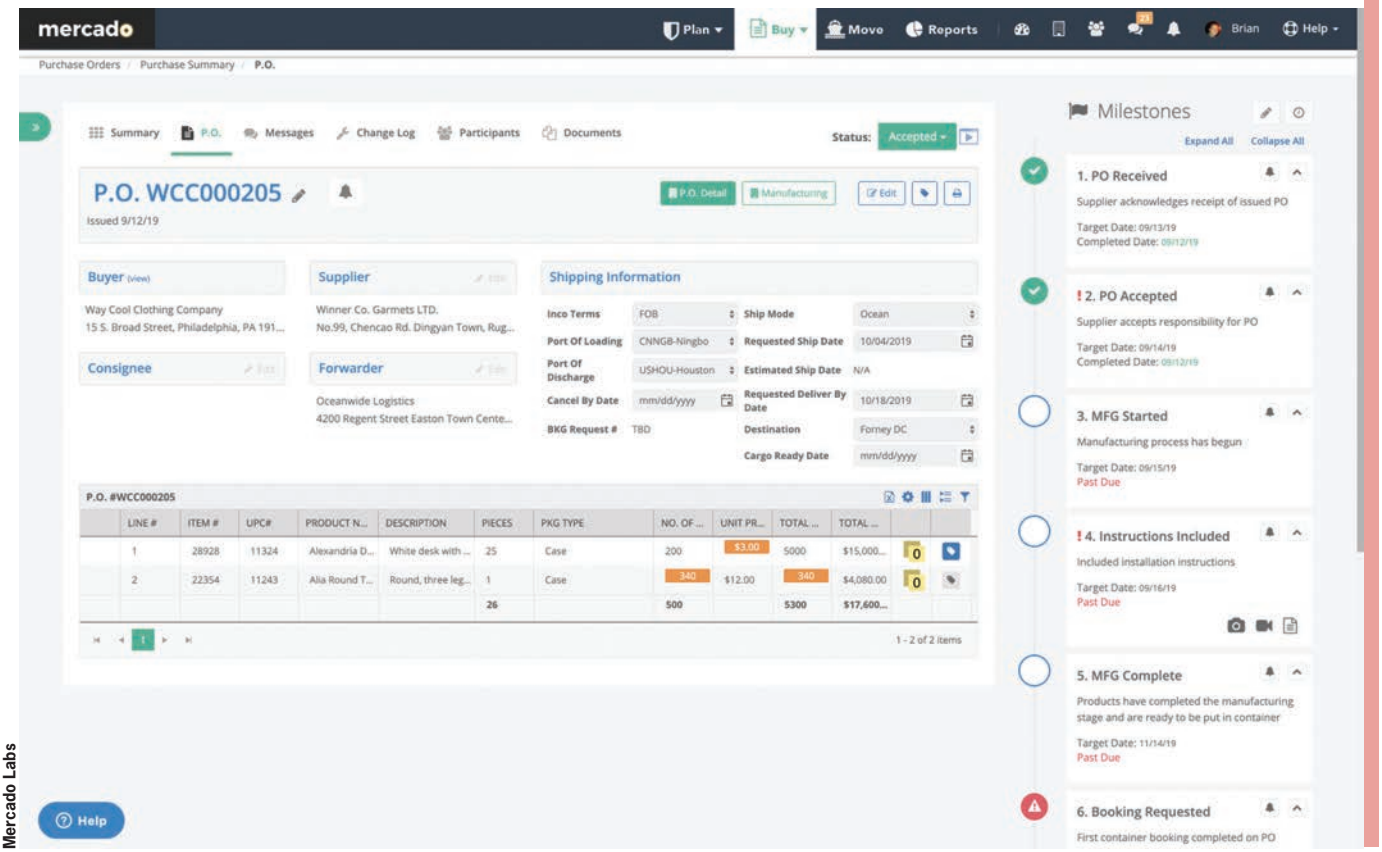
Mercado's platform focuses on the "first mile" – or, the first 120 days of each shipment. The concept is simple; connecting buyers and sellers to help

A simplified look at shipping with and without a digitized management solution platform.



Mercado Labs

A typical screenshot and window into the Mercado Labs platform.



Mercado Labs

businesses better plan, move and ship products. Mercado's cloud-based platform features 73 procurement, ordering and shipping features, spanning the full gamut of supply and logistics processes, vendor vetting and the promotion of better transparency along the entire supply chain for its customers.

"All of those features are important. For example, native language translation may not be important to a buyer, but it may be critical for their supplier. Our five main value propositions include collaboration, predictability, transparency, visibility and automation. All five are connected to the 73 features needed to enable them," explains Garrison.

Time is money. The Mercado service array improves 'predictability' via accurate, real time vision into the shipment's movement. The decision-making process in a fast-moving supply chain is the ultimate beneficiary. The shipment's ETA is one obviously important "predictability" metric. But, the biggest portion of time for any global transaction is not shipping. Garrison explains, "Shipping is relatively predictable; save the Southern California ports. The biggest portion of times is production. Mercado contains a robust work in process engine. We start with the order placement and monitor every milestone from placement to receipt."

In a nutshell, Mercado transforms the first mile of any shipment from analog to digital means. That's important because that process manifests itself across dozens of milestones in every transaction. A typical import scenario might involve 25 entities, 30 people, and myriad departments trying to manage a six-month process of sourcing, purchasing, manufacturing, regulatory and logistics. "Mercado connects all of those entities, people, departments onto a unified platform so everyone has exactly the same information," says Garrison.

On the Waterfront

The maritime mode could be a better partner in the 'first mile,' but carriers and ports have long focused on optimizing assets (ships, terminals, cranes) without connecting to critical data needed to enable networks. A 30,000 TEU vessel that sails from a port that does 86 moves per hour but also experiences a 20% 'no show' rate amply demonstrates that shipping is a 100% perishable commodity.

Garrison asks, "What if the assets were connected directly to the suppliers that manufacture the product, and the carriers leveraged 'AI' to 'predict' the demand, and then put in the appropriate supply in response?"

Mercado's cloud-based software addresses important but often delay inducing issues such as chassis logistics, drayage, container/cargo damage and the surveys that reveal these headaches. Garrison explains further, "Because we are a platform, we can

"At the front of the process we provide our customers a short supply chain profile questionnaire which feeds into our cost savings calculator and is presented to the customer in our proposals for validation. A customer will receive a minimum 3X ROI when using Mercado however it can be considerably higher depending on the client."

– Rob Garrison, CEO and Founder, Mercado Labs

Mercado Labs

partner with these companies on behalf of our customers. We can also partner with other technology companies purpose-built for these challenges – such as Straightline for example."

Still other clients have direct ocean contracts and Mercado connects to carriers in a similar fashion as forwarders. But, says Garrison, "The key is milestones. In both cases, we are looking to gain status updates to provide accounts. The value Mercado brings to this process is adding in the order, supplier, and product data to the shipping data in order to give accounts a complete picture." That 'complete picture,' comes with grave responsibilities.

Mercado Labs touts the increased transparency of key shipment data metrics for concerned parties. Many ocean carriers chafe at intrusive pre-arrival requirements of regulatory bodies. Separately, clients need real time, accurate windows into their shipments. Data transparency and data security are inextricably connected. Mercado Labs keeps both sides of that equation satisfied and in compliance.

Garrison insists, "Transparency and Automation should go hand in glove, so that you can have transparency without a burden. For example, the U.S. government needs transparency to what is loading on a vessel pre-departure, for security purposes. Mercado creates the ISF [the Importer Security Filing for ocean imports] electronically. Carriers need only supply that number and vessel name. This principle applies throughout." Beyond regulatory transparency, the importer should expect production, social and supply chain transparency, all of which Mercado provides.

Social transparency, says Garrison, is especially important. In a complicated world of dealing with multiple, global players – some of whom may not be completely transparent with trading partners as to how they do business – the issue of 'social compliance' and environmental footprint is an increasingly important issue. Indeed, U.S. West Coast container yards are being asked to define the environmental footprint of outside warehouse partners.

"I define Social Compliance as the ability to measure and improve potential harm to humans or the environment," says Garrison firmly, adding for emphasis, "Mercado has the unique ability to collect, assess, monitor, and convey social compliance throughout the production cycle. Social Compliance is my 'why' for starting this business."

Experience Counts

The need to connect the dots between physical assets that move cargo to the technology that enables it to be done efficiently is arguably the most important part of the shipping business. The vision to make that a reality should ideally emanate from someone who has 'been there, and done that.'

Rob Garrison brings deep experience in the full breadth of the supply chain – FEDEX, UPS and before that APL. He understands that the maritime aspect of the intermodal equation has lagged behind the shoreside modes in terms of leveraging technology. Garrison tells MR, "Historically, the maritime industry has focused on the most efficient way to optimize their assets. This is logical as the efficient management of assets are the pri-

mary cost drivers. Ships cost hundreds of millions to purchase and many millions per trip to operate." At the same time, the maritime industry also must look at the most efficient way to optimize network whiles significantly improving customer service.

Garrison offers that the three biggest uncontrollable expenses for a carrier are equipment dwell time, no show bookings, and equipment repositioning. All three are driven by the customer, tied to their ordering process, and yet, carriers have done little to understand this and/or build the technology to turn it into a win/win for everyone. That's where Mercado comes in.

Because Garrison spent half of his career at APL working for their logistics division (now APLL), it taught him the importance of connecting the order to the product. "Customers buy shoes; not containers and bills of ladings," he explains, adding, "Connecting one to the other drives massive value for the customer, however that service is limited to visibility. Once the product is on a boat or a plane, there is little a client can do to correct a bad order." Mercado starts with order management during planning and buying, converting it to visibility during the logistics phase.

Collaboration: Digitalizing the Supply Chain

Mercado integrates with a client's legacy ordering systems, not as an ordering system but one which provides for better tracking, transparency and accountability. Mercado is an International Supply Chain Platform (Plan, Buy, Move) which embeds workflow, process, and automation so that suppliers, orders, products, production, and logistics are all connected. Importantly, Mercado sends data back to the ERP so that host systems stay connected. "The benefit to the client is Collaboration, Transparency, Visibility and Predictability," says Garrison.

It takes six months on average from the time an order is placed from an ERP until it is received by the distribution center. Without Mercado's cloud-based technology, 85% of that period is managed by MS Office, which wasn't designed to manage workflow, automation or process. For the remaining 15% of the total move, a freight forwarder is typically engaged to assist with logistics. Often, the order information remains disconnected from the information chain. Hence, shifting the complex process from the analog world onto a digital platform is the key.

Using digitalization to drive automation is not a new concept for many industries. That transformation has been anything but swift for a waterfront which has long defined progress in terms of deadweight tons, ship LOA and TEU capacity.

Mercado's innovative disruptive difference automates the supply chain by digitizing traditional, manual functions and critical documents such as the order, invoice, packing slip and ISF. That's important because a manual invoice has to be reconciled by both the broker and by the accounting department of the importer to make sure it matches the order. This involves manpower and often, expensive mistakes.

Importantly, Mercado is a 'platform;' not a 'point solution.' 'Point solutions' typically address one aspect of the transaction, whereas Mercado Labs aggregates and improves all of these processes. Here, the Order, Suppliers, Providers, Products, and Logistics all work as one. Mercado's platform connects to any point solution, ocean carriers directly, a shipment visibility tool such as P44, or ocean shipment viability tools like ClearMetal. That kind of collaboration exists only when technology brings all of the pieces together, in one highly visible tool.

Democratizing the Supply Chain: Available Now – to the masses

At the heart of Mercado's value proposition is the goal of democratizing the use of cloud-based supply chain management, providing an accessible price point for the nation's 300,000 importers. The firm aims to serve all importers, not just the big boys.

Rob Garrison explains, "We don't pursue the Fortune 500 market because we don't find them attractive. We were able to build an extremely affordable, easy to adopt, and easy to use system, in part because of modern technology and the cost of same. Our design teams broke down the complexity into simplicity. The founder of GT Nexus is one of my board members and I have also been a customer of theirs."

Hand in hand with that mission is the ease of adoption for even the smallest of business customers. A Mercado user can be up and running on the cloud-based program in less than 30 minutes, typically facilitated by Zoom training. A company can be set up in as little as eight weeks, most of which involves IT integration to ERP and forwarders.

Any service provides both 'soft' and measurable savings to be realized by the customer. For smaller firms with limited financial resources, the speed of that return on investment is as important as the ease of transition to a new technology tool.

"At the front of the process we provide our customers a short supply chain profile questionnaire which feeds into our cost savings calculator and is presented to the customer in our proposals for validation. A customer will receive a minimum 3X ROI when using Mercado however it can be considerably higher depending on the client," says Garrison.

Mercado's First Mile: Making your Last Mile Count

Recently, Mercado closed a $2.5 million funding round led by IronSpring Ventures, joined by new investor Supply Chain Ventures. According to Garrison, IronSpring and Supply Chain Ventures share a thesis that in order for supply chains to become more efficient, they must improve their operations, using technology. "This has proven itself dramatically with what we have witnessed in the final mile over the last five years. For the International supply chain, there are a host of new technology companies trying to do the same for the middle mile (port to DC). We believe the most dramatic change of all will come from efficiencies in the first mile. Both of our partners share that vision and have the expertise and connections to help us realize that potential."

Mercado's 30 employees are spread out between its Dallas, TX headquarters, an engineering group in Austin, and others located globally to support clients and their suppliers. Garrison declined to share a client list, but he said that since its 2018 inception, the firm had won work from a $12B retailer, a DTC retailer, and dozens of wholesalers.

Early in his career, while working for a large importer, Mercado's CEO was confronted by a buyer who blamed 'logistics' for delays in a critical seasonal promotion. This watershed moment cemented his belief that a better outcome would be achieved through greater emphasis on the buying processes. In other words, what happens in a shipment's 'first mile' effectively defines what happens during the last mile.

Similar to the marine coatings business, supply chain success involves 99% preparation and just 1% logistics. To that end, Mercado Labs is already navigating a course line to success, starting from the all-important first mile, culminating in a profitable finish.

Autonomous ANTX

AutoNaut "shepherding" the Remus UUV during operations (the shepherding back to a safe zone was done mostly when the UUV was underwater).

Image: AutoNaut

Geophysical seismic surveys and port security may appear to have little in-common. However, it turns out that managing complex marine seismic operations, where 10km-long seismic streamers have to be deployed harmoniously alongside other offshore marine assets, isn't that dissimilar to managing – and protecting – port facilities.

By Elaine Maslin

It's an area that ION Geophysical, more known for seismic data acquisition technology, has recently been proving its expertise in, using its Marlin system for marine operations management. Dave Gentle, Vice President of Business Development, spoke about the firm's involvement in last year's ANTX (Advanced Naval Technology Exercise) in the U.S. – a project which involved detecting and managing a diverse array of assets, including potential security threats.

He says underwater threats are increasingly dynamic and diverse and therefore increasingly challenging. Gentle recalls the use of an early submarine, the Turtle, in the American revolutionary war in 1775, as an example of a new threat – and how metal hulls were a counter measure. "While threats to harbors have evolved at a slow pace, we're now in a period where there's a rapid advance in autonomous systems, underwater vehicles, where technology is improving and is more easily available to people around the world," he told the Marine and Autonomous Technology Showcase event in Southampton late last year. "It's not a giant leap to imagine these vehicles can be repurposed to make explosive devices or be used for other devious ends." To that end, focus on naval security has increased.

Shifting Focus

Similarly, ION has been shifting its focus. While the company's core business is seismic operations, it's recently been looking at how its capabilities could be relevant to other markets. The idea that it could support naval assets came up within the last couple of years and resulted in ION getting involved in ANTX. The event is run every year by the Naval Undersea Warfare Center (NUWC) out of Newport, Rhode Island, and CNMOC (Naval Meteorology and Oceanography Command), based at Stennis, MS.

For ANTX 2019, ION proposed a joint exercise with AutoNaut, a U.K. based wave propelled unmanned surface vessel (USV) developer, part of the Seiche group of companies, to address the ANTX Marine Security theme. An AutoNaut USV would provide environmental monitoring and be hooked in to Marlin, ION's marine operations management platform.

"However, as we progressed through the planning stages the CNMOC group teamed us up with Atlas Elektronik, who provided the Cerberus Diver Detection Sonar, and Marine Arresting Technologies, who have a non-lethal counter measure device in the form of their Stingray capture net," says Gentle. "This then became an exercise in integrating all of the separate systems into a port security solution."

Operations Management

Marlin is a rule-based software solution for operations management. It combines temporal planning with spatial awareness, primarily using real-time ships' AIS (automatic identification system), as well as radar and other tracked target feeds to improve operational efficiency. ION has been using Marlin and other command and control software platforms for more than three decades in the offshore oil and gas industry. There, it's mostly used in managing seismic survey operations, involving towed streamer surveys comprising up to 14 hydrophone arrays each reaching up to 10km long or seabed surveys with multiple surface vessels and assets deployed on the seafloor. "In later years, we found that, as these surveys were increasingly needed around and in the middle of busy offshore oilfields, the seismic survey operations were in conflict with other oilfield operations," says Gentle. "At this point we turned our attention to simultaneous operations management (simops) enabling the seismic surveys and the oilfield

Marlin Screenshot showing the port area with zones of operation setup around the shore-side stations and target of interest (diver) being tracked moving towards the safe zone this shows the targets within those zones top left (red is safe zone, orange ops zone, and yellow is monitored zone).

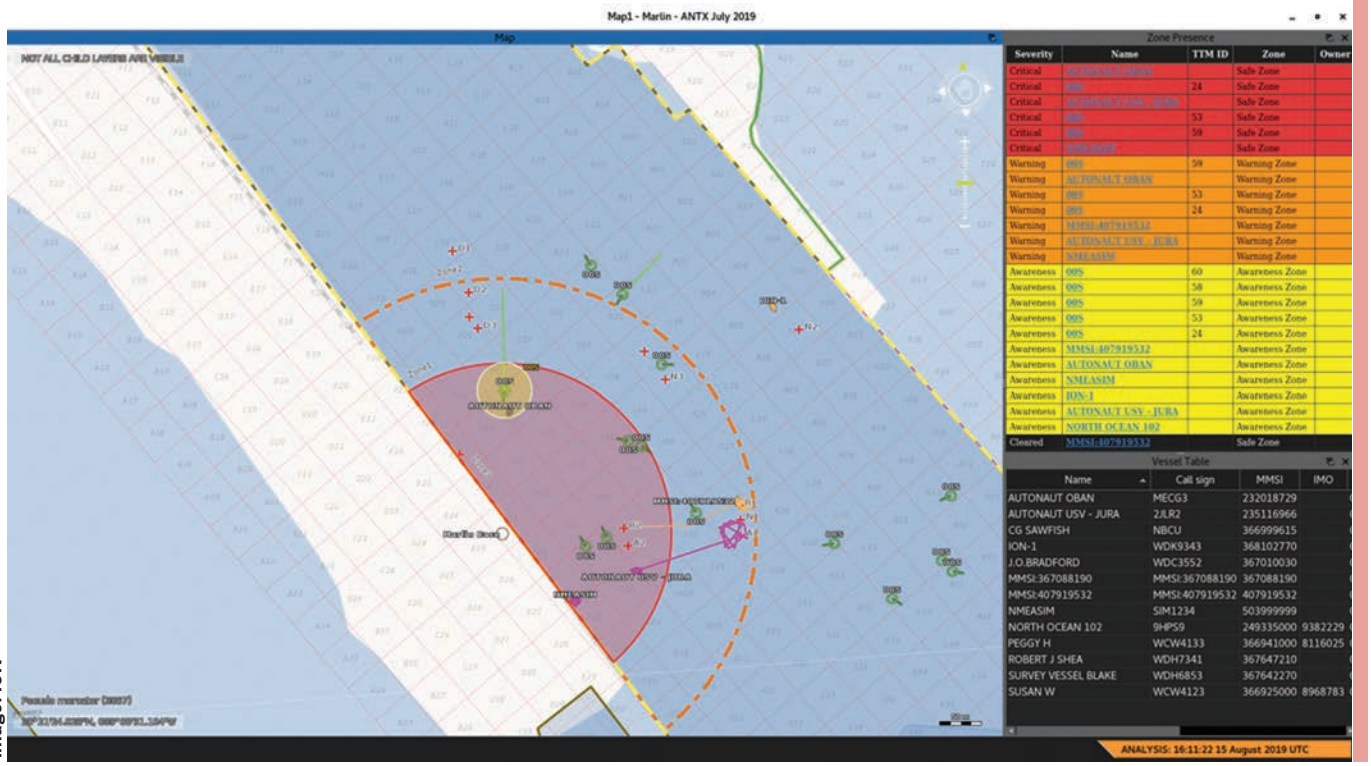


Image: ION

operations to run in harmony with each other and avoiding costly downtime." Marlin could marry the operational plans with a powerful geographic information system (GIS) engine with built-in archiving and look-forward analysis – helping to prevent asset conflicts.

Port Security

For the ANTX exercises, ION wanted to demonstrate that it could integrate third-party systems quickly into Marlin and then use it to provide the necessary information to enable decision optimisation in port security scenarios. This is what it got to do during the CNMOC exercises, which were also supported by the University of Southern Mississippi at their Marine Research Center at the Port of Gulfport.

During a week-long exercise, ION was tasked with working with AutoNaut, Atlas Electronik and Marine Arresting Technologies to provide an integrated system that would detect surface and underwater threats and coordinate a non-lethal mitigation against them. The threats were divers (real and mechanical/dummy) and unmanned underwater vehicles (UUVs), including Remus and Riptide UUVs. Atlas Electronik's Cerberus was used to detect the threats, while their SeaFox fiber optic guided mine countermeasure tool was used to intercept and inspect them and a Stingray capture net

Graphic representation of the exercise; met-ocean data collection operations running concurrently with simulated threats, detection and mitigation assets.

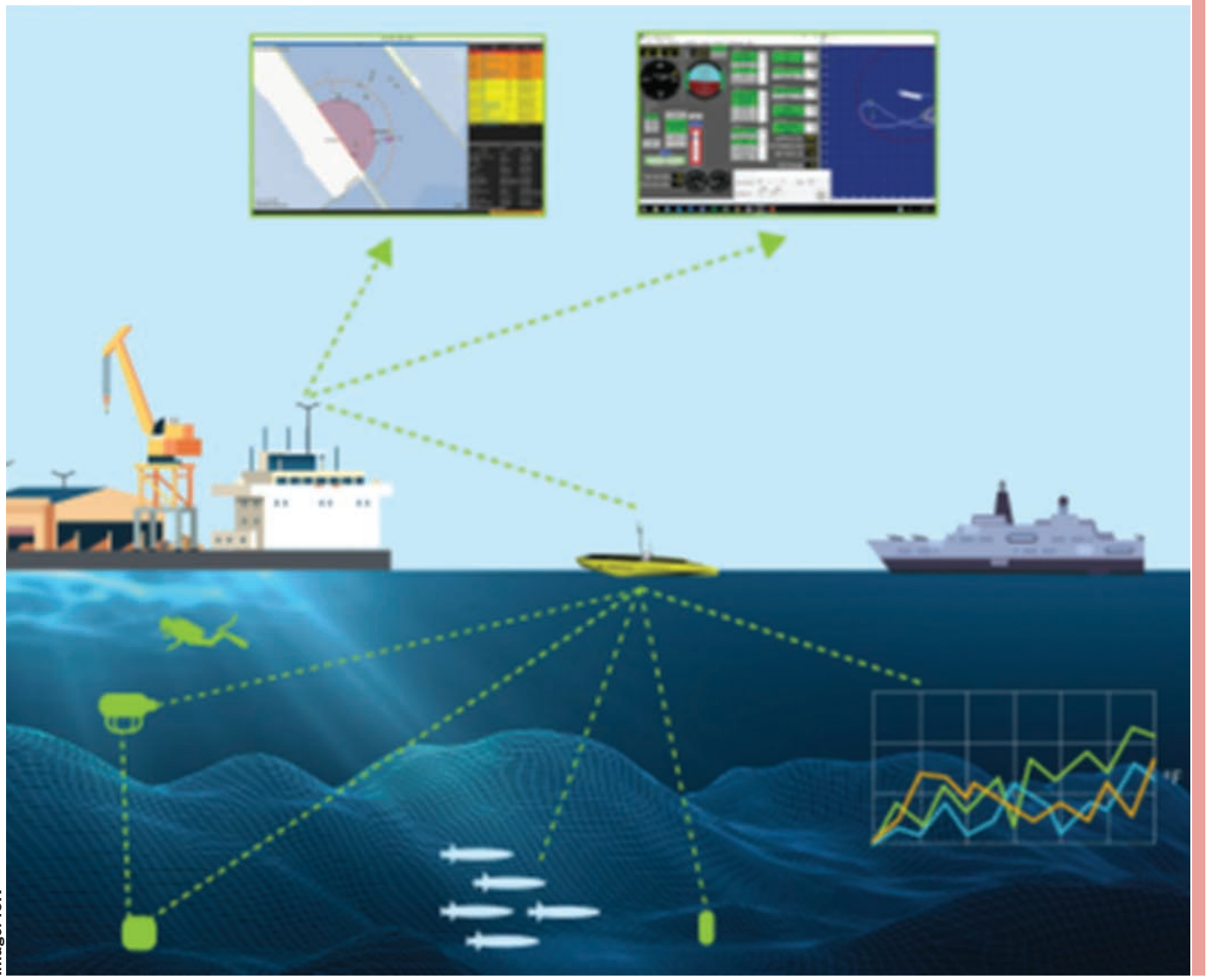


Image: ION

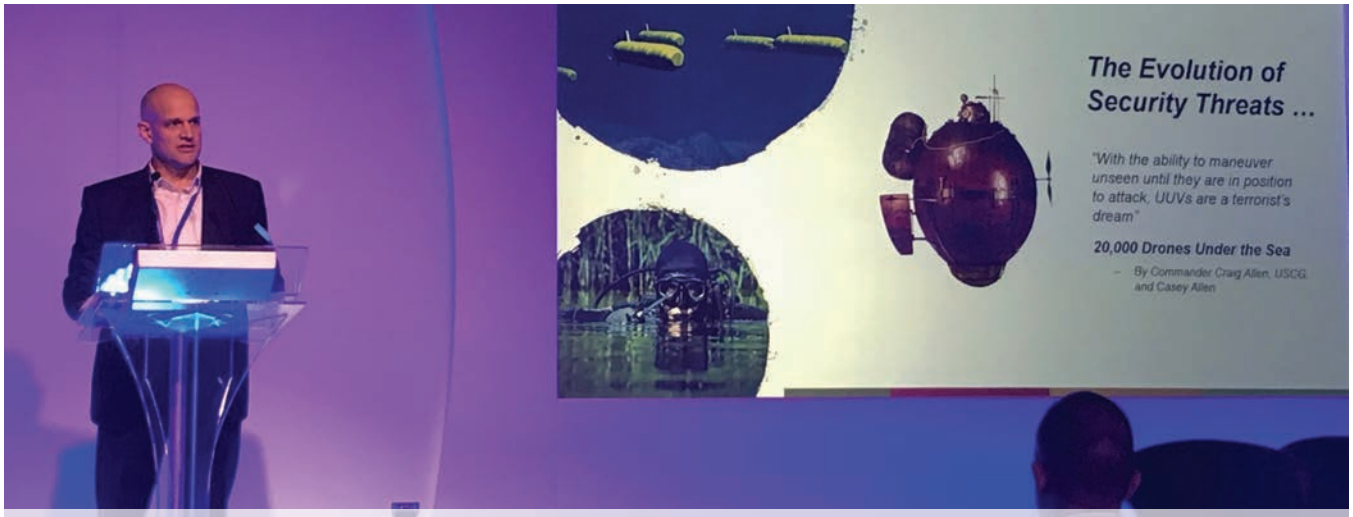


Image: ION

"While threats to harbors have evolved at a slow pace, we're now in a period where there's a rapid advance in autonomous systems ... It's not a giant leap to imagine these vehicles can be repurposed to make explosive devices or be used for other devious ends."

– Dave Gentle, ION, presenting @ MATS

from Marine Arresting Technologies from Florida was also deployed. Approximately twenty people from companies and Navy groups took part. A CONOPS (concept of operations) plan was decided and setup in Marlin which also monitored assets and threats in the operations zones.

Detecting Divers & UUVs

The idea was to have a diver or UUV enter the area and make their way to the controlled zone. There, Cerberus, mounted off a dock, would pick them up, which Marlin would then see, track and predict when and where the diver would go and send the SeaFox to investigate. The exercise then presumed that the diver/UUV would continue to move into the controlled zone, so then the Stingray net would be deployed, on this occasion from the Port Police Patrol boat. AIS transmitters were used to track 'friendly' assets. But, because the update rates during the exercise were slow, ION switched to using GPS tracking, where it was available, through some "on the fly" integration.

"There was a silty bottom (in the area) and high turbidity," said Gentle, "the conditions were challenging. But the system detected real and dummy divers. Atlas Elektronik's SeaFox was used to investigate the intruders and we also used the Stringray net to capture the Remus 100 and Riptide." All of this was coordinated through Marlin, with the AutoNaut USV being used as a communications gateway to the UUVs, with control via a Woods Hole Oceanographic Institute Acomm unit. In addition, the AutoNaut also collected a metocean dataset, which offered some additional interesting data to analyze.

"We were able to do this very quickly during the exercise, leaning on our decades of sensor and data fusion experience in the oil and gas industry," says Gentle. "The end result is that the team were able to successfully detect threats, monitor their tracks and deploy countermeasures, all coordinated through Marlin." "For this exercise, Seiche's engineers built a prototype PAM (passive acoustic monitoring) array that was housed on the AutoNaut USV," says Gentle. "As AutoNaut is capable of very quiet wave propulsion and is able to maintain station and listen as we performed the port security operations, they picked up some very interesting results in later post processing."

Ongoing Challenges

It seems there's more to come, and not just from ION. "Underwater security threat detection and mitigation still has a number of challenges to solve in order to provide a seamless and reliable solution to the growing potential threats that are out there," says Gentle. "A number of companies are working on this area and ION hope to be able to contribute using the Marlin platform as the glue to tie it all together."

ION specifically is doing more work in this area, including providing a Marlin variant, called Marlin SmartPort, in ports for vessel tracking and port operations management. "This is a fairly new area for us, but we are gaining traction working with our partners at the Port of Montrose (in the U.K.) and we working with AWS on this cloud native version of the Marlin platform," says Gentle.

Port Milwaukee Diversity Drives Growth

Port Milwaukee

By Greg Trauthwein

Known historically as a salt port, Port Milwaukee has worked and invested to modernize its infrastructure while diversifying its commodity mix to prepare the port for coming generations. Adam Tindall-Schlicht, Director, Port Milwaukee, discusses the pace of change.

Tindall-Schlicht returned in 2018 to serve as the Director of Port Milwaukee, overseeing a Great Lakes port which encompasses 470 acres, employs 1,300 and offers 24/7/365 service to a growing list of domestic and international shippers, delivering more than $100 million economic impact punch to the region. Historically known as a salt port courtesy of the fierce Wisconsin winters, Tindall-Schlicht has been steadfast in his mission to diversify the commodity and customer base of the port. "When I looked at a lot of our capital assets and infrastructure, some were decades old."

Like any port in any region, this means continued investment in capital assets and infrastructure as an ongoing process, and according to Tindall-Schlicht "the port is moving forward on our Capital Assets Renewal Plan (CARP), which will be the plan, the process and the strategic funding road map for the port, our tenants, our operators and our customers to modernize our facilities for its continued growth over the next generation."

The Year in Review

According to Tindall-Schlicht, 2019 was the best year for Port Milwaukee in a decade, with "overall tonnage handled up 24% at port facilities and up 11% across Milwaukee Harbor in 2019." This was driven by a number of factors, from strength in its traditional salt commodity business, which was up 56% over 2018 and powered by increased business from international shippers. Strength was also evident in its cement and limestone business, and – despite a number of global tariffs – a strong business importing European steel. In addition, with its partner U.S. Venture/U.S. Oil the port has invested millions in its liquid bulk terminal facilities. Other investments include a $4 million to fully refurbish 15 miles of railroad track and crossings, funded by the state and a key intermodal attraction for shippers as Port Milwaukee's rail link connects both the Canadian Pacific and the Union Pacific rail lines. The rail project is expected to be completed in July 2021.

While Tindall-Schlicht was loathe to trumpet one investment as more important than the others, he said that a $31m investment in an agriculture export facility, an investment that includes federal, state, port and private investment from the DeLong Company, will resonate for generations and is "the largest single investment in the port since the 1960s."

Port Milwaukee

"The port is moving forward on our Capital Assets Renewal Plan (CARP), which will be the plan, the process and the strategic funding road map for the port, our tenants, our operators and our customers to modernize our facilities for its continued growth over the next generation."

– Adam Tindall-Schlicht, Director, Port Milwaukee

Finally Tindall-Schlicht noted that the cruise industry will become an increasingly important part of the Port Milwaukee mix, as Viking Cruise Lines, which will start operations on the Great Lakes and the Mississippi River, in April 2022, have selected Port Milwaukee for its turnaround service and homeport.

Technology

Tindall-Schlicht noted that it was cooperation between the U.S. and Canada that arguably will lead to the greatest influx of commerce on the Great Lakes waterways system since the St. Lawrence Seaway opened, investing "hundreds of millions of dollars" in the refurbishment of Seaway locks, introducing 'Hands Free Mooring'. It's an automated system with no need for human interaction to secure the vessel against the lock wall, Tindall-Schlicht said.

The significance is not only ease of operation and safety, but also the removal of costly vessel enhancements traditionally needed on ships to access the Great Lakes system.

"This lock modernization opens the system to thousands of Handy-size and Seaway Max vessels that (traditionally) have not come into the Great Lakes System because of the cost of specific ship outfitting," a joint U.S. and Canadian investment that has helped to open new markets for all ports in the system.

Hands-free mooring (HFM) technology uses vacuum pads instead of lines to hold ships in place as they transit locks, and is now fully deployed throughout the St. Lawrence Seaway.

The U.S. Department of Transportation's Saint Lawrence Seaway Development Corp. (SLSDC) called HFM the most important technological advance on the Seaway since it opened in 1959. The agency invested $23 million to install HFM at the Snell Lock and Eisenhower Lock. The project marked the first use of the technology on an inland waterway, according to the SLSDC, which said it has prepared its workforce with the skills necessary to implement the system.

The vacuum pads each provide up to 20 tons of holding force. They are mounted on vertical rails inside the lock chamber wall to secure a ship as it is raised or lowered, keeping it a fixed distance from the wall. The last step in the lockage operation consists of releasing the vacuum and retracting the pads so that the vessel can sail safely out of the lock. The SLSDC said full implementation of the HFM system was important to the future of the Seaway.

COVID-19

While COVID-19 has had a serious impact on global commerce, Tindall-Schlicht reports that, to date, Port Milwaukee has fared comparatively well. "It really surprised us. While we are still cautious on the economy in 2021/22, our tonnage and activity to date is on par with where we were at this point in 2019."

At the outset of the pandemic, the port implemented an operational shift model to minimize or eliminate altogether redundancy of human interaction. In effect the port took on an "at-call" versus a "shift" model, with personnel coming in as needed to both protect employees and ensure good customer service. While it is difficult to see the silver lining during the storm, Tindall-Schlicht hopes that the importance of seafarers and dock workers, in fact all essential employees throughout the logistics chain, are recognized as the backbone of local and global economies. "Despite it being the age of uncertainty with COVID-19, you have a trusted and reliable partner in Port Milwaukee."

Por New York/New Jersey

Port NY/NJ Container Volume Stands Strong

By Greg Trauthwein

Ports are economic engines for the regions they serve, and the impact from business activities at the Port of New York/New Jersey runs as big as the area it serves: 46 million consumers in a four-hour radius. The port is an economic giant in and of itself, providing for more than a half a million jobs in the region (including 239,100 direct jobs), a cumulative $36 billion in personal income and a cumulative $99 billion in business income.

When Sam Ruda took over as Port Director in April 2019, it helped bring the New Jersey native's career full circle. A graduate of Rutgers University with an economics degree, Ruda has led a maritime life, spending more than two decades in the container shipping industry starting with SeaLand and ending with NYK, followed by a stint with NIKE managing its global supply chain and finally a dozen years running the Port of Portland before joining the Port NY/NJ in 2015 as the assistant director. Port NY/NJ is primarily a containerport, but it has diverse operations as a vehicle transport hub, both import and export, as well as bulk cargo, breakbulk and cruise. "2019 was a record year for the port," said Ruda, noting:

- Nearly 7.5 million TEU containers
- Nearly 578,000 vehicles
- Nearly 50 million tons of bulk cargo
- Nearly 102,000 tons of breakbulk cargo, and
- Visits from 304 cruise vessels.

"What defines this port is the water infrastructure (a 50 ft. draft); the land side infrastructure (led by the recent raising of the Bayonne Bridge) and the facilities," said Ruda. "Prior to COVID, the cruise activity in Bayonne (RCCL) was doing well, too. We were well on our way to becoming a 1 million passenger cruise port."

Investment Strategy

With 3,000 acres of maritime facilities, Ruda and his team are embarked on deploying the *Port Master Plan* which will help shape the port's investment, activities and impact for coming generations. "Infrastructure upgrades have enabled the port to attract larger ships," said Ruda. "(Since deepening the channel to 50-ft.) we've seen year over year growth in the number of containerships over 10,000 TEU calling on the port." Recently, the CMA CGM Brazil, at 15,000+ TEU vessel, called Port Elizabeth the largest ever containership call in the port. On 75% of those containership calls "we are the first port of call, which is obviously a great place to be," said Ruda.

"Investment never stops," said Ruda. "You want to always stay ahead of the demand curve, but that can be tricky. Our Port Master Plan takes a 30-year view and tells us that we need to be planning for our next-generation waterway infra-

Port New York/New Jersey

"Our Port Master Plan takes a 30-year view and tells us that we need to be planning for our next-generation waterway infrastructure and facility infrastructure now. You don't wait 10 years, you have to start now."

– Sam Ruda, Director, Port of NY/NJ

structure and facility infrastructure now. This includes:

- **Deepening the channel:** With the U.S. Army Corps of Engineers the port is evaluating channel depth to accommodate 18,000 TEU container ships.
- **Rail:** Completion of the last major express rail facility in Port Jersey/Jersey City/Bayonne, a public private partnership with GCT, with the port putting in $56 million.
- **Heavy Lift:** Terminal operators have been buying bigger cranes: higher and wider to facilitate more efficient cargo handling operations.
- **Berth and Wharf renewal:** "(Some of) these are facilities that came into being in the 1950s and 1960s with the advent of containerization"

Technology Drivers

While it is not a port-specific technology, Ruda counts e-commerce as a primary driver in the ports planning for the coming generation. "It's not only changing where we buy, but also how people buy," said Ruda. "That doesn't change that there is a container connected to the purchase; but it does drive where distribution and fulfillment centers are located. Fifteen years ago the chase was on for the cheapest land furthest from the port; we're seeing the opposite today, and the industrial real estate market is on fire." He said Port NY/NJ has more than one billion square feet of warehouse and distribution space within 50 miles of the port. Internally at the port, Ruda looks at the intermodal chain holistically, as the technology swing "really is about the technology that support the activities in the port system. It's the interface that the truckers have with the terminals. As we dive deeper into it, we talk about the truck and the containers, but we really have to start talking about the truck chasis, and about returning empty containers. This is a big opportunity for efficiency improvements, and we're hearing a lot about it from the trucking community as to what needs to be improved in the ports sector."

COVID-19

The COVID-19 pandemic is *the* business story of 2020, and when talk turns to its impact, Ruda said there are multiple layers. First, there's the people, and Ruda said port office employees have rapidly moved into the digital workspace. "We no longer pass around hard documents, it's all e-signatures now," said Ruda. "e-signatures have been around forever, but we really weren't using it. Today, we are processing leases, port of entry … everything much faster and more efficiently, and this is a positive that has emerged from the COVID-19 negative. Ultimately though, it are the waterfront workers that have been on the front lines to ensure that commerce flows, and Ruda credits all stakeholders, including labor, the port authority and the employers to keep things moving. "We all decided early on that we would not rely on others for PPE equipment for waterfront labor," said Ruda. "We brought it all in ourselves. Labor started early with temperature checks." To that end, the port has been open as close as possible to usual, and in fact, year to date, volume is only down 8%.

"It's amazing how resilient the maritime, waterfront, and supply chain have been," said Ruda. "This started in late January as a supply shock when China was starting to shut down. When it was happening, it looked like it was just a China issue, but then it evolved from a supply shock to a demand shock. The stay at home economy has really played to the container trade in many respects. There have been strong volumes in furniture, food, home goods, beer wines and spirits … I don't want to give the impression that COVID has not impacted us, but the number of blank sailings has fallen sharply; and we're starting to see a strong recovery."

Fighting Container Fires

Photos: Survitec

Fire safety has become a major concern in the container shipping industry, in particular, with vessels of 20,000-TEU and more entering the market. A fire in just one container can have catastrophic implications for the whole of the cargo. The very nature of container shipping means that the cargoes are in general finished goods of high value. Insurer Allianz gives the example of a March 2018 fire onboard the Maersk Honam southeast of Oman. At the time the ship was carrying 7,860 containers, corresponding to 12,416 TEU. Although the ship was less than a year old at the time of the incident, and consequently was fitted with the latest fire-fighting equipment, the damage to ship and cargo was severe, with five fatalities among the crew members.

The incident was one of the largest general claims on record, thought to be in the hundreds of millions of dollars - Allianz said a total loss would have seen damages of over $1 billion. The fire was not totally extinguished for weeks, and the salvage operation involved a further seven weeks before the ship could be towed to a port of refuge.

This is just one example from a growing list of large container ship fires in the last decade.

One of the major difficulties is that, despite IMO regulations, cargo is not being properly declared, so firefighters can never be certain just what they are dealing with. Insurers, including Allianz and the International Union of Marine Insurance (IUMI) say that both ship design and regulations governing fire-fighting equipment need updating to take into account the growing capacity of ultra-large containerships, minimizing fire risk and making it easier to extinguish and contain fires.

The rule-makers at IMO are aware of this – the Guidelines for Formal Safety Assessment for use in the International Maritime Organization's rule-making process say that fire protection of new cargo ships with containerized cargo on deck should be improved. But implementation of such rules, and their subsequent entry into force, can stretch to many years.

Survitec believes that such improved safety measures should be considered from the outset and should form the basis of the design process of any new container vessel. But it is not just ship design and equipment standards – the potential dangers of fire, and successful crisis management in the event of an explosion or conflagration must be embedded into the mindset of the crew. Although SOLAS regulations specify what type of firefighting system should be on board a specific ship type, UIMI points out that the rules were formulated with older, smaller general cargo vessels in mind, and haven't kept pace with the size of many current ships.

Many containerships still carry CO_2 deployment systems installed onboard, which many now deem be to ineffective where container fires are concerned. Below deck, CO_2 systems are often effective and in common use. However, the gas cannot penetrate container walls and oxygen sealed inside containers will encourage fires to burn resulting in an reignition. A lack of fire detection on deck is another potential problem. Reduced manning levels mean crew members are not able to keep a regular check on container temperatures.

The Water Mist Lance.

The XFlow Mobile Water Monitor has a 40m range.

Following the Maersk Honam fire, Maersk and ABS carried out their own evaluation on hazards which are not addressed in the IMDG code. As a result, Maersk's own procedures have been modified – for example any container identified as carrying dangerous goods is not stowed near crew accommodation or the engine room, and fire-resistant cargo is stowed above deck. But these depend on cargoes being correctly declared. Although some authorities check random containers and impose penalties for misdeclaration – a common practice to avoid higher cargo rates – in many cases such dangers are overlooked, with potentially serious consequences.

SOLAS says that containerships built after January 1, 2016 must have at least one water mist lance capable of penetrating a container wall, while if five or more tiers of containers are carried on deck, ships up to 30m wide need at least two mobile water monitors, and over 30m they need four.

Insurance companies are highlighting this issue with the latest reference being a presentation at IMO sub-committee SSE7. Additional measures may be required in a foreseeable future. Survitec is following this closely to be able to develop new safe fire products to serve our customers, said Erik Christensen, Technical Director Water and Inergen, Novenco Fire Fighting A/S, a Survitec Group Company

Survitec's Novenco Fire Fighting (NFF) XFlow Mobile Water Monitor is used to protect the container deck area and the associated Water Mist Lance is used to protect container bays. In the event of a fire in a container, the water mist lance and the water monitor can be used together or independently. The water mist lance tool case contains a battery-operated drill, a fire hose and the lance itself. The equipment is designed to be easily carried, mounted and operated by one person. The lance is connected to the fire main using the hose in the tool case. For maximum effect the hole needs to be drilled at a significant height, and once lance is then inserted in the hole, it can operate unattended for as long as needed.

In terms of mobility, the Water Mist Lance comes in a practical tool case for storage and use, for ease of transport to significant heights of the top containers. Survitec's water spray is discharged both vertically to protect crew from the heat, and horizontally to suppress the fire. Similarly, the Mobile Water Monitor boasts a nozzle pressure of 4.0 bar, the throwing distance is 40m and the monitor can protect up to 10 tiers of containers, and even more at high pressure. The flexibility of Survitec's Water Mist Lance means the system can reach cabins, waste bin etc. and cars onboard the container ship and is equipped with a drill to penetrate the container wall quickly and safely. Requiring only one crew member to operate reduces the risk of danger to fellow crew members.

With only one waterway connection for fast response time from alarm to operation, the Mobile Water Monitor saves crew members time. With hydrant adaptors available, the dual-purpose nozzle is available for spray and jet functionality. With Survitec, inspection and servicing are part and parcel of these safety solutions. Survitec's ethos of regular inspection and/or servicing, increases the probability of functionality of its systems when needed.

One Input Only

By Lars Fischer, Managing Director, Softship Data Processing

Margins are thin and the search for cost savings and efficiency gains remain a business-critical priority for all breakbulk operators. While in years gone by breakbulk carriers have focused on adopting physical innovations applicable to the vessels themselves and their loading/unloading activities in order to reduce costs, COVID-19 has focused attention on back-office efficiencies. For many shipping companies, this year has laid bare many of the failings in the administration of their business and highlighted how important IT infrastructure and communications capabilities are to the resiliency of their operations.

As a software solutions provider, at Softship, we see many shipowners trying to work with software built for very different purposes and around which they end up having to shoehorn their operations. It is certainly true that modern IT systems and software applications, if used intelligently, can help deliver much-needed benefits, but care must be taken to select applications that are tailored to account for variances required by the break-bulk sector. Many operators mistakenly choose container–specific software which is often simply not up to the job of moving breakbulk, project or out-of-gauge cargoes.

A good software suite designed specifically to accommodate the requirements of these specialised cargoes will connect and integrate all activities from sales to customer service through to documentation and invoicing. Currently, many companies still duplicate their work in these areas which is both inefficient and error prone. Implementing intelligent solutions will streamline these processes and introduce a level of accuracy not previously experienced.

By fully integrating – creating automated processes and syncing programmes – software solutions developed to cater for breakbulk cargoes specifically can markedly reduce risk by providing intuitive, automated and networked processes that simplify all administrative requirements. Working on the "one input only" principle, data is input only once and then shared across the company and with relevant business partners. This significantly reduces the administrative burden and introduces efficiencies across the business.

Take as an example the common problem of calculating the profitability of a breakbulk cargo booking: a well thought out software application will retrieve variable costs per shipment from a cost database and apply these as estimated costs to the booking. Information on volumes taken from the customer at the time of booking are automatically married with this data to provide analysis and profitability assessments for each consignment.

If this can be married with an integrated dynamic pricing tool such as Softship's Pricing Calculator, an exceptionally clear picture of all of the possible transportation routes, options and profitability can calculated instantly, without having to reference a single Excel document or lever-arch file.

The benefits for the end-user making the enquiry, who can receive a detailed breakdown of their options, and the benefit for the carrier, which has a detailed helicopter view of what they can offer and how they can optimise their revenues, are significant. For global or multi-national carriers, the use of this tool also means that all offices are working off a single and unified system, which is incredibly important for transparency and good conduct.

By automating all back-office processes, a huge amount of data is automatically captured, shared and reused throughout the company, and can be analysed and presented in the form of management reports. Introducing such information transparency across the business allows busy executives to understand which areas of their business are profitable and which require more focus – a process which has been complicated by COVID-19 and reduced ability to travel between offices, or inspect processes in person.

The reality for all shipping companies is that COVID-19 will continue to impact operations. Any companies not equipped with the right IT infrastructure will surely suffer in the long term. Now is the time for companies to invest in flexible IT solutions that will fortify their business for a future not only influenced by digital technologies, but wholly reliant upon them. But for breakbulk carriers, in the race to adjust, the biggest mistake would be to adopt the wrong digital solutions or try to shoehorn applications to meet the unique requirements of breakbulk shipping.

Sennebogen

The "Gentle Giant" finds a home in Turkey

When it comes to working effectively in any port of any size around the world, most will attest that safe and efficient heavy life capacity is an unmatched tool in the toolbox.

To that end, meet what is touted as the world's largest purpose-built material handler, a 460-ton electrically powered giant, the Sennebogen 895 E-Series Hybrid, recently commissioned for the Tosyali Holdings fleet, at the Mediterranean port of Iskenderun.

Giant Sized Productivity

A convoy of 16 trucks transported the machine to Turkey, and Sennebogen's Turkish distributor, Forsen Machinery, required just a few days to assemble its crawler platform, configure the set-up for Tosyali, and test run the 670 hp (500 kW) drive. Fitted with a 13-yard orange peel grapple, it can reach out to 130 ft. (40 m) to grab 12 tons (10,900 kg) of scrap on every bite from the holds of panamax and post-panamax ships. Its operators move quickly, perched in the Skylift cab (pictured above) as much as 72 ft. (22 m) above ground level. "We handle 10,000,000 tons a year in this port alone," saod Harun Karaarslan, Tosyali's Technical Port Director at Iskenderun, in one of the Turkey's largest metal producing areas. "Our machines are in constant use. We rely on our fleet to be producing constantly; downtime would be fatal." Tosyali's facility operates a total of seven material handlers, including two 600,000 lb. Sennebogen 880 EQ balance cranes. Both the 880s also run on electric drive.

Electrified Efficiency

"Our experience with Sennebogen machines has shown us that using electric material handlers does not mean compromising on and flexibility or speed; quite the opposite. Despite their size, the machines cover a large work area, moving quickly up and down the pier. By not using diesel, we also save a lot of money every year." Nevertheless, one would expect a significant energy cost simply to move the 895's huge lifting boom and stick – itself a 53-ton steel structure.

The 'Gentle Giant' features a Green Hybrid energy re-capture system engineered into the 895's boom hydraulics. A pair of large hydraulic cylinders are mounted to either side of the main lifting cylinders. On each downstroke of the boom, the Green Hybrid cylinders hydraulically compress the gas in the storage modules at the rear of the upper carriage. On the next lift cycle, the compressed gas is released to give the lift cylinders a power assist, effectively offsetting the boom's own weight, much as a compressed spring generates energy when it's released. As a result, the re-capture system saves up to 55% of the energy for every lift.

Propane Forklift Safety for Crews

Reinforce these 8 simple safety tips for a safe, healthy workplace

By Matt McDonald, Propane Education & Research Council

Material handling equipment, like forklifts, are vital to a port's day-to-day operations. Forklifts enable employees to keep containers and other heavy materials on the move during their shift. But due to the nature of the equipment, forklifts introduce some workplace hazards that crews need to be aware of — and know how to avoid.

The Occupational Safety and Health Administration (OSHA) conducted a study analyzing forklift-related accidents, injuries, and fatalities and discovered the top six causes to be operator inattention, lack of training, unstable loads, forklift overturns, operators struck-by load and elevated employees.

Fortunately for forklift operators, modern forklift technology is safer than ever — but only when operators follow proper safety procedures. To combat common hazards and keep employees safe, OSHA has several safety guidelines in place with regard to forklift operation, maintenance, and required training.

The Propane Education & Research Council — and the propane industry as a whole — are passionate about forklift safety, too. The Propane Council works to educate propane users and has an entire landing page dedicated to forklift safety. There, users can find tips (like those listed below), videos, PERC's trivia challenge and more.

1. **Keep it secure.** The pressure relief valve on a propane forklift cylinder, which provides overpressure protection to the cylinder, should be kept clean, unrestricted, set to the 12 o'clock position, and directed upward at a 45-degree angle when the cylinder is mounted horizontally.

2. **Buckle up.** One of the simplest — yet most important — safety procedures is to buckle up before operating a forklift. A forklift's seatbelt is designed to protect the operator in case of tip-over.

3. **Hit the brakes.** To help prevent an accident, OSHA directs forklift operators to stop the equipment and set the brake before raising or lowering the forks. Accidents can occur when approaching a load too fast or turning too quickly.

© Grispb/AdobeStock

4. **Watch the ramp.** Operators should maintain a safe distance from the edge of ramps in order to prevent dangerous tip-over. When descending a ramp with a loaded forklift, always travel in reverse with the forklift and payload pointed up the grade. When traveling up a ramp with an unloaded forklift, always keep the forks pointed downgrade.

5. **Make some noise.** Slow down and sound the horn to avoid collisions at cross aisles, and anywhere else the forklift visibility may be obstructed.

6. **Call it a day.** When parking, operators should follow proper safety procedures including putting the forklift in neutral and lowering the forks to the floor. If not properly secured, an unattended forklift can be a danger to employees.

7. **Do the twist.** When a propane forklift isn't in use, turn the service valve clockwise until it's completely closed.

8. **Lock it down.** Cylinders should be stored in a secure, padlocked rack outside that protects them from sunlight and rain. Local propane suppliers can assist businesses with the best placement for their cylinder cage.

To learn more about propane forklift safety, visit: Propane.com/SafetyFirst

10 m
DIAMETER OF THE PROPELLER

18 600 m³
TANK CAPACITY

23 000 TEU
VESSEL CAPACITY

63 840 kW
ENGINE POWER

CMD-WinGD
12X92 DF

CMA CGM JACQUES SAADE

This ship is Big: 400 m long x 61 m wide x 78 m high

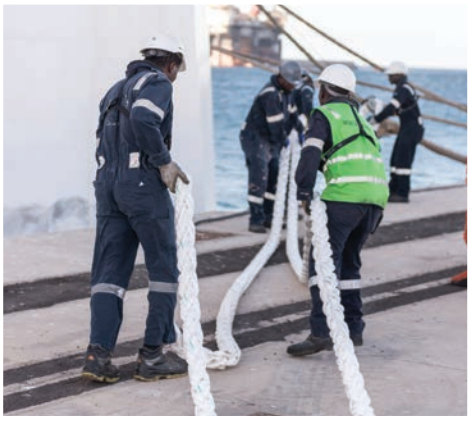
All images CMA CGM

By any measurement, literal or metaphorical, the CMA CGM Jacques Saade is 'Big.' The ship recently joined the CMA CGM fleet, an innovative ship on multiple levels that has garnered global attention as the first 23,000-TEU containership in the world to be powered by liquefied natural gas (LNG). This is the first of a series of nine 23,000 TEU container ships for the French containershipping legend, named after the founder of CMA CGM, Jacques Saadé.

In traditional form CMA CGM Jacques Saade joined the fleet via naming ceremony, albeit a naming ceremony with a COVID-19 twist: a first-of-its-kind digital naming ceremony that saw the shipyard's representatives in Shanghai and CMA CGM Group's management in Marseille share an emotional landmark moment in their common history. Blessed by father Francis Fang, the vessel was then officially named by her Godmother, Tanya Saadé Zeenny, who wished the ship, the captain and its crew the best of luck on their future voyages with the traditional words "May God bless this ship and all who will sail on her."

A full profile of the ship will be featured in the December **"Great Ships of 2020"** edition of *Maritime Reporter & Engineering News.*

Mercy Ships Hospital Ship puts Mooring Lines to the Test



All Photos: Mercy Ships

Phillystran has donated a full set of mooring lines to the Africa Mercy, the largest charity-run hospital ship in the world. Moored for more than 11 months of the year, the ropes will be subjected to relentless and demanding wind and tidal conditions in ports from Senegal to Madagascar. According to Djurre Jan Schutte, Master Mariner, Africa Mercy, "The conditions for Africa Mercy mooring lines are harsh. Where most vessel moorings are for a few days, the hospital ship can be moored for months in one place without the benefit of modern winches to slacken and tension the lines automatically."

The Africa Mercy is operated by Mercy Ships, an international non-governmental, faith-based organization providing healthcare services to the world's poorest countries. The hospital ship is dedicated to serving the people of sub-Saharan Africa. Mercy Ships serves countries that lie on the lower third of the World Health Organization's (WHO) Human Development Index, where access to safe, affordable and timely surgery is extremely limited. As a result, countless people suffer and die from conditions that can easily be cured. The programs delivered by Mercy Ships offer holistic support to developing countries striving to make healthcare accessible for all. Since 1978, Mercy Ships has delivered services to more than 2.8 million direct beneficiaries.

Phillystran Mooring Lines

Phillystran has donated four reels of Lankhorst Ropes' Euroflex rope. Phillystran and Lankhorst Ropes are both part of the WireCo WorldGroup. The decision to donate the mooring ropes followed a chance meeting with a Mercy Ships representative at a maritime ex-

hibition. "When we heard about how Mercy Ships is changing lives among the world's poorest, we felt the least we could do was to donate some mooring lines to the cause," said Mark Pieter Frölich, Commercial Director for Lankhorst Ropes USA & Phillystran. "These high-performance mooring ropes will keep the Africa Mercy secured during their good work in West Africa."

Secure mooring is important. "African ports present many port and weather challenges. The blazing African sun, in particular, causes ropes to deteriorate quickly," said Ciaran Holden, Marine Operations Technical Director for Mercy Ships. "The stability of the vessel for surgical procedures and the comfort of our patients and crew is crucial for us to bring safe and successful medical care to people from nations like Senegal, Guinea, Cameroon, Benin and Madagascar."

Well-equipped Hospital Ship

Formerly a Danish rail ferry, before an extensive refit, the Africa Mercy contains five operating rooms, a four-bed recovery area, intensive care for up to five patients, and 80 ward beds. It carries about 400 volunteer crew members from up to 50 nations. Each year, over 2,000 free, life-changing surgeries are performed in the operating theatres onboard. Mooring the Africa Mercy safely and securely in a sub-Saharan African port is no small feat compared to mooring a regular vessel, according to Djurre Jan Schutte. "Even though the four-line mooring arrangement for the Africa Mercy has been changed for a more optimal mooring alongside the quay. The vessel was never designed to be moored side-on."

As part of its train ferry legacy, the Africa Mercy uses capstans for the mooring lines rather than winches, the train ferry was originally moored with steel wire topes. The mooring lines are tightened with the capstans and secured using deck bitts.

Mooring Challenges

Mooring is a big challenge. As the vessel has to be securely moored to prevent excessive movement during surgical operations, the Africa Mercy is moored as tightly as possible during high tide, this means the load on the mooring line increases significantly during low tide as the lines are stretched. "Mooring tightly at high tide and then letting the mooring lines slacken during low tide simply isn't an option if we want to avoid excessive movement of the vessel," says Djurre Jan Schutte. The mooring lines are regularly checked and retightened when needed with the changing of the tides. To protect the mooring lines from the UV effects of the sun we cover the reels and lines on board the vessel."

Djurre Jan Schutte welcomes the new Euroflex mooring lines. Made of polyester and polypropylene composite yarns, they are better able to absorb the energy and tension-tension fatigue experienced by mooring lines as they tension and slacken with the tide and wind, than nylon mooring lines. Euroflex is also one of the few mooring lines to have been fully tested to the latest OCIMF's Mooring Equipment Guidelines (MEG4). Although MEG4 applies primarily to oil and gas tankers, the guideline's underlying principles of safety during mooring apply to all vessels, and probably more so to mooring the Africa Mercy.

As well as ease of handling and high strength, Euroflex has excellent abrasion resistance, which makes them ideal for mooring in Madagascar, for example, where there is considerable water movement which can cause a lot of chafing and wear on mooring lines. The Euroflex mooring lines were installed during the hospital ship's recent annual maintenance in Tenerife, part of the Canary Islands. Even here the mooring lines are exposed to significant loads arising from strong winds, typically wind force 5 but gusting up to wind force 8, as the Africa Mercy prepared for its next voyage.

"We are pleased to support the valuable work of Mercy Ships as part of one of the Phillystran and Lankhorst Ropes' initiatives to contribute to the creation of a better world. During these difficult times, their services are needed more than ever," said Mark Pieter Frölich, Commercial Director for Lankhorst Ropes USA & Phillystran.

Tech Files

Innovative products, technologies and concepts

PBES

"Microgrid in a Box"

As the maritime industry searches for the means to meet ever tightening emission regulations, battery power sits at the center of future paths to decarbonization. Sterling PBES launched CanPower, an all-encompassing ESS microgrid. The CanPower 'Microgrid in a Box' promises to add energy storage to virtually any vessel, without the need for complex design and build times.

According to Sterline PBES, two of the main hurdles facing shipowners wishing to install ESS' are the physical footprints of the systems and the complexity of the installation. The CanPower microgrid system aims to solve both concerns by using a self-contained unit, designed to easily and inexpensively be located on the top deck or other exterior location of any vessel, alongside intelligent design to streamline installations. CanPower is designed to be used for newbuilds and retrofits.

To aid installation all power electronics are enclosed, and fire fighting, ventilation, insulation, and cooling systems, all encompassed in an IP65, ISO rated steel standard container. It does not require any additional infrastructure and is delivered ready to install on any application. The turnkey system allows connection to the vessel's electrical grid via a fixed connection or a plug-in.

https://spbes.com

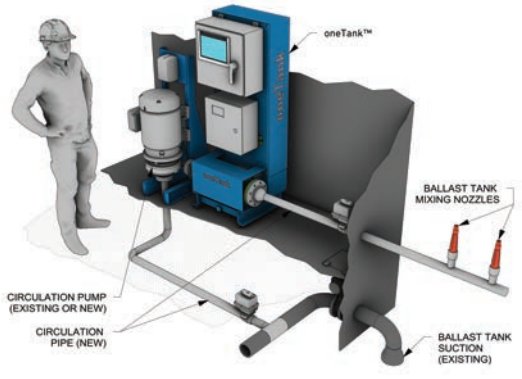
BWMS

oneTank gets USCG OK

oneTank, LLC was granted a US Coast Guard Certificate of Approval for its ballast water treatment system. With an arrangement footprint of just two square-feet, it is a great fit for workboats where space and power are limited.

This award follows the DNV GL Certificate of Approval awarded on behalf of the Norwegian Maritime Authority in compliance with the International Maritime Organization BWMS Code in July of 2020. oneTank is a derivative of the inTank dispersal system brought to market by parent company Glosten, Envirocleanse, and Scienco/FAST and patent protected by US Geological Survey. The inTank system treats ballast water within the vessel's ballast tank and has no filters, no ultra-violet bulbs, and no electrolytic generators. Similarly, oneTank is an in-tank, bulk chemical treatment process for ballast tanks up to 4,000 cu. m.

onetankballast.com



oneTank

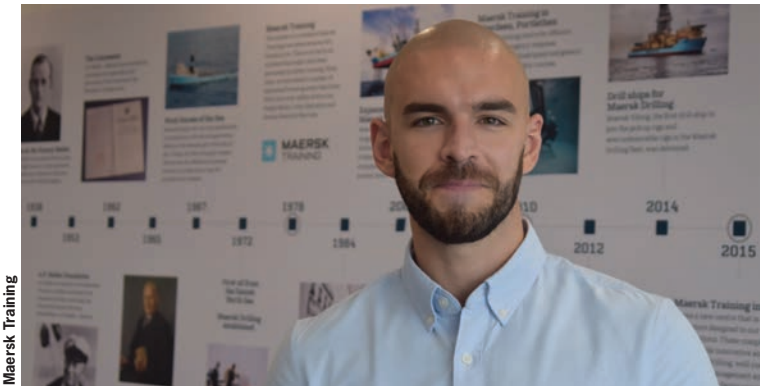
High Pressure Water Blaster for Shipyards

Australian Pump, an Australian designer and manufacturer of high-pressure cleaning equipment, was chosen to design and build 4,000 psi high pressure water blasters for Sydney's Garden Island Dockyard. The machines, called the Aussie Atlas, feature an all stainless steel construction and produce a 4,000 psi 16 liter per minute performance. Designed for working on a wide range of vessels in the dry dock, the machines offer fast and efficient cleaning. With up to 30 machines working at any one time in the dock, safety is key. Australian Pump provided a free training program for operators based on its "Class A Safety Operator" training modules.

"It was a great opportunity to trail the revised training course that brings it in line with the new Australian Standards AS/NZS:4233 for Class A machines," said Hamish Lorenz, Aussie Pump's Operations Manager. The course also covered an overview of how the entire positive displacement pump, a "Big Berty" Bertolini triplex pump, operates.

aussiepumps.com.au/marine-solutions/

Australian Pump



Maersk Training

Maersk Training Launches App

Maersk Training in the UK announced the launch of its upgraded Training Management Solution (TMS) with the aim to improve the training management for companies dealing with fewer headcount and remote working, amid the Coronavirus pandemic. The software which is divided into two parts, a mobile app aimed at delegates and a web-based application for the administrators and training facilitators, offers a fully customised solution to meet the global training needs whilst removing the intermediary and reducing administrative time and costs. The web application supplies the employers with a customised view and management of individual employee's training matrix, simplifying the administrative process including booking and cancellation system, logistics and cost optimization at the same time. The application also allows for the upload of financial records ensuring further cost assurance that training is kept within budget. Maersk Training UK Head of Commercial, Scott Taylor (pictured) said: "As our working habits have changed due to the global pandemic, remote employment has become our next normal. Businesses have had to make cuts, so with lower headcounts and more responsibility for surviving employees a solution that offers a saving on cost, time and is contactless with less administrative processes, is something that fits seamlessly into this new business era we enter."

Tug Maintenance 'Intelligent Tool'

Wilson Sons, with a fleet of 80 tugboats, has developed an intelligent tool to speed up the diagnosis and services of corrective maintenance. Designed by Tuglab, the company's innovation laboratory, and by the Maintenance and IT areas, a chatbot, a robot that simulates a human being in virtual conversations, answers questions and guides the crew on possible repairs to machinery and equipment onboard the vessels.

The solution for tugboat maintenance is part of Wilson Sons' chatbot system, which has various applications and functionalities in the Group's business units. Leandro Aversa, Maintenance Manager of Wilson Sons Tugboat Division, highlights that "the new tool will also help familiarize the crew members, when on board, with the different classes of tugboats."

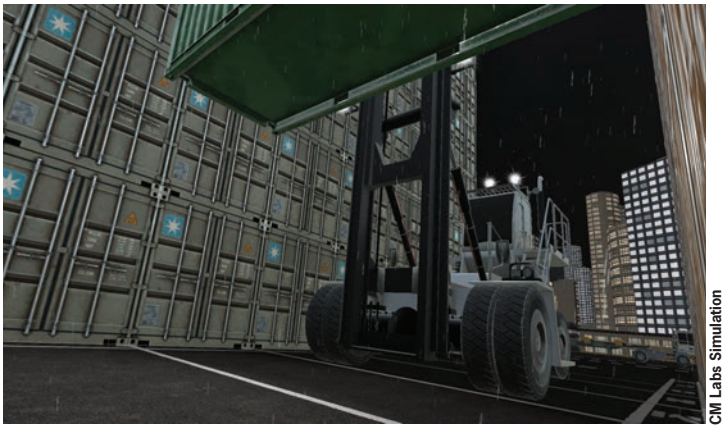
The maintenance chatbot is connected to the tugboat on-board process platform, which stores operational data such as fuel level, maneuvers to be performed, preventive maintenance, among others.


Wilson Sons

Immersive Training for ECH Operators

CM Labs Simulations launched an immersive new training pack for empty container handler (ECH) operators, a solution that allows operators to experience the effects of unbalanced loads and other causes of machine instability The ECH Simulator Training Pack can run on any CM Labs ports equipment simulator, including the desktop Vortex Trainer, the motion-enabled Vortex Advantage, and the high-immersion Vortex Master. The simulated ECH stacks 8 containers high, and lifts 20-, 40-, and 45-foot containers, with realistic manipulation of twistlocks and vertical bar, and a maximum travel speed of 27 km/h.

www.cm-labs.com/simulation-solutions


CM Labs Simulation

Roxtec

Sealing Metal Pipe Penetrations Without Weld

By William Hoffman, Pipe Sealing Specialist, Roxtec

Welding in general, is a costly, time-consuming and labor-intensive process that is the accepted normal practice when managing and installing metal pipe penetrations onboard marine vessels and offshore platforms. However, developments in tested and approved pipe penetration seals are making the accepted normal practice of welding everything in sight, a thing of the past.

Heavy-duty pipe systems

Historically, for thick walled metal pipe there has been the process of welding it directly to the structure on both sides of the deck or bulkhead or utilizing a heavy and thicker walled penetration piece that may either be purchased or self-fabricated.

Both these systems require a significant amount of welding with either two or possibly four different welding joints. However, options are now available which can significantly reduce and even eliminate the need for any welded joints when passing metal pipe through any fire rated deck or bulkhead.

With the growth in use of thin walled (less than 3mm) metal pipes such as stainless steel, copper, CuNi and even titanium, welding requirements and the levels of technical skill required to weld and manage these pipe penetrations have also grown.

The high costs associated with these increasing levels of welding can be completely erased by a change in process, and a change in thinking about how to manage metal pipe penetrations. The traditional methods of transitioning to bulkhead unions, steel pipes via flange or coupling connections or through sleeves or coamings, are gradually being replaced within the industry by alternative solutions that do not require any welding at all. Zero welding for these dissimilar metal pipe installations is a significant benefit in its own right however, additional benefits also exist by not transitioning to steel pipe at each penetration.

Benefits such as not compromising the integrity, quality and performance of the pipe system by changing from your chosen, technically superior thin walled metal pipe of choice, to a low quality steel pipe at every deck or bulkhead penetration.

Hot work permits

During a retrofit or repair project, the logistics, manpower level and practical steps required to obtain, monitor and implement a hot work permit are significant. By limiting or removing the need for any hot work, simple time management cost savings which contribute to the project being delivered on time, should be enough to justify a switch from traditional welding solutions. Other savings are also generated, such as installation time, labor rates and other associated costs.

Benefits with non-weld solutions

- Faster installation time
- Only requires access to one side of the deck or bulkhead
- Integrity of pipe material of choice is maintained throughout the complete length of the pipe system
- Reduced requirements for hot work permits

To learn more, visit: www.roxtec.com/en/in-focus/metal-pipe-penetration-seals/roxtec-spm-seal/

Over Watch

Advancing NATO's maritime situational awareness & understanding resiliency through commercially available space-based assets.

By Captain Todd Bonnar

It is hard to get past headlines painting the portrait of a world besieged physically and economically by a medical crisis on a global scale and a nation that has turned the national spotlight onto the fundamentals of its constitutional democracy, including the persistence of racism, the right to protest and the character of local and national security forces in the United States. Lost in this this mass media reporting is a story worth a more detailed examination for it may portend a revolutionary change for modern naval warfare – advancing NATO's maritime situational awareness and understanding resiliency through commercially available space-based assets.

On Saturday, May 30, 2020, SpaceX's Crew Dragon spacecraft carried NASA astronauts Doug Hurley and Bob Behnken into orbit for a rendezvous with the International Space Station. Of national significance was the fact that the Crew Dragon launched astronauts from U.S. soil for the first time since the last Shuttle flight in 2011. The real point to hone, however, is that the SpaceX Crew Dragon spacecraft is the first to be designed, built and launched to space by a private entity. That's an accomplishment only three nations — the U.S., Russia and China — have achieved previously. "A private company has just achieved a feat that heretofore has only been achieved by nation-states." As CNBC reported it, "The launch unlocks the possibility of a new era of sustained, private, commercial activity in space."

A very natural extension of the significance of CNBC's statement is to ask "what impact will commercialization have on space-based military applications such as Intelligence, Surveillance, Reconnaissance (ISR)". A celestial vantage point, as the ultimate high ground for overwatch, offers significant potential for satisfying a fundamental tenet of naval warfare - Maritime Situational Awareness (MDA). Having a clear picture and access to timely, relevant information is essential as it enables the early identification of potential threats and enhances appropriate responses. Information superiority through high quality MSA enables naval warfare commanders at all levels – tactical through strategic – to get inside their adversaries' OODA Loop.

The OODA loop was a tool developed by military strategist John Boyd to explain how individuals and organizations can win in uncertain and chaotic environments. The ability to get inside your adversary's decision cycle of Observe, Orient, Decide, Act creates a Gordian Knot of threatening events and gener-

"All the business of war, and indeed all the business of life, is to endeavour to find out what you don't know by what you do"

Arthur Wellesley, 1st Duke of Wellington

ates mismatches between what an adversary expects you to do and what you actually do. This makes your adversary feel trapped in an unpredictable world of doubt, mistrust, confusion, disorder, fear, panic and chaos. As former Commandant of the Marine Corps, General Charles C. Krulak stated in his analysis of the Gulf War that "The Iraqi army collapsed morally and intellectually under the onslaught of American and Coalition forces. John Boyd was an architect of that victory as surely as if he'd commanded a fighter wing or a maneuver division in the desert."

When naval warfare operators think of ISR, for many, minds are often immediately drawn to modern day, advanced technological capabilities – low orbit earth observation or military communications satellites rapidly passing large data sets which ultimately result in operational outputs such as coordinated surface and subsurface TLAM strikes on shore based targets or providing high resolution imagery to assist with ship and submarine movements. In reality, it is actually a system of systems that make up the space based ISR toolbox.

It is undeniable that NATO's joint maritime operations rely on space support provided by satellites, such as Satellite Communications (SatCom), Position, Navigation and Timing (PNT), and Intelligence, Surveillance and Reconnaissance (ISR), as a critical mission enablers. The services of ISR systems, in particular, have become more and more essential to NATO's decision-making and planning processes as the Alliance continues to project deterrence based on strength, readiness and speed of response with our Command and Control.

Some defense planners envision a future battlefield in which the ground is crawling with robots and the skies are darkened by drones. Swarms of unmanned systems would dominate in the battle for an ISR advantage. In reality, the issue of quantity versus quality when it comes to next-generation ISR is yet to be resolved. This is particularly the case in contested environments where targets are mobile or hidden, defenses have proliferated, a drone's guidance systems can be jammed and networks compromised. In such a world, more sophisticated platforms deploying multiple sensors of greater range and acuity and carrying defensive and even offensive capabilities may make more sense.

It is widely agreed that as civilization entered the "Age of Information," but a couple of decades ago, militaries have seen ISR capabilities expanding in the air, land, maritime, space and cyberspace domains, across what has been called 'today's knowledge-based environment.' Although one could of course, easily argue that acting on knowledge is absolutely nothing new, it is also just as easy to argue that the complexity and the sheer volume of data and information management that indeed makes this the 'Age of Information". Thus, we now find the 'knowledge-based environment' in which today's modern navies must operate.

A recent study by the Netherlands based Clingendael Organization looking at the trends affecting the state of the Alliance in this Age of Information concluded that there are two main categorizations: structural challenges to NATO's own cohesion and the forecast on the Alliance's deterrence and defence posture by 2024. In terms of force requirements NATO will continue to ask the member states to strengthen their high-end capabilities quantitatively and qualitatively as well as to invest in cyber security and key enablers such as intelligence and reconnaissance, networked C4I, etc.

If NATO is to succeed in the race to master this "knowledge-based environment", it has to optimize maritime ISR in the Alliance, and in turn, is compelled to consider the range of options available and add more tools to the ISR toolbox including resiliency through commercial applications. In terms of force requirements, NATO will continue to ask the member states to strengthen their high-end capabilities quantitatively and qualitatively as well as to invest in cyber security and key enablers such as intelligence and reconnaissance, networked C4I, etc. In a post COVID economy, this will be very difficult to accomplish with military acquisitions competing with much required social and economic impetus projects. Thus, NATO's nations absolutely need to look at more cost-effective options and models for acquisition and implementation.

The Author

Bonnar

Captain Todd Bonnar, M.S.C., CD from Canada heads the Warfare Analysis Team at Combined Joint Operations from the Sea Center of Excellence in Norfolk, VA.

BUYER'S DIRECTORY

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

ANCHORS & CHAINS

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

APPROVED U.S. COAST GUARD MARINE SANITATION DEVICES

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

CLEAN, QUIET, PROVEN: POWER & PROPULSION SOLUTIONS

BAE Systems, Bldg. 14, 1098 Clark Street Endicott, NY 13760 , tel:(607) 770-2083, carol.gorenflo@baesystems.com contact: Carol Gorenflo, www.GetToZero.com

COMMUNICATIONS

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

FALL OVERBOARD PREVENTION AND RESCUE & RECOVERY

HARKEN, N15W24983 Bluemound Rd. Pewaukee, WI 53072, Pewaukee, WI , USA , tel:+1 262 691 3320, infoUSA@harkenindustrial.com, www.harkenindustrial.com

FIRE FIGHTING

Aussie Pumps, 7 Gladstone Road, Castle Hill , Australia , tel:+61 (2) 88653500, wlorenz@aussiepumps.com.au contact: Warwick Lorenz, www.aussiepumps.com.au

GET TO ZERO EMISSIONS

BAE Systems, Bldg. 14, 1098 Clark Street Endicott, NY 13760 , tel:(607) 770-2083, carol.gorenflo@baesystems.com contact: Carol Gorenflo, www.GetToZero.com

INERTIAL SENSING SYSTEMS

Silicon Sensing Systems Ltd, Clittaford Road Southway, Plymouth, Devon PL6 6DE United Kingdom , UK , tel:+44 (0) 1752 723330, sales@siliconsensing.com

MECHANICALLY ATTACHED FITTINGS (MAFS)

Viega LLC, 585 Interlocken Blvd. Broomfield, CO 80021 , tel:(316) 425-7400, mark.brodie@viega.us

MEMS MOTION SENSING

Silicon Sensing Systems Ltd, Clittaford Road Southway, Plymouth, Devon PL6 6DE United Kingdom , UK , tel:+44 (0) 1752 723330, sales@siliconsensing.com

METEOROLOGICAL INSTRUMENTS

R.M. Young Company, 2801 Aero Park Dr., Traverse City, MI , tel:231-946-3980, fax:231-946-4772, vsherman@youngusa.com

NAVAL ARCHITECTS, MARINE ENGINEERS

All American Marine, 1010 Hilton Ave. Bellingham, WA 98225 U.S.A. , tel:(360) 647-7602, marketing@allamericanmarine.com

Bristol Harbor Group, Inc., 103 Poppasquash Rd., Bristol, RI 02809, USA , tel:401-253-4318, fax:401-253-2329, design@bristolharborgroup.com contact: Greg Beers, P.E. - President, www.bristolharborgroup.com

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

SHIP REPAIR, CONVERSION, REFIT, DRYDOCKING AND MAINTENANCE

Blohm+Voss B.V. & Co. KG, Hermann-Blohm-Strasse 3, 20457 Hamburg, Germany , tel:+49 40 3119 2110, shipservices@blohmvoss.com , www.blohmvoss.com

SURFACE PREP TOOLS

Water Cannon, 4300 West Lake Mary Blvd. Units 1010-424 , USA , tel:321-800-5763, sales@watercannon.com , www.watercannon.com

ULTRASONIC TRANSDUCERS

AIRMAR Technology Corporation, 35 Meadowbrook Dr., Milford, NH, USA, tel: , tel:(603) 249-7199, sales@airmar.com

Employment

www.MaritimeJobs.com

MARKETPLACE

Products & Services

www.MaritimeEquipment.com

Vessels, Barges & Real Estate for Sale/Rent

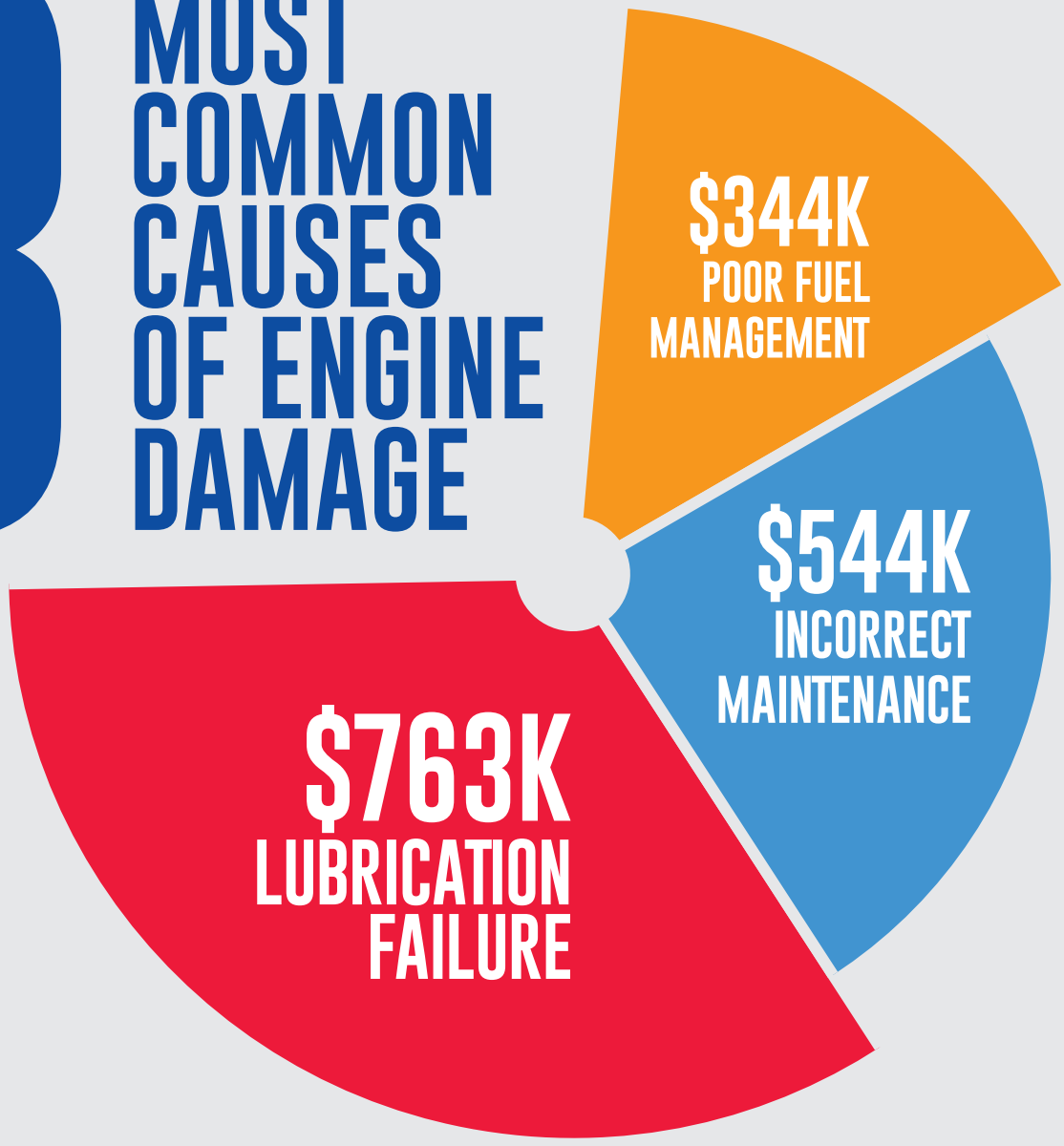
ADVERTISER INDEX

Page	Advertiser	Website	Phone#
53	Anchor Maine & Supply, Inc	www.anchormarinehouston.com	(800) 233-8014
15	C & D Professional Services	www.cdproservices.com	(360) 459-1395
12	DNV GL	eto.dnvgl.com	Please visit us online
C2	Great Lakes Dredge & Dock Co, LLC	www.GLDD.com	(630) 574-3000
1	Hyde Marine/Calgon	www.hydemarine.com	(724) 218-7001
C4	Liebherr USA, Co.	www.liebherr.com	Please visit us online
9	Omnithruster	www.omnithruster.com	(330) 963-6310
37	Port Milwaukee	www.portmilwaukee.com	Please visit us online
23	Sennebogen	www.sennenbogen-na.com	(704) 347-4910
3	SMM 2020	www.smm-hamburg.com	Please visit us online
29	St. Lawrence Seaway Development Corp.	www.usajobs.gov	Please visit us online
C3	Total Lubmarine	www.totallubmarine.com/TU	Please visit us online
8	Wallem Services Ltd.	www.wallem.com	Please visit us online
5	World Energy Reports	www.worldenergyreports.com/wind	(212) 477-6944

The listings above are an editorial service provided for the convenience of our readers.
If you are an advertiser and would like to update or modify any of the above information, please contact: productionmanager@marinelink.com

TOTAL Lubmarine

3 MOST COMMON CAUSES OF ENGINE DAMAGE



TOTAL
Committed to Better Energy

The Swedish Club

Source: The Swedish Club
Main Engine Damage Report
(figures quoted are average costs)

Use the QR Code to visit
totallubmarine.com/TU

Experience the progress.

Solutions to keep your business moving

- Safety, reliability and low operational costs
- Hydrostatic drive for stepless speed control – Excellent drive comfort
- Space-saving port solutions – For vessels up to Post-Panamax Class
- High-performance winches – Designed for continuous operation at full capacity
- Proven Liebherr technology and professional service worldwide

mobile.harbour.crane@liebherr.com
facebook.com/LiebherrMaritime
www.liebherr.com

LIEBHERR