MARITIME LOGISTICS PROFESSIONAL

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Regulatory Realities

ALL Emissions matter in 2020

BALLAST WATER TREATMENT
IS IT TOO LATE TO COMPLY?

IMO 2020
COMPLIANCE, REPORTING & ENFORCEMENT

INTERMODAL OUTLOOK
LOOKING FORWARD TO PORT EFFICIENCIES

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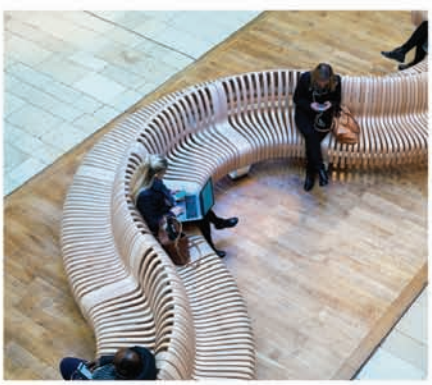

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Due to the driver shortage, some companies may skip a few vital steps out of pure desperation. Ensuring the safety of the cargo is absolutely critical, and ensuring driver compliance is a tedious and time-consuming process.

– Nimesh Modi,
CEO, BookYourCargo.com

Credit: Ares

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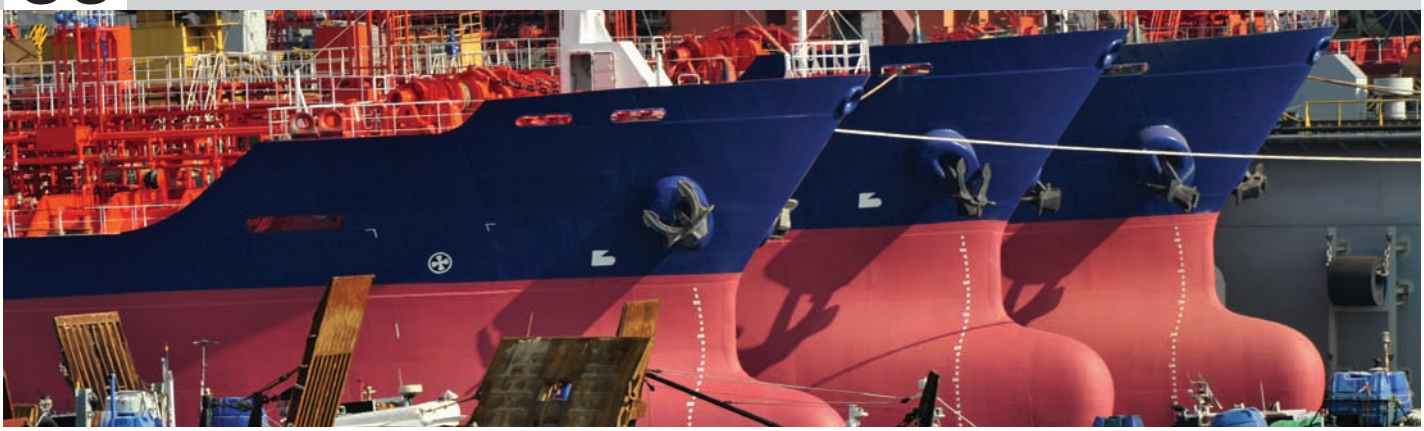


ON THE COVER

As many as 30,000 commercial ships are required to install new ballast water management systems in the near future. Not all will. All of them, one way or another, will head for either the shipyard or, conversely, the bone yard. The story begins on page 36.

Image Credit: ABS & © Sorin Colac/Shutterstock

Editor's Note

Decisions, Decisions ...

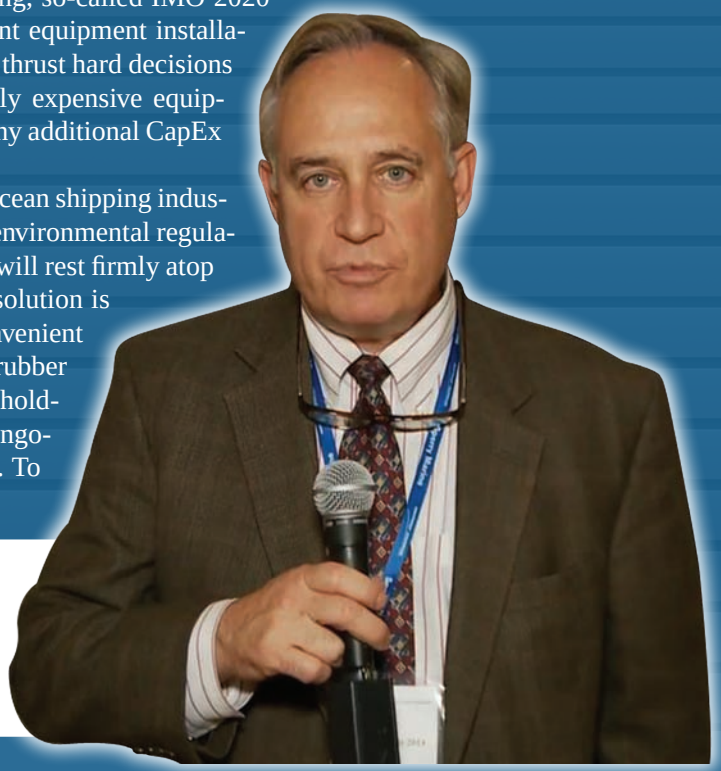
2019, so it seems, will go out on a high note, especially where the global waterfront is concerned. For example, confidence in the shipping industry rose in the last quarter to its highest level in 18 months, according to the latest Shipping Confidence Survey from shipping adviser and accountant BDO. Separately, closer to home, the United States finds itself poised to ink not one, but two global trade deals in a matter of weeks. Specifically, the painful trade spat with China may finally be resolved and the USMCA pact that will replace NAFTA is in a similar spot.

You can argue that one or both deals aren't everything we'd hoped for. It is also true that the mark of a good deal is one where everyone walks away from the table a little bit unsatisfied. That's certainly how it looks from my chair. Beyond this, and you may remember my ***MaritimeProfessional.com*** blog of only a few months ago where I asked, *"Do WE have the intestinal fortitude to ride out the short term pain on the way to long term prosperity?"* It seems that we actually did, and although many thought the two struggles would take down an otherwise red hot economy, nothing of the sort transpired. Let that be a lesson to you.

In fact, even the most negative financial prognosticators have conceded that the recession that they'd predicted (hoped for?) for the past three years, has not come to pass and most likely won't, for the foreseeable future. That's a good thing for global trade and the ocean shipping industry, and it is an exceedingly good thing for everyone who depends on both. That means just about everyone.

From the waterfront, the foregoing variables were pushed upon us. We had to ride it out; come good or bad. But, there are many more challenges to navigate in the New Year. For vessel owner/operators, these come in the form of the impending, so-called IMO 2020 deadline and of course, the deadlines for ballast water treatment equipment installations. Both constitute serious dilemmas for ocean shipping, and thrust hard decisions on principals, one on top of the other. Both involve potentially expensive equipment installations, sometimes for marginal tonnage, for which any additional CapEx might just send them to the breakers.

If 2019 was the year of international trade uncertainty for the ocean shipping industry, then 2020 will most certainly be the year when a decade of environmental regulatory policy comes home to roost. That bird will be heavy, and it will rest firmly atop your bottom line. The weight of deciding which ballast water solution is best for your tonnage, combined with the necessary, but inconvenient choice of very expensive, ultra low sulphur fuel oil or a stack scrubber that may or may not be legal in certain ports, will for some stakeholders, be crushing. On the other hand, the two-tier climate for oceangoing tonnage of all types may finally be approaching its demise. To the shipyard, or to the breakers; that is the decision.



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IMO 2020 and Diesel Engines: Powering up for Change

By Neil Graham

The International Maritime Organization (IMO) is introducing new rules on marine fuels, which will see a reduction of the MARPOL Annex VI global fuel sulphur cap from 3.5% to 0.5% come into effect from January 1st 2020. A prohibition on the carriage of non-compliant fuel will come into force on 1 January 2020. The main aim of the new regulation is to ensure that marine engines use a low-sulphur HFO or marine distillate oils, which already comply with low sulphur regulations. The move is aimed at curbing SOx (Sulphur Dioxide) pollution produced by ships and represents a very significant, industry wide event, which will likely have far reaching effects on the global shipping industry for many years to come.

SOx released into the atmosphere via a ship's exhaust gas combines with NO2, which acts as a catalyst with other compounds to form sulphuric acid. This can contribute to the formation of acid rain and as a result cause damage to the quality of air, water, soil, food and life itself. It can also have a detrimental effect on the ozone layer and thereby contribute to global warming. It's therefore incumbent upon shipowners, vessel managers and crews to take the necessary steps to ensure they understand the issues and that their vessels are provided with fuel oil that's suitable for use by marine engine power plants. If any problems arise, these must be addressed to minimize any impact.

There is also an alternative option to low sulphur fuel and that is to install post-combustion treatments such as a scrubber system to curb SOx. However, due to the large CAPEX requirement and time out of service for installation, only a small percentage of shipowners are opting for scrubbers, with most going for compliant fuels.

Neil Graham, technical director of Royston, considers what marine vessel owners and operators can do to ensure diesel engines are as prepared as possible for IMO Sulphur 2020.

Fuel Oils

As 2020 rapidly approaches, very low and ultra-low sulphur HFO availability has long been a concern, but it appears that suppliers have responded to the upcoming demand and supply will not be a problem. Possibly of greater concern is how long High Sulphur HFO will remain available or if the price of it will get closer to the low sulphur fuels, greatly affecting the ROI of those owners who opt for scrubbers.

Incompatibility of bunker stems may leave shipowners facing serious engine repairs, requiring vessels to be taken out of service and leading to serious loss of earnings for operators. The mixing of non-compatible fuels can lead to the formation of sediment in the tanks which can block filters and purifiers. Add to that the ever-present risk of asphaltenes and cat-fines in certain fuels, then the stemming of good quality fuel and good on-board management is essential if damage to the engines and fuel systems is to be avoided.

The nature and type of fuel oils that will be available are expected to differ significantly. Different mix of fuels – a variety of blends – will mean practical steps need to be taken to secure quality control. Industry good practice proposes developing a 'bunker checklist' to supplement the vessel's own safety management system procedures which entail a list of checks and tasks from pre-bunkering through bunkering to final completion and disconnection (see also IMO's Ship Implementation Plan).

Fuel segregation between bunker sources will also become a feature of future operations until all sources of fuel can be proven to be stable, mixable and compatible with each other. Smaller bunker orders may become the order of the day to avoid mixing different fuel supplies. Monitoring of the fuel will be increasingly important to avoid poor quality fuel reaching the engine, as well as running purifiers at their optimum settings; for example, the right fuel oil temperature and the correct throughput (as slowly as possible). Checks by port authorities on compliance, especially in ECAs (Emission Control Areas), will increase and it probably won't be too long before on-board testing of sulphur content and emission measurement becomes the norm.

Technical Challenges

Lower sulphur content in fuels will contribute to decreased levels of 'lubricity' in engines, contributing to increased wear and tear in fuel pumps and requiring additional maintenance of injectors. These components have high tolerances and most manufacturers of fuel pumps have already moved towards a higher material specification for their plungers and often use a diamond-like carbon (DLC) coating to reduce wear. These coatings are extremely hard, corrosion resistant and have ultra-low coefficients of friction. They can also be deposited with a high-degree of control of the coating thickness.

If the decision is made to move away from high sulphur HFO and scrubbers, the cleaning of pipes and storage tanks will need careful planning and inevitably result in substantial costs and down-time.

Manual cleaning is time consuming, and again may result in down-time for the ship if not carefully planned. Recommended best practices call for flushing the system with distillate and then disposing these materials as waste oil.

Some ships will limit the SOx air pollution by installing exhaust gas cleaning systems, or scrubbers. This is accepted by flag states as an alternative means to meet the sulphur limit requirement. These scrubbers are designed to remove sulphur oxides from the ship's engine and boiler exhaust gases. A ship fitted with a scrubber can use high sulphur heavy fuel oil since the sulphur oxides emissions will be reduced to a level equivalent to the required fuel oil sulphur limit. The most likely ships to install scrubbers are the larger deep sea vessels which have high fuel consumptions and crucially have the space in the engine room to fit this equipment. A consumption rate of 50tonmnes/day seems to be an accepted cut-off point for fitting a scrubber and still obtain a reasonable ROI; within 5 years.

Alternatives

What's the alternative to burning low sulphur fuel or using scrubbers? Converting engines to liquefied natural gas (LNG) will provide considerable reductions in fuel costs as well as reducing emissions, including SOx. It will first need to be determined if the existing engines can be converted to gas, or if new engines are required (dual fuel or pure gas). Finding space in the engine room for the storage tanks is key and, depending on whether the engines are converted to dual fuel or pure gas, there may still need to be a liquid fuel storage system as well.

Underpinning the aims of IMO Sulphur 2020 is a need to improve fuel consumption for the ship operator, and thereby keep costs to an acceptable limit and reduce all exhaust gas emissions, including SOx and CO2. The implementation of advanced technologies, for example, such as 'Eco Speed' – a recent development in Royston's enginei fuel monitoring system – allows vessel

operators and owners to determine the most economical speed against the best fuel consumption for any particular vessel.

There is an obvious need to pay close attention to the detail in the project management and planning of service jobs in meeting the requirements around Sulphur 2020. Careful review of the options (low sulphur fuel or high sulphur fuel plus scrubber or conversion to LNG) around practicalities and ROI should be made, with a project management team appointed to undertake the program. To that end, independent service providers can be totally focused on providing a fully responsive engineering service that is geared towards meeting the specific timing, location and technical needs of a customer facing IMO Sulphur 2020 compliance issues. The company can provide such project management in collaboration with the relevant engine or scrubber manufacturers, as well as providing supervision of installations and fuel system cleaning and tank segregation.

The Author **Neil Graham**

is Technical Director at Royston, with responsibility for the company's established medium and high-speed engine service capabilities – and identifying new opportunities for market growth. He has more than 35 years of marine engineering experience, which includes many varied senior roles as a sea going Chief Engineer, Engineer Superintendent and in regional operations management for shipping companies. ***www.royston.co.uk***

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Sea change: The 3 biggest at-sea impacts of a marine-fuel switch to LNG

By John Endsley

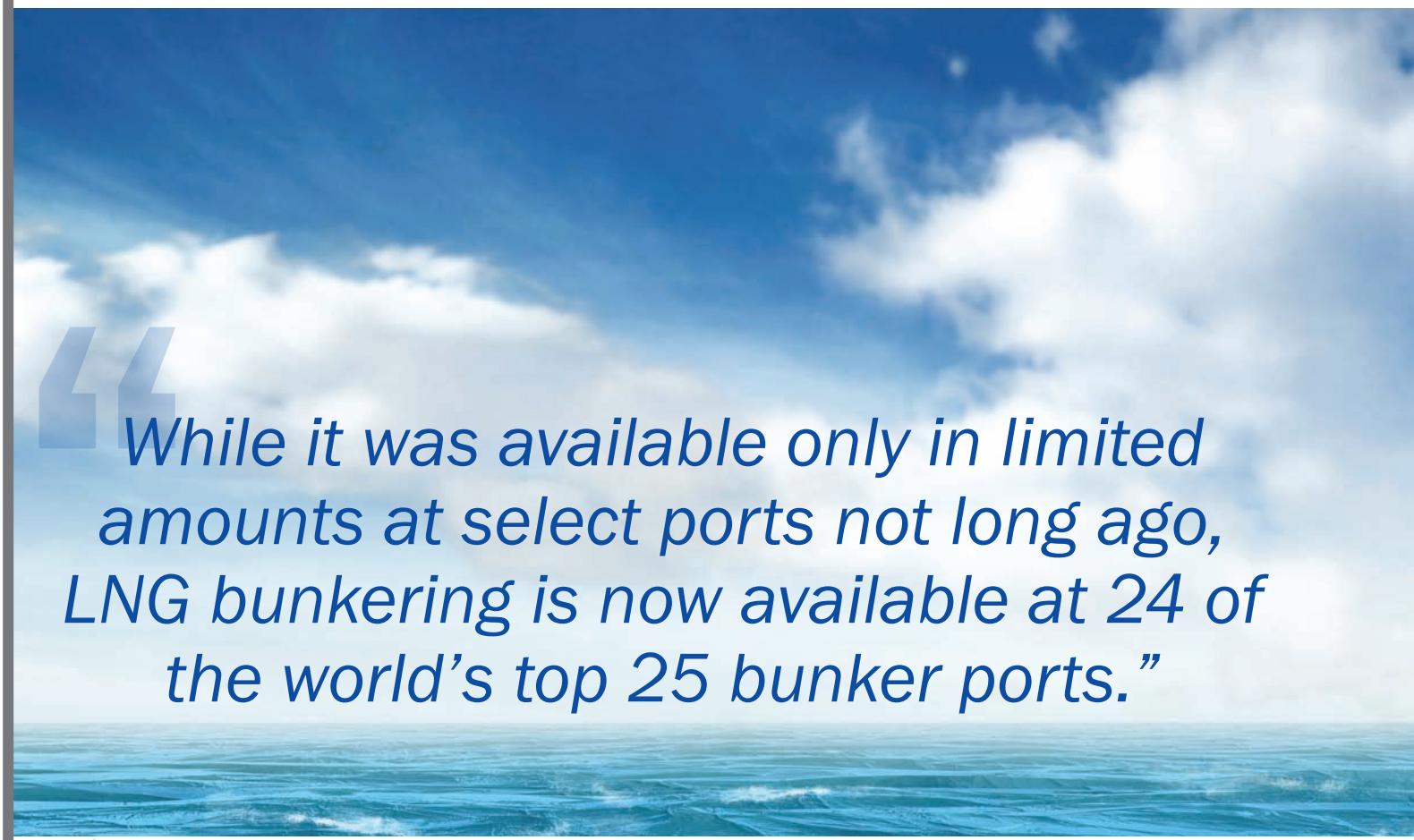
By Jan. 1, 2020 — a deadline set in 2008 by the International Maritime Organization (IMO) — the maximum sulfur content of vessel fuels must be reduced to 0.5% or lower (compared with a previous limit of 3.5%), or vessels must install exhaust-cleaning "scrubbers" so that emissions of sulfur oxides are reduced to equivalent levels. Otherwise, they'll face fines from IMO member states.

Because it is the simplest and least expensive solution in the short term, it is widely expected that most vessels currently in operation will switch to using distillate fuels or low-sulfur fuel oils — which would require minimal or no up-front investment for ship owners (though their fuel costs are likely to climb) and would allow for current bunkering/refueling infrastructure to be used at ports.

For many forward-looking maritime operators, though, the long-term answer entails a switch to using liquefied natural gas (LNG) for fuel, which is a cheaper fuel option (especially over time), and which industry estimates indicate can reduce polluting nitrogen oxide and sulfur oxide emissions by up to 95 percent. In fact, as of late 2018, roughly 125 ships worldwide were powered by LNG — but an estimated 400 to 600 more were expected to be delivered by 2020. And according to a recent South Korean study, LNG-powered ships are expected to account for 60% of new vessel orders by 2025.

For those in the shipping industry who have long been accustomed to burning fossil fuels, what are the biggest onboard changes that can be expected with a switch to LNG?

Consider these three top at-sea impacts on shipping operations of the switch to LNG:



CREDIT: Atlas Copco

Driving what appears to be the biggest shake-up to the shipping industry in decades, the rules are changing regarding shipping vessel emissions and fuel — and the deadline for compliance is fast-approaching.

Onboard equipment:

Often, the switch to LNG power necessitates that additional equipment be carried on board larger ships, some of it not typically seen on a vessel burning strictly fossil fuel. One common driver for this variance is safety precautions — for which having nitrogen-generation capabilities on board can provide a substantial boost.

On LNG-powered vessels, nitrogen is often used along with air compressors during the process of cleaning the LNG pipework and storage tank. Because it is a dry, oxygen-free inert gas, using nitrogen as an agent for flushing and/or purging a ship's LNG tank engines and fuel lines can greatly reduce the potential for combustion and explosions during the process. In fact, regulations often require vessels using LNG as a fuel source or transporting LNG to blanket their fuel tanks with nitrogen to prevent the possibility of an explosion. And, instead of bringing nitrogen tanks on board, it often makes more sense to generate nitrogen on board.

Further, in an effort to create the space needed to bring nitrogen generation onboard, the move to LNG is likely to drive manufacturers to engineer even smaller footprints for their marine-application products. Take, for example, air compressors. Beyond providing the feed for onboard nitrogen generators, air compressors typically perform three crucial onboard functions: providing starting air; providing control, instrument and working air; and providing hull-lubrication air. All three functions, of course, will still be vital — but they'll need to be accomplished while using less space.

In addition, with nitrogen production in mind, even more thought and care will need to go into sizing onboard air compressors appropriately for needed performance and maximum effi-

ciency. Not having enough air on a vessel can have catastrophic consequences, but in a business where maintaining margins can already present major challenges, inefficiency can have significant negative impacts on the bottom line. As is the case with the equipment's onshore counterparts, audits and needs analysis will play crucial roles in choosing the marine products of the future. And the synergies of purchasing varied pieces of equipment (nitrogen generators and air compressors, for example) from a single manufacturer will be crucial in keeping floor space to a minimum and ensuring efficiency in operations.

Some manufacturers are already producing marine equipment with these evolutions in mind. For example, Atlas Copco — an OEM equipment provider in the marine compressor and generator categories — produces a line of nitrogen generators and compressors that are all built according to the latest SOLAS and class rules, and all offer the compact sizes and harsh-condition durability vital to offshore applications.

Ship build/components:

When it comes to an LNG-powered ship's build, the most noticeable difference from traditional fossil fuel-burning vessels can be seen in the area of LNG storage. Because the LNG must be kept at very low temperatures (around -160° Celsius) to remain in its liquid form, LNG-powered ships are heavily insulated using highly advanced insulation technology. The LNG is stored as a boiling liquid in a pressurized state — slightly above atmospheric pressure.

When the insulated storage tanks are inevitably penetrated by heat, the temperature of the LNG rises, causing some of the liquid to boil off and vaporize into gas. The resulting gas is then routed to the ship's power plant, where it's used to fuel steam boilers and dual-fuel marine diesel engines. The LNG boil-off also causes a rise in tank pressure, which often must be relieved by venting into the atmosphere via relief or safety valves, as on most ships, LNG re-liquefaction has proven cost-prohibitive.

Infrastructure:

Anticipating the increased demand for LNG expected in the near future, LNG bunkering infrastructure has been rapidly expanding in recent years. While it was available only in limited amounts at select ports not long ago, LNG bunkering is now available at 24 of the world's top 25 bunker ports. And, as can be seen on SEA/LNG's Bunker Navigator tool — available at sea-lng.org/bunker-navigator — LNG bunkering locations and vessels are becoming somewhat common on major shipping routes throughout North America, Europe and Asia.

That said, while the bunkering infrastructure has been growing, whether it will be sufficient to support wide-scale LNG adoption by the January 2020 IMO emissions deadline remains a huge question mark. For operators of LNG-powered vessels, careful planning regarding refueling needs will be a must, at least initially, especially on routes where LNG bunkering infrastructure is still lacking.

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A Harvey Gulf OSV in the process of loading LNG bunkers. Harvey Gulf was an early adopter of this clean fuel option.

CREDIT: ABS

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Avoiding a Wrong Turn to IMO Compliance

By Simon Whitford

> *Machine learning is the clever part of this story but accessing vessel data is also important. Equipping vessels with ioT sensors/dataloggers has become a cheap, straightforward business which does not require vessel downtime. Only small packets of data are required and transmissions costs are modest and falling.*

In October, the International Maritime Organization faced calls for a blanket 20% reduction of vessel speed in order to reduce greenhouse gas emissions. While the proposal was ultimately not carried forward at that conference, slow steaming is still common among shipowners in response to poor demand and the low rates of utilization endured since 2008.

Whilst cutting the speed of ships does help reduce emissions, vessel speed is only part of the solution and a simple speed limit is not practical across the board. To reduce emissions and cut fuel waste reliably, ship owners and charterers must optimize vessel speed across each voyage – optimization being quite different from a blanket speed limit.

Slow steaming is not the answer

Slow steaming may reduce the emissions of a given vessel and each vessel has its "most economical" sweet spot speed, but a slower voyage needs more vessels to meet the same level of demand. More ships mean more cargo in transit and a one off "stocking" boost in global factories to fill this "fatter" supply chain. As a result, both factories and shipyards would experience a short-term increase to production to fill these vessels and this spike in manufacturing activity would inevitably add to carbon emissions.

In practice, more vessels could worsen port congestion, and a mandatory speed cap might prevent vessels taking measures to avoid bad weather en-route. Slow steaming has already created technical issues like cold corrosion of marine engines.

Using data to optimize speed

Speed optimization cuts GHG emissions without affecting transit times. Along a given route, departure and arrival dates, a machine learning enabled ship saves fuel by adjusting speed to take best advantage of a host of forecast environmental factors. To enable vessels in this way, Owners and Charterers use machine learning to create and then continuously refine each vessel's unique performance model.

For such vessels, the operator can then accurately deconstruct each element of the vessel's GHG emissions – separating out weather, trim, fouling and speed effect to reveal a dynamic baseline – the vessel's underlying level of performance.

Machine learning is the clever part of this story but accessing vessel data is also important. Equipping vessels with ioT sensors/dataloggers has become a cheap, straightforward business which does not require vessel downtime. Only small packets of data are required and transmissions costs are modest and falling.

Through this route, machine learning enabled vessels with dynamic consumption baselines have access to a range of optimizing and decision support tools, notifications, analytical methods and push reports which together drive improvements in vessel performance across all stakeholders on board and onshore.

To plan a voyage for a machine learning enabled vessel, hundreds of thousands of speed profile simulations are run along a particular route – each one predicting the vessel's response to the latest forecasts of weather, sea state, and so on. The speed pro-

Setting speed limits for ships is not a sustainable emissions strategy.

file delivering the lowest fuel consumption for the vessel, whilst respecting the vessel's original estimated time of arrival is then chosen for the voyage. In this way, owners and operators of vessels are truly optimizing the speed performance and achieving the lowest GHG emissions for each voyage.

A zero-emissions shipping industry

We can't tackle emissions from shipping without a workable solution for the 50,000 deep-sea commercial vessels already in service and carrying most of the world's sea-borne trade.

Around 30% of GHG emissions from international shipping arise above and beyond the basic need to propel a perfectly optimized vessel (trim, speed and perfectly clean hull) across the calmest of seas. This 30% is accounted for by poor weather (around half of the 30%) and sub-optimal vessel performance (trim, fouling and speed).

In time, the industry can progress towards a zero-emissions future by replacing older tonnage with new innovative vessels powered with low or zero-carbon fuels and other as-yet unknown technology. However, the climate emergency is upon us now and since we can't scrap the world fleet and start afresh tomorrow, we need a solution to minimize the GHG emissions from the current world fleet.

Optimizing vessel speed, along with trim and hull cleanliness, is a very accessible way for operators to maintain supply chain commitments whilst reducing their carbon footprint. In this way, speed optimization, not speed limits, is the most practical route to enable the shipping industry to reduce GHG emissions ahead of 2030 and 2050 targets.

The Authors **Simon Whitford**

is the Chief Operations Officer at GreenSteam, a vessel performance and optimization specialist, and has worked in the maritime and shipping industry for over 20 years.

Anticipating Enforcement of Sulfur Emissions Rules under IMO 2020

By Justin Savage, Peter Whitfield, and Marshall Morales

The new limits adopted under the International Convention for the Prevention of Pollution from Ships (MARPOL) by the International Maritime Organization (IMO) have been styled "IMO 2020." These rules will affect ships operating in any country that has adopted MARPOL, including the United States. The U.S. Environmental Protection Agency (EPA) and U.S. Coast Guard (USCG) share domestic enforcement authority for these rules, and enforcement of IMO 2020 will bring new challenges to shipping companies, with potentially severe civil and criminal penalties for noncompliance

Legal Background

MARPOL is an international convention promulgated in 1983 to prevent pollution of the marine environment, including from air emissions. The IMO administers MARPOL, but enforcement is the responsibility of the individual member states. The United States incorporated MARPOL as part of the Act to Prevent Pollution from Ships (APPS). The APPS governs US-flagged vessels as well as foreign ships operating in the navigable waters or the exclusive economic zone of the United States—save for a small exclusion for Canadian vessels operating only in the Great Lakes.

MARPOL Annex VI, which entered into force on May 19, 2005, limits the main air pollutants contained in ships' exhaust gas, including sulfur oxides (SOx) with a global cap on the sulfur content of marine fuel oil and additional limits in specific waters, referred to as emission control areas (ECAs). The current cap limits sulfur content in fuel at 3.5 percent, with an additional restriction in ECAs of 0.1 percent. Effective January 1, 2020, the global sulfur cap will be reduced from 3.5 to 0.5 percent (while the limit for ECAs will remain at 0.1 percent).

IMO 2020 Compliance Strategies

To comply with the new fuel requirements, a regulated ship operator has four options:

- *Use IMO-compliant fuel with a maximum sulfur content of 0.5 percent or 0.1 percent for operations in the ECAs (5,000 ppm and 1,000 ppm, respectively).*
- *Where IMO-compliant fuel is not available, ships can obtain a Fuel Oil Non-Availability Report (FONAR), documenting unavailability. That report must be filed with the U.S. Coast Guard (USCG) Captain of the Port (not filed with the EPA).*
- *Continue to burn high-sulfur fuel with a maximum sulfur content of 3.5 percent by installing a scrubber.*
- *Use an acceptable alternative marine fuel, such as those identified by the IMO: liquefied natural gas, battery power, biofuels, hydrogen fuel cells, or wind-assisted propulsion.*

In addition to fuel requirements, regulations require that ship operators maintain onboard records that verify compliance. For example, bunker delivery notes and representative samples of fuel oil provided by fuel suppliers must be maintained onboard for a minimum of three years and 12 months, respectively. The records must also include a written fuel oil changeover procedure and a log that records changeover details. These records may be inspected and the samples may be taken for verification to determine if the fuel oil used onboard meets the Annex VI sulfur standard.

Future Enforcement of IMO 2020

New standards provide new opportunities for federal enforcement actions. According to U.S. Department of Justice (DOJ) media statements, the United States is the leading country in enforcing MARPOL, and the DOJ has been actively involved training law enforcement officials in the United States and abroad in MARPOL enforcement. In recent years, the USCG has seen at least 80 deficiencies and over a dozen APPS enforcement actions. The EPA has entered into five settlements for violations of sulfur content rules since 2016, which may increase with more focus on IMO 2020 requirements. United States criminal prosecutions have resulted in cases against key segments of the commercial maritime industry, including cruise ships, container ships, oil and chemical tankers, and bulk cargo vessels.

Most recently, in 2019, the DOJ pursued criminal charges against three shipping companies in the Virgin Islands. Two of the shipping companies reached plea agreements involving a criminal fine of $1.5 million, four years of probation, and a com-

New limits on the sulfur content of maritime fuel will go into effect on January 1, 2020, and they represent some of the most significant changes to marine fuel regulations in years.

SAVAGE

WHITFIELD

MORALES

> *"New standards provide new opportunities for federal enforcement actions. According to U.S. Department of Justice (DOJ) media statements, the United States is the leading country in enforcing MARPOL, and the DOJ has been actively involved training law enforcement officials in the United States and abroad in MARPOL enforcement. In recent years, the USCG has seen at least 80 deficiencies and over a dozen APPS enforcement actions.*

prehensive environmental compliance plan. While the USCG has previously initiated enforcement for ships lacking low-sulfur compliant fuel, this is the first criminal prosecution by the DOJ for Annex VI requirements. (Previously, DOJ criminal prosecutions of MARPOL requirements have focused on ocean dumping cases.) This recent criminal case could herald more cases involving IMO 2020 rules, and ship operators should be prepared for increased enforcement of fuel limits through USCG inspections with greater scrutiny of records.

Increased enforcement can come from two separate federal agencies. The USCG and the EPA share responsibility for enforcing the provisions of Annex VI and APPS. The USCG has the authority under APPS to conduct ship inspections, examinations, and investigations. The most frequent method for enforcement is the USCG's regularly scheduled Port State Control exams (approximately 9,500 per year), which include checking Annex VI compliance. Targets of enforcement actions often may include the crew, managers, and owners of both domestic- and foreign-flagged vessels. The EPA has the authority to take enforcement action for violations whenever it detects a violation or whenever such violations have been referred to the agency by the USCG. The protocol for enforcement referral is set forth in a memorandum with the agencies, whereby potential violations are referred to the agency with relevant expertise. The USCG focuses on a ships' International Air Pollution Prevention certificate, Certificate of Adequacy, and volatile organic chemical management

plan. The EPA focuses on ships' Engine International Air Pollution Prevention certificate, bunker delivery notes, fuel samples, and other requirements.

Potential Violations and Penalties

Potential violations of the IMO 2020 rules fall into two categories: fuel violations and recordkeeping violations. That is, the USCG and EPA will be inspecting ships to ensure they are using compliance fuel and to ensure that sufficient records of fuel use are maintained. While recordkeeping might seem like an ancillary requirement, recordkeeping violations in previous APPS enforcement cases have carried significant financial penalties, especially where the government alleged that records were fraudulent. In certain cases, the U.S. government may also charge violators with obstruction of an agency proceeding.

Penalties for violations of the domestic IMO 2020 regulations are governed by the penalty provisions of APPS and EPA's 2015 marine penalty policy. (These penalty provisions have been adjusted for inflation under the 2015 amendments to the Federal Civil Penalties Inflation Adjustment Act and subsequent EPA regulations.) Under APPS, a total civil penalty could be assessed up to approximately $70,000 per violation, per day. The EPA's penalty policy considers the economic benefit to the violator from using noncompliant fuel and the seriousness of the violation, including how much fuel was burned, the sulfur content of the fuel burned, and the type of recordkeeping violations, if any.

At the upper range, inflation-adjusted penalties may reach approximately $775 per metric ton of fuel burned containing over 3.5 percent sulfur in an area subject to the 0.1 percent limit, and recordkeeping violations may reach about $15,500 per day. Penalties may be adjusted up or down depending on various factors, including the degree of willfulness or negligence involved, cooperation during investigations and enforcement, history of noncompliance, the violators ability to pay, and other factors. Penalties can sometimes be adjusted based on a violator agreeing to pay funds for an environmentally benefit project (termed a "supplemental environmental project"), but such a project essentially diverts penalty funds into the project, rather than reducing the overall amount a violator must pay.

Under APPS, if the USCG has "reasonable cause" to believe that a ship may be liable for a violation of APPS and corresponding regulations, then the USCG may revoke or withhold a vessel's customs clearance or demand a Letter of Undertaking, bond, or other surety to the satisfaction of the USCG. Knowing or willful violations could subject shippers to criminal liability, as in the recent Virgin Islands case. The IMO 2020 regulations do not change the existing penalty scheme for APPS violations.

How to Respond to Enforcement

The best way to respond to an enforcement action is to prevent it before it begins. Shipping company executives should ensure that their crews and managers have sufficient training and recordkeeping systems to maintain compliance with IMO 2020 rules, including understanding the lower requirements specific to ECAs. Those training and compliance procedures should include how managers should respond to USCG or EPA requests for records relevant to IMO 2020 or other APPS provisions. Should compliance issues arise during a USCG inspection, shipping companies should retain counsel and cooperate with authorities, especially to avoid any obstruction charges.

The Authors

Justin Savage

focuses on high-stakes environmental litigation and strategic counseling, including government enforcement actions, internal investigations, and rulemaking challenges. Justin's clients span the range of regulated industries and are particularly concentrated in the auto and energy sectors, including refiners, chemical manufacturers, producers, OEMs, Tier 1 suppliers, and aftermarket companies. He served for nearly a decade at the Environmental Enforcement Section of the U.S. Department of Justice, where he led teams in several multi-billion dollar enforcement cases.

Peter Whitfield

assists his clients with environmental issues during project development and operation. He helps companies navigate citizen suits, enforcement actions, regulatory proceedings and challenges to their environmental clearances. Peter also handles a variety of administrative litigation matters on behalf of clients. With over a decade of experience, Peter has extensive knowledge of the Clean Air Act, National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, Administrative Procedure Act and numerous other federal and state laws.

Marshall Morales

focuses on complex environmental litigation, enforcement and regulatory compliance. His experience includes matters involving the Clean Air Act, the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Endangered Species Act (ESA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). He counsels clients with respect to chemical regulatory approvals, industrial permitting, consumer and commercial product restrictions, environmental marketing claims and industrial health and safety matters.

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PORT RESILIENCY IS CRITICAL TO SUPPORT LOCAL ECONOMY

By Doug Wheeler

In my home state of Florida, our ports support almost 1 million jobs and have an annual impact of more than $117 billion. The enormous economic impact of our ports system in Florida and across the country must be protected. In the state of Florida, we recently studied resiliency from critical incidents, including threats like sea level rise, immediate impacts from hurricanes and other natural disasters, and even cyber attacks and security threats.

Port resiliency will allow continued freight movement after a crisis, which may include planning for damage to infrastructure, a lack of fuel, a shortage of workforce and a lack of communication and technology. This study helps us understand the steps we have taken to protect our ports and the businesses located there, along with the supply chain.

We are proud to say that Florida has innovative practices that increase our resiliency:

- *Our ports have entered into a Memorandum of Understanding to assist other impacted ports after a disaster. This could include personnel, equipment and other resources necessary to recover quickly.*
- *Our 15 seaports have also invested in a single information reporting platform, known as CommandBridge, to connect and share real-time information with other ports and key state and federal agencies during and after a critical incident.*

Most seaports are required to address environmental issues, including sea level rise and upgrades to infrastructure for resiliency, in their master planning process, so we expect to see seaports across the country preparing for resiliency.

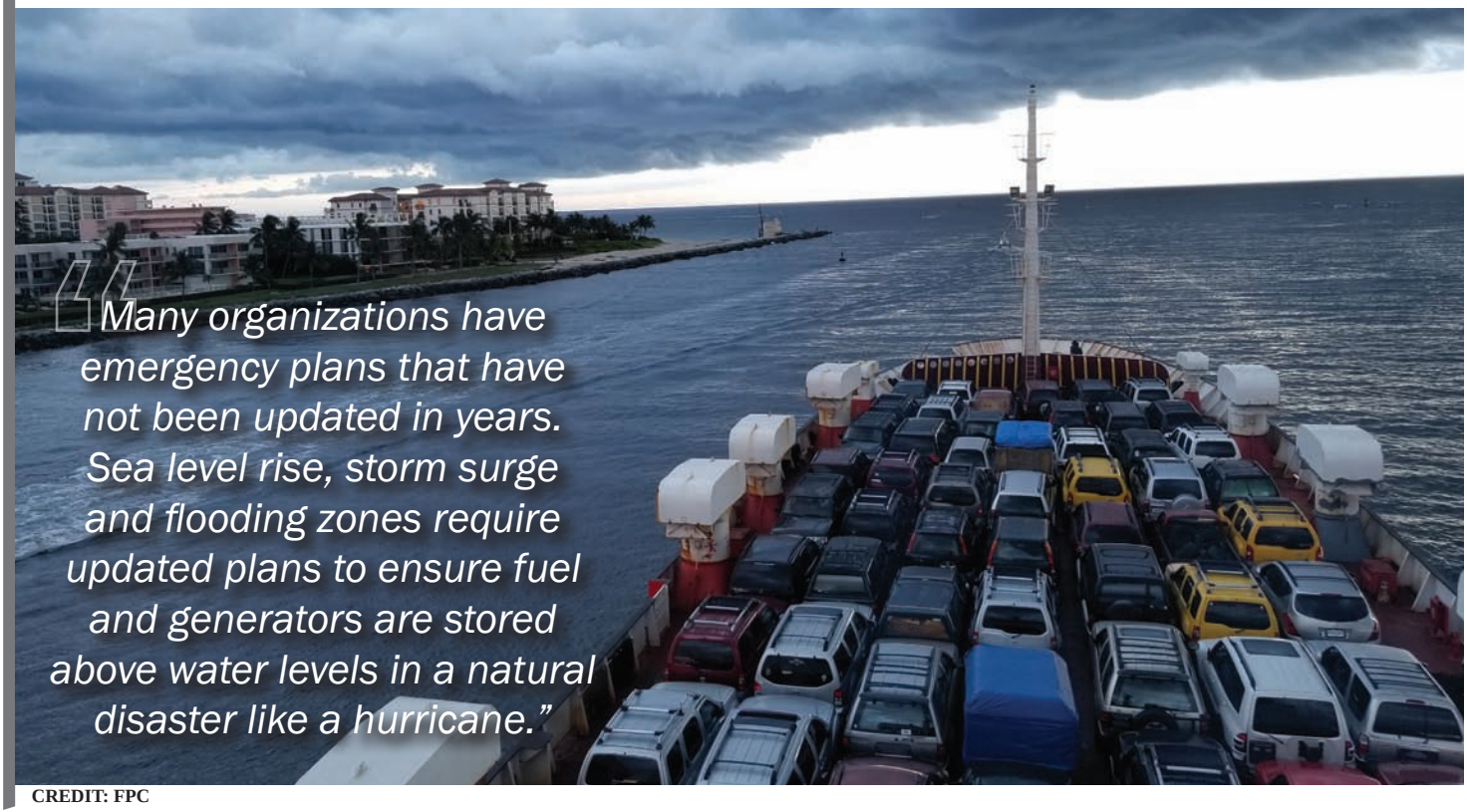
The good news is there is no immediate need to update equipment or infrastructure for rising seas, given the lifespan of current infrastructure and estimates of sea levels, however, ports should continue to assess inventory and address needed modifications for sea level changes.

Still, disaster-related vessel and cargo surges must also be anticipated. Diverted shipments can cause many logistical challenges. Port closures in certain areas of the state can cause other ports to be overloaded, even far away from a specific disaster or incident.

But more can be done to continue to protect our ports – the property, the businesses, and the employees – from potential threats. These steps include:

- ***Collaboration with local communities***

Florida ports have worked with state and local governments



CREDIT: FPC

Across the nation, seaports support more than 30 million jobs and have an economic impact of more than $5 trillion.

and utility providers to harden electrical infrastructure, to build power redundancy, and to receive priority power restoration. Additionally, our ports have provided support after large disasters, including Hurricane Michael in 2018, where Port Panama City donated acres of land for first responders to help the community recovery process begin.

- ***Preparation for any disaster***

Conducting regular simulations or scenarios of critical incidents provide a best practice in increasing resiliency and response to natural disasters or other events. Although natural disasters happen more frequently in some coastal areas, preparing for unusual events is also critical to a faster recovery. This includes ensuring that satellite phones or two-way radios are available and that individuals are trained in how to properly use them.

- ***Updating procedures***

Many organizations have emergency plans that have not been updated in years. Sea level rise, storm surge and flooding zones require updated plans to ensure fuel and generators are stored above water levels in a natural disaster like a hurricane. Also, move truck, rail and cargo to safe locations, above flood-prone areas.

- ***Going high-tech***

Technology provides support to all systems across seaports today. Being able to access this technology will be critical to opening port operations and local businesses as soon as possible. Backing up all technology and communications systems in the cloud and off-site will allow you to gain access to critical documentation, from employee contact information to security measures and logistical strategies.

Seaports are a critical hub of employment, logistics, transportation and business. Ports across our country work with many small and large businesses and must be prepared to provide resiliency support to tenants and other partners to coordinate response and long-term recovery of the port, and the local economy.

The Author **Doug Wheeler**
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CREDIT: Ares

Ocean Transportation Intermediaries' U.S. Regulatory Scheme:

By Carlos Rodriguez of Husch Blackwell

In the last year or so, it has become clearly evident that ocean carriers are treating European and other forwarders differently than how they deal with U.S. forwarders, creating a distinctly competitive disadvantage for U.S. ocean forwarders, Non-Vessel-Operating Common Carriers (NVOCCs) and customs brokers. The bottom line activity is that ocean carriers are creating beneficial sell rates to "forwarders", usually in ocean carriers' tariffs, for use exclusively by European forwarders located in certain locations in Europe and elsewhere (not the U.S.).

We are using the term "forwarders" in the U.S. sense. But for our narrative here, the European forwarder, located in Europe and other locations, will dispatch cargo from Europe based on lump sum rates formulated from the sell rates offered to them by the ocean carriers, but will not hold out as NVOCCs, nor issue house bills of lading.

Many of these forwarders are neither licensed nor registered with the Federal Maritime Commission (FMC) as NVOCCs. In fact, U.S. forwarders under the current definition of "forwarders" could similarly issue lump sum rates under the current FMC regulations for export transport from the U.S.

Unfortunately, the ocean carriers, probably sensitive to U.S. regulatory structures do not provide U.S. forwarders similarly competitive rate structures for exports from the U.S. or for inbound traffic controlled by U.S. consignees. But also, more egregiously, if a U.S. forwarder, who also may be an NVOCC/customs broker, controls import cargo to be shipped to the U.S. on a "collect" basis, the U.S. Ocean Transportation Intermediary (OTI) may have to "purchase" a favorable rate from the unlicensed, unregistered forwarder in Europe who does have the benefit of the competitive rate, even though it may not be a licensed or registered NVOCC. The question: Is this legal? After discussing this with FMC officials, the answer is, *"probably."*

Everything described above has regulatory risk as follows, but as will be seen, this risk can be easily mitigated or it disappears altogether:

- *Even if the European forwarder is not a licensed or registered FMC NVOCC, it can legitimately argue that it is merely acting as a "freight forwarder" per the U.S. definition of "freight forwarder" and that the FMC, therefore, does not have jurisdiction over it since it only has jurisdiction over U.S. domiciled forwarders. The European freight forwarder would argue it does not act as an NVOCC in that it does not hold out as such, and does not issue a bill of lading. It is merely acting as a "forwarder" in the U.S. sense of the term by dispatching cargo from Europe (or elsewhere) to the U.S. In fact, U.S. forwarders could do the same pursuant to current regulations, but, as noted, ocean carriers have shied away from this practice in the U.S.*
- *The ocean carrier has a more precarious, but not particularly dangerous regulatory position. Notwithstanding that there is an FMC prohibition for a common carrier to provide transport to unlicensed/unregistered intermediaries which act as NVOCCs, the carrier would likely maintain that the European forwarder is not acting*

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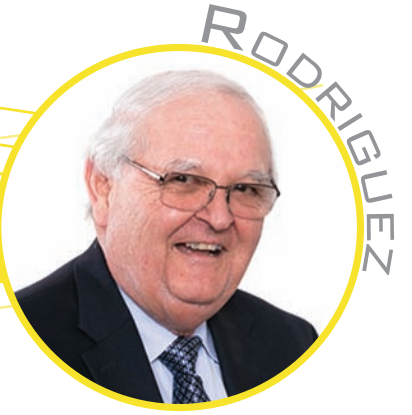
European Ocean Freight Forwarders and Freight Pricing: **what you need to know.**



as an NVOCC since it does not hold out as either a common carrier, nor does it issue its house bill of lading, and would be acting much like a U.S. forwarder. It is not likely that the FMC would challenge this in the sense that it would have a tough time in asserting jurisdiction over a European forwarder with no presence in the U.S.

- *To minimize FMC regulatory risk, it would be prudent for the common carriers (VOCCs and NVOCCs), accepting such rates/cargo from European or other non-U.S. based freight forwarders, to carefully structure these transactions so that the master bill of lading indicates appropriate relationships between shippers, consignees, and the ocean carrier. Additionally, in the case of the U.S. NVOCC (that is arranging this transaction with the European forwarder), which may also be acting as a Customs broker in the U.S. for consignee customers who control the freight (usually "collect" shipments), the NVOCC must also take care in the structuring of pricing (preferably via Negotiated Rate Arrangements) (NRAs), invoicing the charges to its import customer, and the structuring of its housebill of lading.*

Over the last couple of years, we have been monitoring these practices and requesting and obtaining input from FMC staff in order to insure that these transactions are properly documented.

Therefore, the salient features of the U.S. forwarder are that it does not act as a common carrier (i.e., it does not act as a NVOCC). It does not hold out to provide ocean transportation as a common carrier, and it does not issue its own house bills of lading. The development of the NVOCC mechanism over the years in the U.S. has pretty much become the process by which U.S. intermediaries in the U.S. trade lanes negotiate rates with ocean carriers and by which they structure transport rates to their shipper customers. In Europe, obviously, NVOCCs also follow the U.S. model, but the difference is that ocean carriers still provide rate structures to forwarders, which are not necessarily FMC licensed or registered with the FMC, and we have noticed an increase of this type of pricing structure.

European forwarders are now aggressively selling rate structures, not only to shippers, but also to U.S. NVOCCs. The U.S. NVOCCs are those who generally control consignee "collect" cargo in the U.S. either as NVOCCs or sometimes as customs brokers, but who do not have competitive enough rates directly with the relevant ocean carriers. To underscore that this practice is institutionalized commercially by ocean carriers, we have reviewed ocean carrier tariff rate sheets applicable in the U.S. trade lanes which are specified exclusively for "forwarders" in specific locations in Europe, without reference as to whether or not they are FMC licensed or registered NVOCCs. The tariff rate pages which contain these rates are even designated as "service contracts", but obviously, the FMC service contract procedures are not followed since there are no filings, and the rates are applicable to "forwarders." And lastly, the European forwarders are not acting as NVOCCs in that they are not holding out as such and do not issue house bills, but yet are controlling the pricing mechanisms of these transactions with the blessing of the ocean common carriers.

Conclusion

In the U.S. there is long legal precedent in some important U.S. jurisdictions that when a forwarder is negotiating rates for its customers, and when an ocean common carrier looks to payment from the U.S. forwarder, that the actual shipper is excused from double payment if it has paid the forwarder and the forwarder has failed to turn over freight monies to the ocean carrier. It is factually implicit in these strings of historical court holdings that an ocean common carrier, for commercial reasons, did historically in the U.S. negotiate rates with forwarders and expected payments from those forwarders.

However, for whatever reasons, which we suspect are principally regulatory, this commercial practice of forwarders being offered rates by ocean carriers has effectively ceased in the U.S. but is very much alive and well in Europe and beyond. (**NOTE**: *the commercial/legal/regulatory risks of a forwarder are minimal when compared with those of an NVOCC, acting as a common carrier. If the objective is rate margins only, these are currently being effectively obtained by European forwarders.*)

These forwarder practices merit some review in the U.S. with the objective of encouraging their use in the U.S. As noted, U.S. NVOCCs which are selling transport to U.S. importers and arranging transportation with the above described European forwarders should at this time be cautious as to how these transactions are structured so as to ensure compliance with current U.S. shipping laws and regulations.

The Author **Carlos Rodriguez**

is a Washington-based partner with the law firm Husch Blackwell LLP. He practices in the International Trade & Supply Chain group of the firm's Technology, Manufacturing & Transportation industry team.

Chassis Provisioning 2020: A look ahead

Within the chassis sector, the concept of collaboration and maximized synergies translates into full interoperability, whereby multiple chassis providers fully share equipment to ensure supply chain fluidity.

By Mike Wilson

To accurately look ahead to 2020, we need to reflect properly on 2019. From where I stand, the number one take-away from the challenges and opportunities presented last year is that supply chains need be designed to withstand global volatility in order to ensure optimized supply chain fluidity. With market-shifting challenges, such as the trade war between the US and China as well as the upcoming IMO 2020 deadline looming large in the proverbial porthole, whereby volumes likely decrease and costs increase, the industry must be prepared to look for innovative, collaborative approaches to doing business.

This last year in particular, we at Consolidated Chassis Management (CCM) saw that the most agile and flexible supply chains were built on a foundation of collaborative supply chain and intermodal partners. Collaboration is at the heart of intermodalism—individual companies working together toward one common goal to swiftly move freight from point A to point B, keeping the needs of the customer ahead of one's own needs.

With the current unpredictable environment, the industry as a whole has moved in the direction of maximizing synergies and seeking deeper collaboration, rather than running away from it. Those who want to thrive rather than simply survive understand that their toughest competitor on Monday can be the most strategic collaborator on Tuesday. We see this throughout the entire supply chain, including the ocean carrier alliances.

Gray Chassis Pool: Intermodal collaboration at its heart

As a neutral chassis gray pool manager, CCM has seen a movement toward an open, sharing, collaborative approach. Within the chassis sector, the concept of collaboration and maximized synergies translates into "full interoperability," whereby multiple chassis providers fully share equipment to ensure supply chain fluidity. They all have the same goal of efficiently meeting the customers' needs.

Providing unmatched supply chain efficiency opportunities, a fully optimized interoperable chassis gray pool (IOGP) is designed, first and foremost, to ensure safe, reliable chassis are available at the right place at the right time. CCM has a proven record of providing chassis with a very low percentage of flips, and we consistently deliver 99% or above on chassis availability.

It's worth noting that there are degrees of interoperability within the chassis pool sector. CCM's chassis pools are fully interoperable – meaning the assets are fully shared and neutrally managed. Other pools are partially interoperable, and while they offer some synergistic benefits such as shared fleet and improved repositioning, the benefits are limited because each provider essentially operates independently within the pool.

The Downside of the Non-Interopable Chassis Model

With a non-interoperable chassis provision model, equipment providers work independently of each other. They are individual companies, and they can choose to operate as such. While this may work for the equipment provider, experience has shown that this independent, or fragmented approach results in inefficiencies throughout the supply chain, slowing down fluidity and increasing costs to all stakeholders.

The most obvious impact of the non-interoperable model is on the trucker. Motor carriers frequently spend more time than average having to drop off one chassis while picking up another when the container operators have different arrangements instead of using the same chassis. These chassis splits are a significant point of frustration for the motor carrier and have a direct negative effect on supply chain fluidity, creates gate congestion and costs everyone money. This impacts ocean carriers, shippers, terminal operators, truckers and even the equipment providers who lose money with unnecessary bare chassis moves.

Another place the ramifications of non-interoperability can be clearly seen is at the rail yards. Multiple chassis pools have resulted in lower productivity in rail L/D operations. Rail demurrage is a significant problem for ocean carriers, shippers and motor carriers as they pay storage charges at a rail ramp when chassis run short. Also slowing down the flow of cargo at the rail ramps are the rail flips, whereby containers are moved from one chassis to another. Often, we see 'dead runs,' or in other words, the failed attempt to pick up a container at a rail ramp because the right

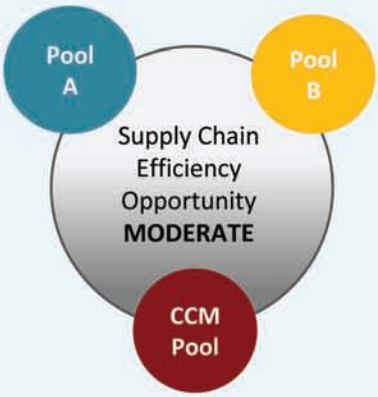
DEGREES OF INTEROPERABILITY WITHIN THE CHASSIS POOL SECTOR

Non-Interoperable

In a non-interoperable pool, gray fleet synergies are not captured. The fragmented approach slows the supply chain and adds cost.

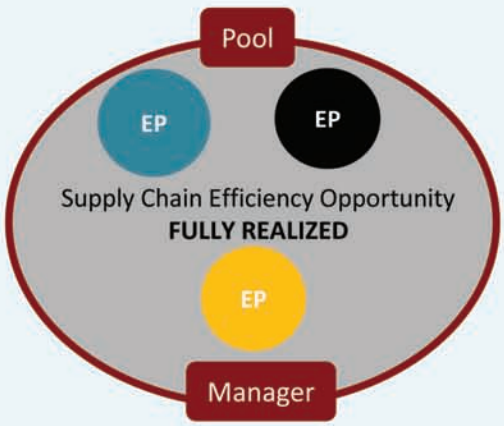
Partially Interoperable

In a partially interoperable pool (such as a Pool of Pools) some efficiency is gained while much is still left out due to independent behaviors from each provider.



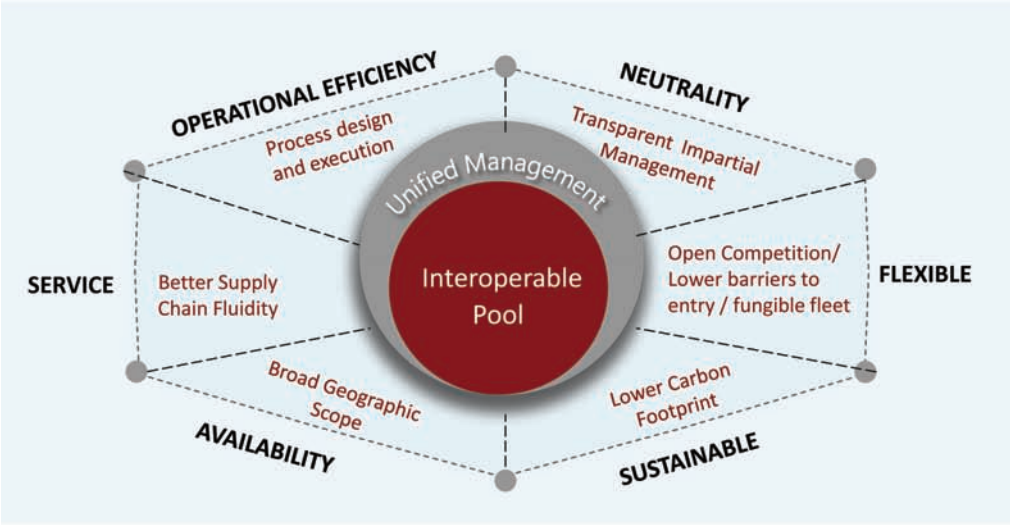
Fully Interoperable

In a fully interoperable pool, the gray fleet concept takes full effect, under single management and fully shared assets creating the opportunity for efficient supply chain fluidity.



ALL GRAPHICS: CCM

INTEROPERABILITY MATTERS



WHO IS IMPACTED BY NON-INTEROPERABILITY

COST CATEGORY	DESCRIPTION	WHO EXPERIENCES THESE COSTS?				
		OC	BCO	MC	EP	RR
Chassis Splits	When a trucker drops off a load or empty container for one ocean carrier and needs to backtrack to return the chassis in order to get a different chassis from a new location to pull for a different ocean carrier	✓	✓	✓		
Rail Demurrage	Storage charges at a rail ramp beyond the free time when chassis run short	✓	✓	✓		
Truck Detention	When a trucker spends more than the agreed wait time (usually 2 hours) at a facility for a chassis	✓	✓	✓		
Rail Flips	Moving a container from one chassis to another, usually at rail ramps	✓	✓	✓		
Dead Runs	A failed attempt to pick up a container at a rail ramp	✓	✓	✓		
Bare Repositioning	Moving a bare chassis from one location to another for redeployment purposes	✓	✓	✓	✓	
Extra Stock/Chassis	Additional chassis needed due to inefficient use of the fleet	✓	✓	✓	✓	
Reduced Truck Turns/Truck Capacity Impact	Reduced productivity of the truck due to overall inefficiency-in the supply chain adds cost	✓	✓	✓		
Slower Rail L/D Ops	Lower productivity in rail L/D operations due to multiple chassis pools					✓
Extra Product Inventory	Extra product/inventory needed due to reduced velocity in the supply chain		✓			

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chassis isn't available.

General fleet management is also a problem which results in excess inventory taking up much needed space on terminals and ramps, which will ultimately require bare repositioning, meaning a bare chassis is moved from one location to another for redeployment purposes. In a nutshell, hauling bare chassis is bad for business.

Bottom Line Benefits

For shippers/BCOs, a fully interoperable pool provides more reliable cargo flows; hence, less buffer stock is needed, resulting in lower cargo carrying cost. Additionally, shippers will find multiple chassis suppliers offering more competitive chassis provision options and pricing as a result. Beyond this, BCOs are given the opportunity to contribute chassis to the CCM pool. They can directly contribute, or their motor carrier can do it on their behalf; either way, the BCO is given options on chassis provision.

Railroads benefit from full interoperability because the rail ramp operator can choose any chassis on the facility to discharge a container, saving time and money. With faster loading and discharging of trains, a railroad can move railcars in and

out of the rail ramp more quickly; improving service, saving on cost, and ultimately creating more capacity for the railroad. This is fully in line with most railroads PRS strategy.

CCM's role is to manage and operate the interoperable gray pool, providing objective business oversight to ensure the IOGP benefits are fully realized. As the single point of contact balancing the needs of multiple stakeholders, CCM provides third-party, impartial decision making to ensure healthy competition as well as safe and reliable equipment in addition to supply chain fluidity.

CCM's low barrier to entry creates level playing field and healthy competition, which drives efficiency and service. In an interoperable chassis pool the chassis are fungible, meaning that business can move between providers without the actual chassis having to be added or taken out of the pool. In this way business can find the most competitive options without worrying about not having the chassis in place to support the business; they are already there.

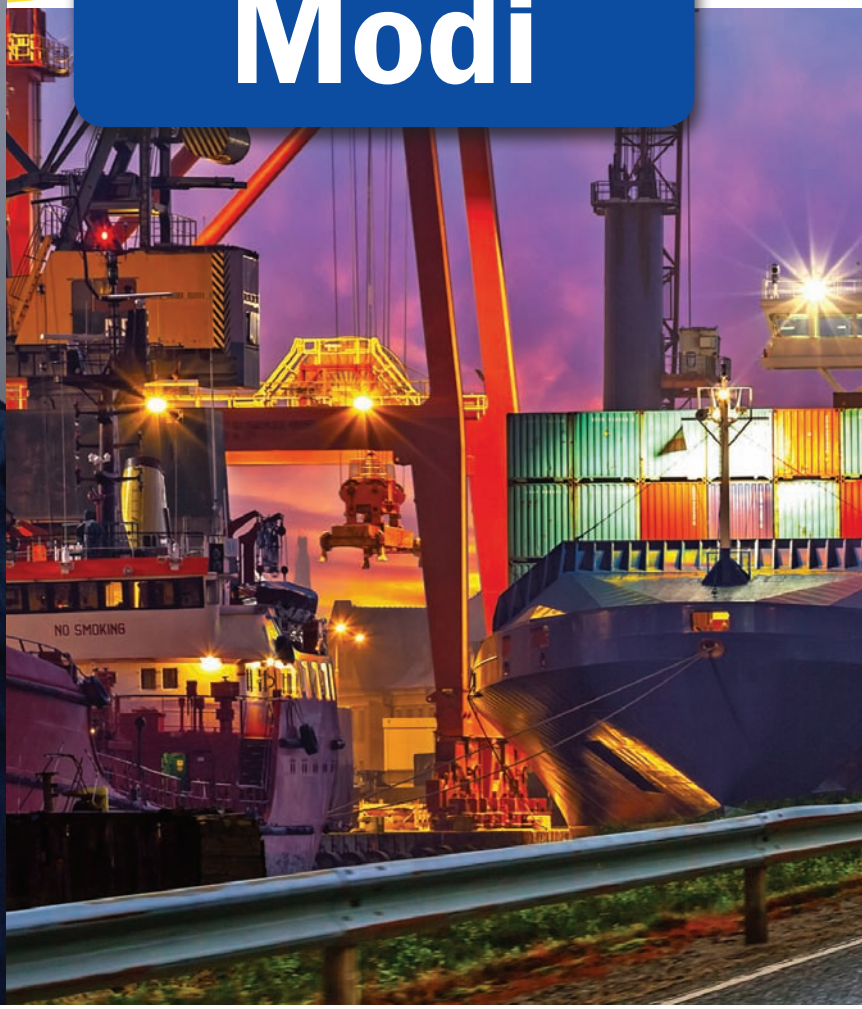
We are committed to providing safe and reliable equipment and recognize the impact of out-of-service equipment on our stakeholders. Proactive management of these assets, utilizing both technology and man-on-the ground service checks, is an essential part of the business model. Our newly developed MANDR (M&R) system has successfully helped us to manage all maintenance and repair schedules, to mitigate OOS issues. Looking ahead, and building off recently rolled out processes in the South Atlantic, in conjunction with our equipment suppliers, we have initiated upgrade schedules which will continue to be implemented in 2020. We believe upgrading the chassis with radial tires, anti-lock brakes, LED lights and other components will significantly improve reliability.

While safety and reliability are our number one concern, environmental sustainability is a close second. We believe the CCM interoperable gray pool model is the most environmentally sustainable chassis pool model in the market today. In wheeled operations, rail/ship loading and unloading operations are faster, requiring fewer machine operating hours thus burning much less fuel, resulting in less emissions and a smaller carbon footprint. And outside the terminals, motor carriers can use the same chassis for multiple container moves allowing for fewer bare chassis moves or "chassis splits," which means more efficient truck use, less idling and waiting time, allowing for lower emissions and a lower carbon output from the truck.

The sustainability benefits of the interoperable chassis gray pool model are undisputed, as are unmatched efficiency, enhanced supply chain fluidity and healthy competition. As the industry continues to move toward synergistic collaboration, it will become clear that CCM IOGP model is the most efficient, equitable and sustainable chassis provision model in the market today.

The Author **Michael Wilson**
is the CEO of Consolidated Chassis Management.

Nimesh Modi



Nimesh Modi is Chief Executive Officer of BookYourCargo, a five-year-old startup launched in 2014 that services the drayage needs of the shipping industry. He most recently served as COO. Prior to joining BookYourCargo, Mr. Modi began his career in 2003 as an NVOCC with Atlantic Pacific Lines, where he served as Vice President, Commercial, primarily overseeing sales and development of agency networks and procurement. Throughout his tenure, he continued to take on additional responsibilities, including finance, administration, HR and technology. Mr. Modi graduated from DDIT Institute of Technology, where he received an Engineering degree with a concentration in Electronics and Communications.

BookYourCargo.com is a freight brokerage platform that aggregates shippers and truckers for seamless transportation of cargo across the USA. It displays a real time matrix of trucking rates based on the National Motor Freight System and then tracks and traces the movement of cargo. The company is technology driven, leveraging a proprietary state-of-the-art digital platform, leading to higher productivity and steep reduction in costs. BookYourCargo works with retailers and customers across all categories - small, mid-range and large business entities, including retail and commercial shippers.

Any mode in the transportation equation is only as efficient as the one that immediately precedes, and follows it. Like the chassis issue that plagues the intermodal supply chain, drayage is also an underserved part of the market. Listen as Nimesh Modi weighs in on what the supply chain can do to change that reality.

Describe the Bookyourcargo.com solution.

BookYourCargo serves as the single point of all trucking ser-

CEO, *BookYourCargo.com*

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vice requirements with a specific focus on drayage. A technology-driven company, BookYourCargo offers competitive rates through an easy-to-use online platform that brings state-of-the-art solutions to customers across all categories – small, mid-range and large business entities. We understand that drayage is a short but critical piece of the supply chain; underserved and misunderstood. Traditional challenges, combined with the trucker shortage, have made drayage one of the most critical pain points in the supply chain.

You work with as many as 1500 trucking companies. What is your most valuable service that you provide to these operators?

The most valuable service we provide our customers is that we treat them well. We respect their value and appreciate that they are critical to the supply chain. What's more, we never forget that these truck drivers are people – husbands, parents, aunts and uncles – who often spend more time behind the wheel than with their own families, so we want to make their time on the road as pleasant and efficient as possible.

You also provide Intel to importers/exporters – presumably logistics related data about the positions, ETA's of trucks and chassis? Would that be a fair description?

Our customers rely on our service to provide data about positions, ETAs of trucks and chassis, even anticipated weather, to help their planning process. We become a true planning partner to our customers, who rely on our data to ensure seamless efficiency as they plot their course.

You advocate for the need to improve quality of life for truckers, eliminating the chronic high turnover, etc. How does Bookyourcargo.com contribute to that effort?

We believe we can play a role in improving the quality of life for truckers, which, in turn, reduces the chronic high turnover and resistance from the current generation to become a truck driver. One way we try to express our respect for their time is to match them with the right freight, fully assessing their position and their ETA as well as type and size of the drayage assignment. For the shipping community that uses our system, we handle all the administrative work so we are confident the paperwork is handled properly, which dramatically reduces the truck driver wait times and facilitates quicker turnarounds. Truckers want to be driving, not sitting idle in the terminal.

Your tech solution "maximizes the efficiency of trucking models locally." Presumably, this means less mileage and distance for that "last mile" delivery. Describe that process.

BookYourCargo.com provides a tool for maximizing efficiency of trucking models locally, which translates into less mileage and distance for the last mile. We educate customers on how they can utilize additional modes of transportation to help minimize dray related issues with ELD and the limited hours drivers have in one day. Sometimes it makes more economical sense to move freight using multiple modes of transportation such as rail and road combined.

The ELD situation has thrown a bit of a wrench into trucking today. You see truckers pulled over to the side of the road in places never seen before, and in volume. These are strict rules regarding rest, monitoring data, reporting, etc? How much more pressure has this put on the supply chain?

Of course, safety on the road is of paramount importance, but we need to have a plan on how to handle the implications of the new rules. It is common now to see truckers pulled over to the side of the road in places that you would not have seen before, and the sheer volume of truckers pulled over is a major contributor to the trucker headache, and to supply chain log jams in general. These strict rules regarding rest, monitoring data, reporting are adding significant strain to the supply chain, and impacting the ability to meet deadlines. All of this leads to additional costs, which are ultimately passed on to the consumer.

This software solution addresses and solves "critical issues surrounding drayage." Name a few examples of that in action.

BookYourCargo.com solution addresses and solves critical issues surrounding drayage, including ensuring prior knowledge of delivery schedule, proper updates on appointments and timely information about freight availability for delivery. The system enables troubleshooting any issues related to delivery or pickup at the warehouse, such as wrong freight, wrong warehouse, freight not ready, etc. It requires after-delivery confirmation in the form of PoD. The system allows visibility to review and update all loads in action. What we find to be one of the most important aspects is our focus on safety of the freight, which often comes down to our handling compliance and insurance issues for all the truck drivers in our pool. At the end of the day, it is critical that our customers know their cargo is in safe hands and that the driver has been properly vetted, has all necessary insurance and is in 100% compliance. Due to the driver shortage, some companies may skip a few vital steps out of pure desperation. Ensuring the safety of the cargo is absolutely critical, and ensuring driver compliance is a tedious and time-consuming process. Customers are very happy for us to handle it for them.

The company has "a state-of-the-art, web-based platform, which effectively addresses the mounting challenges associated with drayage." Tell us about your

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platform's set-up.

BookYourCargo.com is a state-of-the-art, web-based, easy-to-use system that utilizes the cloud. It does not require the installation of any software. This is important to our customers because everyone wants to be able to access real-time information on their mobile devices, not just their computers.

For truckers, BookYourCargo's platform helps in managing their return journey/idle hours whereas for shippers, it helps them to accomplish their needs with real-time cargo visibility from origin to the destination. What actual data feeds do truckers have access to?

Truckers receive critical information regarding available loads, size, congestion, POD, etc. That said; each trucker decides how to receive the information—it may be by text, email, an alert or to use the 'app.' Part of the appeal is the flexibility and ease of use as well as the customization to respond to how the trucker prefers to receive the intel.

Who exactly are your customers – do you act as the middle man between the cargo owner and the shipping companies?

Our customers are the members of the shipping community, including freight forwarders, shippers, custom brokers and everyone in between. Specializing in drayage solutions, BookYourCargo consistently provides customers with truckers, even in a trucker shortage, using fully digitized processes for handling administrative aspects, such as billing and scheduling and enhanced planning tools including real-time dashboards.

It seems that one of your functions is to more efficiently route cargo so that truckers can get in more loads on a given day, with less waiting. Would that be accurate?

One function of BookYourCargo is to help ensure the behind-the-scenes work is handled properly so that they can not lose their space in the queue, which helps the driver spend less time waiting. In addition, the transparency of information in our system helps the truck drivers plan—we provide updates on congestion, on weather, on wait times at the terminals, and we try to arrange appointments at times that work best for them.

Because of multiple issues, the roster of truck drivers is quickly diminishing. Compare the situation today to that which existed just five years ago. Is it getting worse?

The drayage truck driver shortage is definitely getting worse while the demands are increasing. The ELD rules mandating their hours plus the wait times at the terminals are making this a less attractive career path choice. The shortage could reach 50,000 truckers in the near future. The industry has a responsibility to proactively develop solutions, especially as e-commerce continues to explode and the demand for truck drivers are already far outpacing the supply.

Ensuring faster transactions and constant control over operations, BookYourCargo's one-window Technology Aggregation Platform seamlessly integrates all the stakeholders in cargo supply chain, including importers, exporters, shippers, BCOs, NVOs, freight forwarders, on one side and truckers and intermodal operators on the other. Tell us about your tracking technology.

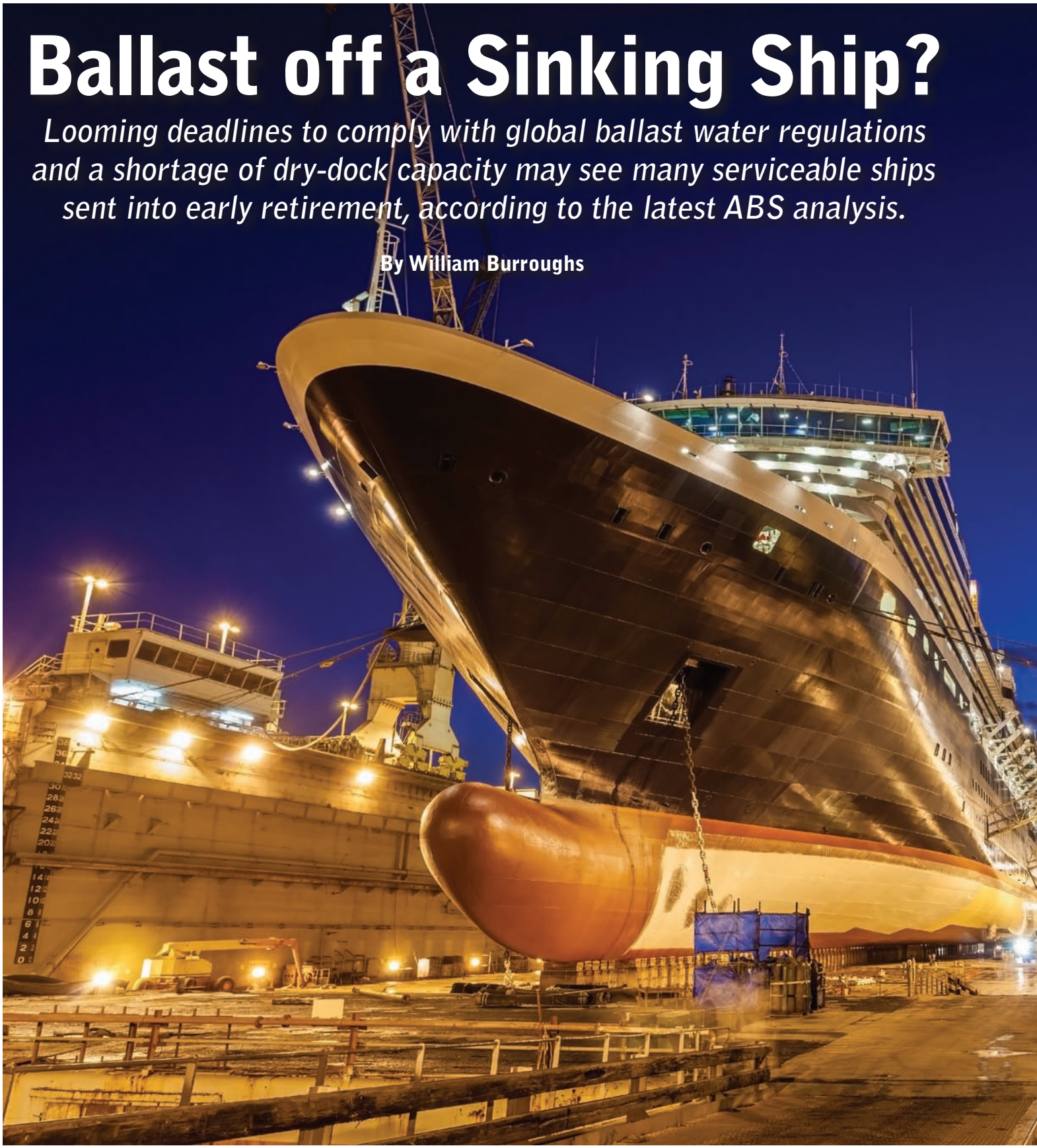
Ensuring faster transactions and constant control over operations, BookYourCargo's one-window Technology Aggregation Platform seamlessly integrates supply chain stakeholders, including importers, exporters, shippers, BCO's, NVO's, freight forwarders on one side, and truckers and intermodal operators on the other. We provide instant competitive quotes with live, high-visibility cargo and trucker tracking. We are currently connected with all ports and rail ramps to secure information regarding the containers, and plans to create a GPS tracking piece are in development.

www.bookyourcargo.com

Ballast off a Sinking Ship?

Looming deadlines to comply with global ballast water regulations and a shortage of dry-dock capacity may see many serviceable ships sent into early retirement, according to the latest ABS analysis.

By William Burroughs



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About 30,000 commercially trading ships above 2,000 dwt are required to install new ballast water management systems (BWMS) before the September 8, 2024 deadline. The retrofits are required under the IMO's International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004), which was enacted to eliminate the global transfer of invasive species that are a major threat to marine ecosystems.

The majority of owners are expected to conduct BWMS retrofits for their ships during their five-year Special Surveys, when the vessels are already scheduled to be out of service. But, according to ABS data, a global crush for dock space is emerging that could force owners to make some tough economic decisions about otherwise healthy ships.

Real Data, Difficult Choices

According to ABS data for the fleet under its class, peak demand for retrofits will be in 2022, when more than 1,600 ships will need BWMS retrofits. Recent data made publicly available by other IACS members confirms a similar proportion of their fleets will require servicing at that time, potentially creating a bottleneck at the shipyards.

The pending peak in demand for future dock space has been made more acute by owners' recent efforts to 'de-harmonize' their ships' IOPP Renewal Surveys, decoupling the BWMS retrofit deadlines with the traditional out-of-service period (i.e., the vessel's Special Surveys).

An examination of the current dock capacity suggests that global shipyards will collectively struggle to cope with any sharp rises in demand for retrofitting space, a shortfall that could compel many owners to consider early scrapping for ships that can no longer trade internationally.

A limited number of vessels above the age of 15 – or after their 3rd Special Survey – are likely to be considered viable candidates for BWMS retrofits. The exceptions to the rule could prove to be gas ships, which have design lives that are on average 10 years longer than bulk carriers or tankers, for example. However, gas ships represent a very

"ABS estimates that, of ships greater than 2,000dwt currently under its class and scheduled for retrofits before 2024, as much as 20% of that subset could lack the economic justification for having a BWMS installed. With the potential resultant inability to trade internationally, those ships may be destined for the industry's breaking yards."

– William Burroughs, Senior Principal Engineer, Advisory Services, for ABS

small proportion of the fleet that is scheduled for BWMS retrofits.

ABS estimates that, of ships greater than 2,000 dwt currently under its class and scheduled for retrofits before 2024, as much as 20% of that subset could lack the economic justification for having a BWMS installed. With the potential resultant inability to trade internationally, those ships may be destined for the industry's breaking yards.

To the Yard – OR – to the Breakers?

As capacity becomes tighter at new construction and repair yards, the rush of ships looking for BWMS retrofits may result in a record number of removals from the global fleet in 2022. Retrofits on vessels aged 15 years and younger in 2022 are likely to be completed; the next year, ships over that age are less likely

CREDIT: © Oleksandr Kalinichenko/Shutterstock

to be viable candidates.

Around 45,000 vessels above 2,000 dwt are currently without a BWMS that complies with the new regulation, industry data indicates. About 25% of those ships are unlikely to complete their 4th Special Survey, and will not be retrofitted.

If, as the analysis suggests, 30,000 ships pursue retrofits during their Special Surveys before September 2024, global demand for an average of 500 retrofits a month would be created throughout the five-year period. It is safe to say that not only dock space would be in short supply.

Based on the man hours required to add the retrofits to the regular out-of-service periods required by class, flag states, shipowners, yards, equipment vendors and other stakeholders, industry also could face an acute shortage of qualified personnel to undertake the work. If any stakeholder community fails to meet the challenge, a significant proportion of five-year retrofit period would be put at risk.

Another area where expertise is likely to be needed is in the certification field. There are about 75 type-approved BWMS currently being sold to shipowners worldwide, about 10 of which are already compliant with the requirements of the 2016 G8 (and now, the BWMS Code). There is a considerable amount of technical work that will be required before the October 28 deadline next year, when all of the systems need to be certified to the new mandatory code.

The Regulatory Gauntlet

There is also another layer of compliance requirements from national regulators, such as the U.S. Coast Guard, to be met.

To support those efforts in the U.S., ABS and the independent Dutch laboratory Control Union Certifications (CUC) in September formed an alliance to offer the manufacturers of ballast-water systems an efficient path to compliance with both IMO and U.S. Coast Guard (USCG) regulations.

The alliance combines ABS, a Recognized Organization under the IMO that is authorized by 57 flag states to certify BWMS, with CUC, a USCG-approved independent laboratory. As a single point of contact for manufacturers for all BWMS type approvals and compliance processes – including planning, testing and execution – the alliance helps shipowners to gain the multiple flag and class approvals required for the systems.

Part of Peterson and Control Union, CUC is an independent laboratory offering all the services required by USCG regulation (46 CFR 162.060) and the IMO BWMS Code. Their team of scientists has been conducting tests on ballast water systems since the inception of the BWM Convention.

For systems manufacturers, the 2016 G8 and BWMS Code require re-approval of all BWMS, even those approved under previous IMO legislation. If a manufacturer is offering a system that received type approval prior to the newer 2008 G8 guidelines, it can still be sold, but the last date it can be installed on a vessel is October 28, 2020. After that, every system is required to meet the newer 2016 G8 or BWMS Code regulations.

For now, all testing will be undertaken at CUC's facilities in The Netherlands. However, they are expanding their network of laboratories to include US-based testing. Systems tests are being conducted in three salinity ranges: freshwater (defined as containing less than one Practical Salinity Unit [PSU]); 'brackish' water (between 10 and 20 PSU) and marine salinity (between 28 and 36 PSU), as required by the IMO.

By engaging with the BWMS at the type-approval stage, class can apply its considerable experience with regulatory compliance to evaluating their original designs, manufacturing processes and certification.

The maritime industry has gained a lot of experience with BWMS since the early days of their design and installation a decade ago. But while the owners or shipyards may have gained familiarity with 10 to 20 systems during that time, IACS classification societies such as ABS have seen thousands of individual systems, and have developed the kind of experience that can help owners avoid a lot of the operational conflicts the industry has seen.

As compliance and certification deadlines draw nearer, it is knowledge that will prove useful to an industry with some tough decisions to make.

Blockchain and DNA:

The game changers in the IMO 2020 challenge.

By Marc Johnson and Stuart Hall

In 2020, the shipping industry finds itself dealing with a complex set of new risks originating from the International Maritime Organization's (IMO) changing rules for marine fuels. Although the industry has been preparing for this change for years, the main priority for owners, operators and suppliers will be to manage fuel supplies to ensure the fuels they've selected are safe, stable and meet the new sulphur requirements.

A recent report by S&P Global Platts shows how several bunker fuel suppliers are re-entering or expanding their presence in the Singaporean market to meet the demand for 2020-compliant fuels. Many large firms, such as Freeport, Mitsui and co., Marubeni and Petrobras, have all indicated that they're stepping up operations to meet the need for low-sulphur fuels in 2020 and beyond.

Emerging Risks

While some of the world's largest bunkering ports, such as Singapore, can rely on major players re-entering the market or expanding their presence in major ports, others may have to rely on new suppliers with less of a marine track record, or those who decide to cut corners, in order to comply with next year's regulation.

This, in and of itself, presents many risks. Even in our current supply chain, the risks of contamination and incompatibility in compliant fuels are still a possibility. This was the case last year when more than 100 vessels were affected by contaminated fuel, which started in Houston and resulted in blocked filters and clogged fuel injectors. Knowing who was legally responsible was hard to identify, which is often the case in a supply chain historically known to be fragmented and opaque.

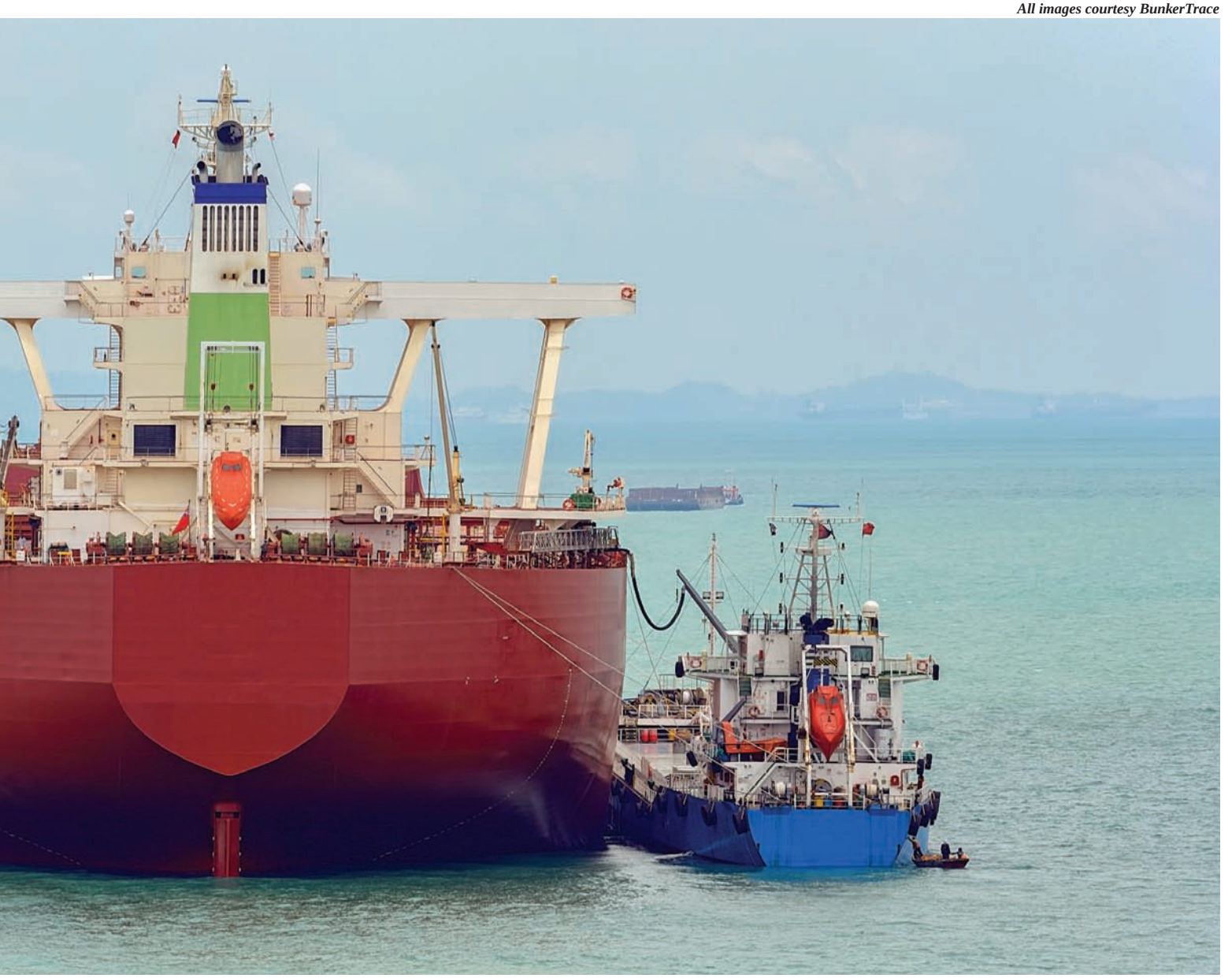
As we found through our research with Maritime Blockchain Labs, a consortium exploring the potential of blockchain to solve critical safety problems in shipping, blockchain is ideally suited to resolving issues in complex supply chains such as this. Transparency and traceability are, ultimately at the core of the technology, and as such it enables a shared, unalterable store of data which allows, in theory, trust to be established between parties with limited intermediation. This is how, for instance, bitcoin allows transactions between parties without a bank.

However, digital solutions are limited in their ability to accurately represent what happens in the physical realm when working in the digital realm – the problem of incorrect information entering a blockchain-based system still creates issues. However, by combining physical and digital information, it's possible to create a two-layer system, where the physical and digital streams of information reinforce one another.

The Way Forward

By creating synthetic DNA and combining it with blockchain, information can be added to marine fuel, which can carry information in the same way DNA carries information around the human body. Looking at a fuel supply chain, a unique tracer can be added upstream at the refinery and then, at subsequent points

All images courtesy BunkerTrace



along the supply chain, other tags can be added, to demonstrate where fuel has been tested and found to be compliant. By the time it reaches a vessel, there will be an entirely auditable trail of tags contained in the fuel, which upon lab analysis, will reveal the associated data regarding that fuel.

The addition of a molecular label alongside the DNA tag acts as a covert screening tool which allows crew and/or independent surveyor to be able to test for the presence of the necessary DNA markers and, if they're absent, make a decision about whether to proceed. Where the DNA markers tag the provenance and movement of the actual fuel, the blockchain solution traces interactions that occur on a human-to-human level – the digital 'handshakes' that occur along the journey of the fuel.

The result is a solution combining both elements of DNA and blockchain, which create an immutable chain of custody audit trail that follows the fuel, and any changes made to it, throughout the supply chain and records all activities and sign offs by actors transacting the fuel. It provides assurance of quality, including meeting permissible ISO specifications or flagging a potential contaminant introduced at any point of the supply chain, and in the future we hope it will be an application which could be used to trace solutions of pollution. This unique tag is linked to key data about provenance, location, chain of custody and any information, which is deemed relevant. The two technologies combine to provide a powerful framework which links the digital world with the physical world, therefore tracking the entire supply chain by integrating blockchain with DNA tracing in one solution.

"…by combining physical and digital information, it's possible to create a two-layer system, where the physical and digital streams of information reinforce one another."

Available Now

BunkerTrace successfully completed our first pilot in September, which was conducted in partnership with Cooperative Bebeka. The Boskalis-owned dredger Prins der Nederlanden was bunkered with 900 cubic meters (CBM) of DMA 0.1% sulphur ISO 8217:2010 compliant fuel, supplied by Minerva with a unique tracer added. Following this, the crew successfully detected this mark with an on-board analysis case that took less than a minute, with the result of the test logged in a blockchain-based transaction record. A tracer was then added to the fuel as it was loaded onto a Minerva bunker barge through a dosing pump on the fuel line. Bureau Veritas verified that the fuel line and receiving cargo tanks were empty.

To tag the fuels, BunkerTrace uses "oligonucleotides" (short single strands of synthetic DNA) to provide a virtually unlimited number of unique, secure codes (fingerprints), which are encoded with the information on quality and origin of fuels from the BunkerTrace solution. The prototype for BunkerTrace was developed by the Maritime Blockchain Labs (MBL) consortium, funded by the Lloyd's Register Foundation.

Having carried out the pilot in Belgium and the Netherlands, we commercially launched BunkerTrace at Aracon to indicate our readiness for IMO 2020. We're ready to receive requests for commercial partnerships and adoption by bunker suppliers, vessel and barge operators, as well as surveyors. We also intend to work with port authorities to start creating automatic reporting using our application.

The marine fuels supply chain needs multiple parties to collaborate to ensure post-2020 fuels are safe and reliable. In doing so, technology gives the vessel owner far better control of its supply chain. Although this is not the one-stop solution for compliance and traceability, BunkerTrace does provide the basis for systems that give owners, charterers, credit providers and financiers more confidence in the fuels they buy, insurers a better picture of the risks they must manage, operators more assurance in the fuels they combust, and enforcers better tools to use to effectively regulate the fuels market.

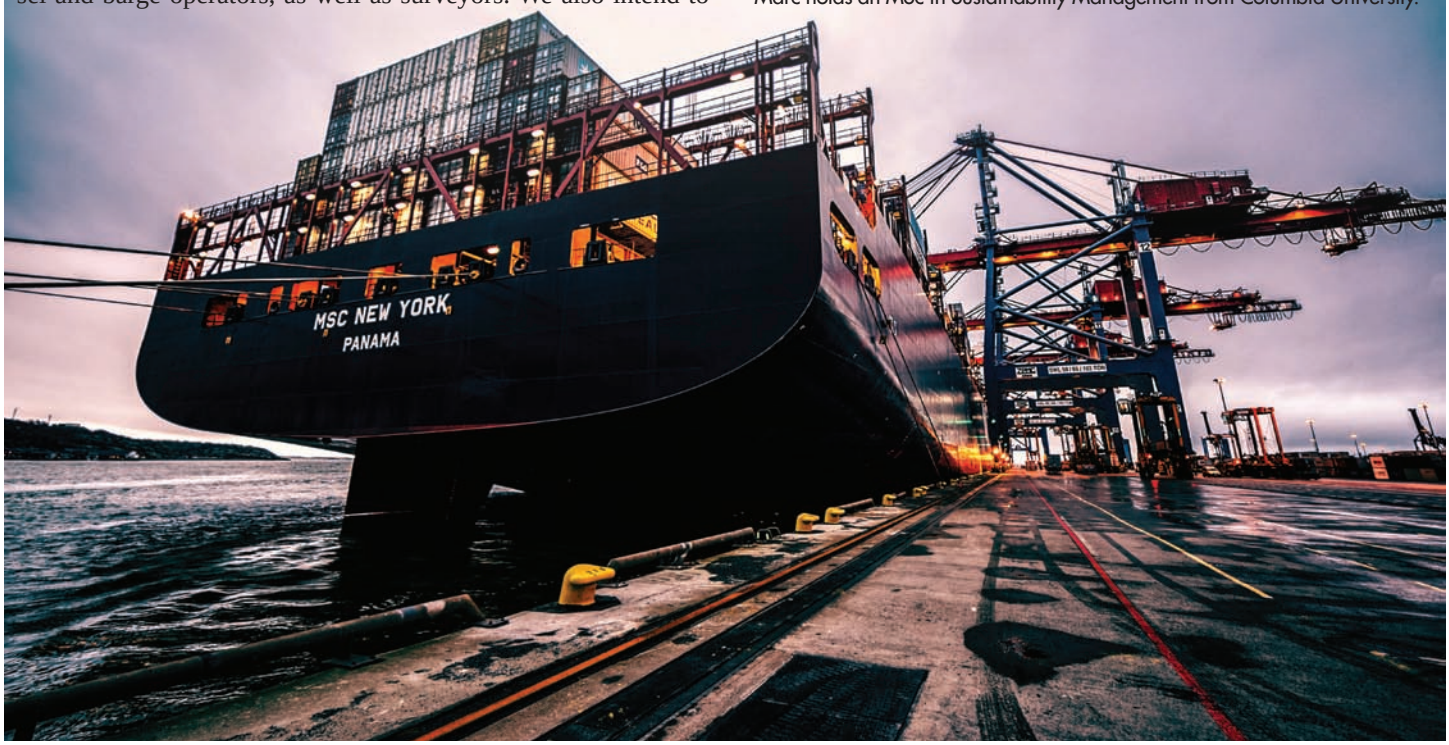
The Authors

Stuart Hall

is the Technical Sales Director at BunkerTrace. Stuart has an engineering background with extensive hands-on experience of capital plant, fluid handling and consumables in numerous industries. This involved the introduction of new technology, training, management of change and improvement in profitability with achievements in team building.

Marc Johnson

is CEO at BunkerTrace. Marc brings his extensive experience in product development, implementation, and management from previous roles in the energy and finance industries. For BunkerTrace, he leads the development and execution of long-term strategies, which includes overseeing the technical tracks of integrating our solutions, business models, and scaling processes. Marc holds an MSc in Sustainability Management from Columbia University.



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Teleoperation:

As the pressures mount to improve efficiencies, safety and a port's environmental footprint, the means to make all of that happen are already within reach. And, contrary to what organized labor might think, it's not about reducing headcounts.

By Amit Rosenweig

Port operations and logistics have significantly changed over the years, yet the core of this line of work remains dangerous, polluting, and repetitive. Autonomous technologies and teleoperation have the ability to change the nature of industrial drudgery, increasing productivity and efficiency, while reducing its harmful nature to both employees and to the environment.

WHAT IS TELEOPERATION?

Teleoperation, also known as remote operation, is the technical term for the operation of a machine, system, robot or vehicle from a distance. The distance involved could vary from millions of kilometers (as in space applications), to centimeters (as in microsurgery or in micro-applications). Teleoperation most commonly consists of technology in which a remote robot is controlled by a human operator. Teleoperation makes headlines today for its applications in the robodelivery and autonomous passenger vehicle markets, but this technology is also an effective and impactful tool for port and intermodal operations due to the added efficiency and safety that it lends to operators.

Technology is revolutionizing ports. In the not-so distant future, ports will likely rely on teleoperation to streamline operations and make machine operation more efficient, safer and a lot smoother. With this in mind, ports currently face three "D's" that we should focus on – "dull, dirty and dangerous" – as we talk our way through the benefits that teleoperation has to offer.

HOW TELEOPERATION INNOVATES PORTS

Teleoperation in ports can be used in two main scenarios. In the first, it allows one operator to directly control one vehicle continuously throughout the completion of a task. The vehicle does not have to be an autonomous vehicle, although it will require integration to a teleoperation kit. In this scenario, the vehicle can be used to conduct hazardous activities, like operating a tractor in the belly of a coal ship or conduct non-routine operations that are not relevant for autonomous operations, like short distance transport by terminal tractors.

In the second scenario, teleoperation can support autonomous vehicles such as terminal tractors, forklifts and trucks that will

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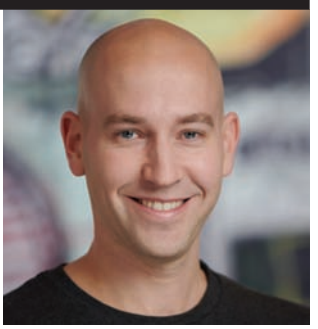
– Amit Rosenweig



mostly operate autonomously. Teleoperation will allow these vehicles to navigate edge cases that require human intervention for situations such as abnormal stops, lost self-positioning, incomplete jobs or changes to the operational environment. In this scenario, one operator can support several vehicles as they only require the human operator's attention for a few moments at a time. Once the vehicles receive that help, they continue autonomously.

Although autonomous vehicle technology is advancing toward providing a complete solution to all logistics and port operation scenarios, for the foreseeable future, it's easier and safer to have a human help operate these vehicles remotely using teleoperation technology.

The advantages of teleoperation go beyond economic efficiencies and safety as they can also contribute to reductions in emissions. Teleoperated vehicles require less energy and operate less hours – they don't need to run the air conditioning/heating, and they do not need to transport a driver back and forth around the port, as their operators control the vehicles from the comfort of their office.

TELEOPERATION AS A NEW CAREER PATH

Teleoperation also provides port workers with new employment opportunities, and the potential to extend their skill set and advance their career. New technologies like teleoperation require additional training and certification. Training to operate teleoperated vehicles will open completely new positions for port employees.

Teleoperation will also improve the wellbeing and work conditions of operators who are currently exposed to potentially dangerous situations. With teleoperation, their job will be conducted in the safety and comfort of an office, away from the elements.

Some logistics employees are paid based on the efficiency of their work. Teleoperation provides these employees a new platform to improve their own efficiency and increase both their pay and company revenues. Recently, workers at the port of Los Angeles supported the use of autonomous operations onsite due to the efficiency gains and higher earning power it offered them.

TELEOPERATION DECREASES COSTS AND POLLUTION

The globalization of trade makes the shipment of goods via maritime transport a fundamental sector of the world economy. Currently, over 80 percent of all world trade is carried by sea. Overall, 25 percent of world energy consumption is employed for transport. About 75 percent of this energy is employed for road transport, 12 percent for shipping and 12 percent for air transport.

Clearly the intermodal industry is under pressure to reduce energy consumption and emissions. As the majority of trucks, terminal tractors, and forklifts used today are diesel powered, any operational improvement can lead to substantial reduction in energy consumption and emissions. Teleoperation can do just that. For example, by using a teleoperated terminal tractors can help reduce dwell time for trucks waiting to pick up or unload their cargo at port entrances. Once dwell time is reduced, drivers will no longer need to wait in their cabins and run their engines for heating or air conditioning.

The industry is also facing a shortage of skilled operators and an increase in labor costs. Once again; teleoperation provides a solution – relying upon fewer workers to remotely oversee and support the operation of a fleet of autonomous vehicles. Even when used in a direct mode of operation with one operator directly controlling one vehicle, that operator can be reassigned immediately to operate another vehicle at the other end of the port – at the click of a button. This provides operational efficiencies and substantial cost reductions. Moreover, while these vehicles are not operating, their engines can be remotely shut down, reducing energy consumption.

THE CHANCES OF INJURY/DEATH IS MINIMIZED WITH TELEOPERATION

Teleoperation can help remove humans from dangerous situations in port operations. Between 2011 and 2016, port workers were subject to fatal injuries at a rate five times higher than the overall U.S. workforce. The risk of injury or death is minimized with the use of teleoperation as fewer people are working in the danger zone.

BOTTOM LINE – A FATTER, CLEANER AND SAFER ONE

While teleoperation is a newer innovation within shipping, logistics and related industries, it is becoming increasingly clear that it has the ability to make a significant impact at ports worldwide. Expect more port workers to soon encounter first-hand the safer, cleaner and more efficient outcomes of integrating teleoperation into their daily routines.

Operational Efficiency

By Cassandra Higham

With only a few months to go until the implementation of the IMO's global 0.5% sulphur cap, a level of nervousness remains for shipowners and operators. Selecting an appropriate route to achieve compliance and understanding the risks associated should not overshadow the broader operational implications that compliance can bring.

The need for ongoing, operational efficiency can understandably get lost in the discussion. Recognizing the benefits of increased efficacy and the opportunities that it brings is key. Simply put, without consideration of the planning and procurement process, owners and operators are left with the risk of carrying the burden of inefficiencies which can lead to companies struggling to financially survive within a competitive marketplace.

Increased efficiency offers the opportunity to ensure operational excellence – from basics like hull cleaning to ensuring your lubricant selection is matched to your fuel. Making the right procurement choice is sometimes costly but when mismanaged, the impact on a vessel and overall operational costs could be unfavorable and catastrophic for the engine itself.

Due to the constant change that we are seeing in the shipping industry, it is imperative that operational excellence is not overlooked and is continually reviewed despite the many distractions 2020 has created. With this in mind, strong and ongoing relationships with customers and partners – including engine manufacturers and fuel suppliers – are critical in ensuring efficiencies are continuously assessed to match commercial objectives.

For example, with shipping segments broadening, such as LNG transportation, the marine fuel supply network is expanding to meet the demands for fuel and lubricants in new locations, making it crucial for any shipowner or operator to have a supplier with

ALL IMAGES: Castrol

a wide and deep network. With coverage across more than 820 ports in 82 countries worldwide for example, Castrol provides the assurance that the procurement process will be seamless and available globally. The SmartGains approach ensures the smallest efficiencies are delivered across our customers' supply chains. Simple interventions, from reducing waste oil to proper cleaning of the engine, can create immediate value and peace of mind.

Ensuring operational efficiencies is a quick win for owners and operators – especially during this period of constant change and future uncertainties. This is something that can be planned for; there is no reason for a vessel not to have the right products for every application onboard, from hydraulic systems to gearboxes and many others.

In short, while the build-up to 2020 has been tumultuous, the potential turbulence and risk, particularly from an operational perspective in a post-2020 world, is significant – and is overlooked at a company's peril. And it is this point – beyond compliance – where shipowners and operators need to begin to shift their focus in order to avoid unexpected costs later on.

The 2020 global sulphur cap will bring real sustainable benefits to the shipping industry and society. However, it is critical ship owners and operators are ready and prepared for every eventuality. The industry must fully understand the operational implications of compliance – which, if done properly, will allow it to meet effectively the challenges of the post-2020 world.

The Author **Cassandra Higham**
is the Head of Marketing of Global Marine and Energy at Castrol.

Container Volume Data

By John D. McCown

The monthly volume data on container movements includes a wealth of information at both the macro and micro level. When aggregated, it has historically provided a timely and useful pulse of overall economic activity. Warren Buffet has said that if he was stuck on a desert island and allowed only one number to see how the economy was doing, it would be monthly railcar loadings. Monthly container activity is a similar benchmark, albeit with more of an international focus. Subsets of regional or even individual port data, particularly when reviewed over time, can point to geographical differences in economic activity.

At the most micro level, container volume data telegraphs the later detailed census trade data where shipment trends by commodity codes give a precise pulse on individual products by state. The monthly container volume data comes out as early as five days after month-end and is available from all the largest U.S. ports by mid-month. That works out to three weeks earlier than the detailed census data released five weeks after each month-end.

The China Effect

Recently the monthly container volume data in the U.S. has been affected by the China trade situation. My focus is on inbound loaded container volume as that is the headhaul direction for all large U.S. ports. It is twice the outbound volume and typically involves higher value loads. In addition to the inbound lane being more relevant, it is more connected with China. Some 65% of U.S. inbound loaded containers originate in the Far East and two-thirds of those come from China. That translates into approximately 43% of the inbound containers into the U.S. originating in China.

Seven of the ten largest container ports in the world are now in China. There are nine container ports in China that are larger than Los Angeles, our largest port. Just the average volume at those nine China ports is more than twice Los Angeles's total container volume. The two-way trade between Asia and North America is 15.8% of container volume worldwide and 24.6% of loaded container-miles. This large lane is dominated by moves

CREDIT: Port of Los Angeles

Tells a Story

between China and the U.S.

In November, total inbound containers declined 7.9% from the year earlier month. This follows a similar 8.0% decline in October. Both of these sharp declines are a direct result of the China tariffs. The table below recaps the inbound TEU volume at the Top 10 U.S. ports for November 2019 and the related percent change. The table also shows the change for the three months ending November and the twelve months ending November periods to demonstrate the downward trend across most periods.

The last two months are the first with a pronounced volume downturn since the China tariffs began over a year ago. Front-loading to get goods in before expected tariff rate hikes has mitigated the impact in previous periods. The changes in expected and actual tariffs have whipsawed supply chains and this has been seen in a sine wave pattern at many ports. Going forward, absent any further changes, there will be less noise in the data and we will continue to see the clear impact of the China tariffs. Any continuation of declines in the 8% range in this key metric will quickly weigh on economic growth.

The volume data shows West Coast ports performing worse than other U.S. ports. While some of this is due to a slightly higher concentration of trade with China, there are macro factors at work that overlay this and that will continue to reduce the share of inbound containers that arrive via the West Coast. Those macro factors include population dispersion and the expansion of the Panama Canal.

PORT NAME	NOV TEU's	PCT Change	3 M/E % Change	12 M/E % Change
Los Angeles	371,350	-12.2	-11.8	0.5%
Long Beach	293,287	-8.3	-5.4	-6.4%
New York (*)	278,284	-7.8	-1.3	3.9%
Savannah	173,863	2.8	1.5	8.3%
Norfolk	103,410	-7.8	-1.9	4.0%
Houston	101,494	0.2	1.7	6.0%
Seattle/Tacoma (*)	94,978	-18.5	-16.4	-2.0%
Charleston	82,705	-1.7	4.2	7.2%
Oakland	77,350	-7.2	-3.0	2.5%
Total TOP 10	1,576,721	-7.9	-5.2	1.3%
Subtotal EC/GC	739,756	-3.8	0.2	5.5%
Subtotal WC	836,965	-11.2	-9.5	-2.2%

(*)NY estimated for November using change from closest port; Seattle and Tacoma don't report separately but each are in the Top 10; smaller ports representing less than 10% are mostly on East Coast and would bring coastal split to approximately 50%/50%

In the latest month, 53.1% of inbound containers at the Top 10 U.S. ports came via the West Coast. Only 24.3% of the population in the continental United States lives in a state on or closer to the West Coast. Some 75.7% live in states closer to the East Coast (56.1%) or the Gulf Coast (19.6%).

Inbound containers go where the people are and lots of West Coast cargo moves overland to destinations closer to the East or Gulf Coasts. As container ships got geometrically bigger, the much lower cost of longer water routes became more attractive even with longer transit time. A constraint was the Panama Canal that limited the size of ships taking the typical all-water route to the East Coast. With its expansion in mid-2016, that constraint has been lifted and the ships in the Far East to East Coast lane are 58% larger than in 2015 and similar in size to ships going to West Coast.

Since 2015, the West Coast share of inbound containers has gone from 56.7% to 53.1%. My analysis shows that 50-75 basis points per year can be credited to transition away from the West Coast due to more economical longer water routes. The expanded Panama Canal energized a transition that has been underway for some time. In 1995, 62.7% of inbound containers went to the West Coast, resulting in an average shift of 25 basis points per year through 2015. My anticipation is that this coastal transition driven by overall cost economics and population dispersion will continue for years. While it won't synch with population, I can envision a 45%/55% split between West Coast and other U.S. ports. The migration of manufacturing capacity to Southeast Asia that is closer to the U.S. East Coast (via the Suez Canal) will also assist in this transition.

Bottom line?: Container volume data can provide timely and tangible information that may be useful to you.

The Author **John D. McCown**

is the co-founder and former Chairman & CEO of U.S. flag container carrier Trailer Bridge, Inc. Mr. McCown has been in and around container shipping since getting his MBA from Harvard more than three decades ago. His mentor was Malcom McLean, the transportation pioneer who invented container shipping. More recently, Mr. McCown's focus on the industry has been from an investment perspective, including several years as the transport sector head at a $20 billion hedge fund. He has written a book on the development of the modern cargo shipping industry that will be published soon.

SLIPS, TRIPS AND FALLS

In 2018, the American Club, in partnership with American Bureau of Shipping (ABS) and Lamar University (Lamar), launched a new project aimed at reducing accidents caused by unsafe conditions aboard vessels. The initiative's long-term objective is to develop recommendations aimed at improving the day-to-day safety of maritime personnel, both afloat and ashore, through sharing the results of data analyses derived from this initiative.

All of that is important not just because the American Club has incurred over 8,400 claims from 2013 to 2018. Significantly, of these claims, 4,241 – or more than 50% – were the result of injuries. Even one injury is too many, but the staggering total costs of injury-related claims during this time period is US$246.2 million. Beyond this, says the study, between 2013 and 2018, 46% of injuries were the result of slips, trips, falls and lifting incidents.

Well beyond the human cost, falls on average US$182,000, slips cost US$137,000 and lifting incidents cost US$112,000. The urgency to address these types of claims is obvious. This project analyzed the American Club injury records, generating unprecedented insight into the nature and cost of maritime-related accidents. These records were compared to the data from the ABS/Lamar Mariner Safety Research Initiative (MSRI) data set with more than 8,000 injury and 100,000 near miss records from over 31 data sources that were collected with support from other maritime organizations. These data sets were also compared with the data summaries from the European Maritime Safety Agency (EMSA).

TYPES OF INJURIES

Table I compares the type of injury event in the ABS/Lamar and American Club data sets. Slips, trips and falls were the most common event type in the American Club database and the second most common event type in the ABS/Lamar data set. Being struck by an object was the most common event in the ABS/Lamar data set and the second most common in the American Club data set. Lifting events were the second most common event in the American Club data set and third most common in the ABS/Lamar data set. However, the cost per event shows that burns are the most expensive event and lifting events and slips are the least expensive.

The data sets are surprisingly similar given that each data set has a wide variety of vessel types. For example, The American Club data includes a significant number of fishing vessels injuries that are not represented in the ABS/Lamar data set. The data sets identify key areas of maritime injuries. Even with the differences noted, the similarity of the incidents is striking given the different incident record keeping definitions, taxonomies and motivations between the data sets.

In comparison with the European Maritime Safety Agency's (EMSA's) Annual Overview of Marine Casualties and Incidents 2018, they report that slips and falls account for 40% of injury incidents. Loss of control of machines and material handling equipment and body movement were the next two more common injury categories for cargo vessels in their report. The EMSA taxonomy is very different than the ABS/Lamar and American Club databases, so a direct comparison beyond slip, trip and fall percentage was not performed. This is another example where consensus terminology and standardized reporting requirements could yield valuable information to help reduce or eliminate injuries to seafarers.

FOCUS ON SLIPS, TRIPS AND FALLS

Falls represented 22% of the incidents in the American Club data set. Slips accounted for 12% of the American Club injury claims. Fall events were more expensive than slip events in the American Club data set. Falls were also common in the ABS/Lamar data set accounting for 23% injuries. Slips and trips were also common in injury in the ABS/Lamar data set (6% of records).

Falls were more common than slips and trips in both data sets. This could be due to slip events not resulting in reportable injuries. This is commonly called a near miss or close call. Based on the ABS/Lamar data set, common locations for falls that caused injury are deck (43%), engine room (13%), and stairs (7%). Common locations for slips that caused injury were deck (44%), stairs and ladders (13%) and engine room (11%).

From the ABS/Lamar MSRI data set, injuries involving slips, trips, and falls accounted for 11% of the records, while near misses accounted for over 24% of records. Contributing factors for the injury records included situational awareness, spills, poor housekeeping2, and inappropriate lighting. Key contributing factors related to the near misses include situational awareness, housekeeping, asset design, seafarer fatigue, lack of following procedures, and lack of anti-skid material on decks.

LIFTING

Lifting injuries are clearly a key concern as highlighted in Table I. Of the records that could be classified in the American Club data set, 28% of the injury incidents were lifting related. In contrast, the ABS/Lamar data set found that 13% of injuries were lifting related. From the ABS/Lamar data set, lifting injuries mostly occurred on the deck (45%), in the engine room (25%), cargo areas (5%), and galley (5%). Back injuries (46%), arm and hand (30%) and leg and foot (13%) were the most common body locations for lifting-related injuries. At the time of the lifting injury, a wide range of activities in the ABS/Lamar data set were being performed including material handling (34%), maintenance (18%), deck activities (16%), and housekeeping (5%).

Lifting injury related lessons learned from industry participants on the ABS/Lamar MSRI initiative include:

- ***Education on the proper lifting techniques;***

The American Club, ABS & Lamar University are collaborating to standardize reporting, provide recommendations and ultimately improve day-to-day maritime safety.

- ***Proper exercise to strengthen back muscles;***
- ***Nutrition and weight control; and***
- ***Removing or properly marking the slippery surfaces to avoid slips, trips and falls that can lead to back injuries.***

NEAR MISSES

Many safety researchers and safety professionals view a pyramid or iceberg model relationship between near misses and incidents based on Heinrich Accident Triangle, increasing from unsafe acts and hazardous conditions, to near misses, to first aid cases, to lost work time, to major injuries, and finally to fatalities. The ratio between reported near misses and unreported near misses is arguably on the order of 5 to 1 or 10 to 1. A similar ratio may be maintained at each level as one goes from near misses to fatalities.

While the exact ratio may vary widely, safety researches would anticipate some similar pattern of many near misses and hazardous conditions and few major events. Near misses may represent a warning signal that an incident might occur. Table 2 displays the near miss by event types in the ABS/Lamar data set.

Some near miss categories such as spills, housekeeping, conditions of equipment, line handling activities, and personal protective equipment (PPE) do not match a specific corresponding injury category, but they can potentially cause several different types of injuries.

The near miss pattern suggests that perceived risk drives near miss reporting. When the percentage of near miss in an area significantly diverges from the percentage of injuries in an area, a potential opportunity exists for educational interventions being useful to reduce injuries. In the study, lifting was the area of greatest divergence between the number of near misses and actual injury events. Almost as many near misses in the ABS/Lamar data set were reported for smoking (0.5%) as all lifting-related near miss events (0.7%).

ABS/LAMAR MARINER SAFETY RESEARCH INITIATIVE (MSRI)

The ABS/Lamar MSRI is a collaborative effort to create a large international database and online repository of maritime injury and close call (near miss) reports. The information is analyzed to identify and share trends, corrective actions, lessons learned and to develop benchmarking statistics. More information can be found by clicking: **https://maritime.lamar.edu/**

ABS and Lamar's efforts support an understanding of the human element in all aspects of the maritime industry. Industry and university involvement with the MSRI allows us to target specific needs that could be addressed to achieve a better understanding of human factors, ergonomics, the contribution of human decisions and behaviors to accidents and incidents, and different means to improve safety. Stakeholdres have used the MSRI analyses to:

- ***Help direct safety auditing efforts or vessel design change efforts;***
- ***Identify additional shipboard hazards (space specific);***
- ***Assist safety interventions and resource allocation;***
- ***Input to safety (metrics) – benchmarking;***
- ***Augment existing Toolbox Talks and other safety related education for crew; and***
- ***Support continual improvement of shipboard safety and related safety***
- ***management systems.***

RESOURCES

This joint initiative has spurred a number of further considerations for the American Club, and the ABS/Lamar MSRI, particularly related to addressing the most critical injury factors related to slips, trips, falls, lifting incidents and near miss and hazardous situation reporting. The American Club is considering a mobile application type of hazardous situation, near miss reporting system for Members in 2020. The product will also be accompanied by a user training program to assist in building a consistent reporting system. Currently, the ABS/Lamar MSRI has an existing public portal (**http://maritime.lamar.edu**) which has some guidance on near miss reporting.

Recently, Lamar and ABS supported the US Department of Transportation's Maritime Administration in the development of two ASTM Guides to support more consistent injury and near miss reporting and recording. These can be used a building blocks for a more comprehensive and consistent international reporting effort.

ASTM F3256-17 (Standard Guide for Near Miss Reporting and Recording) can be found by clicking: www.astm.org/Standards/F3256.htm

ASTM F3284-18 (Standard Guide for Injury Reporting and Recording) can be found by clicking: www.astm.org/Standards/F3284.htm

The American Club's loss prevention products and services can be found by clicking: www.american-club.com/page/loss-prevention

The Full Report can be found by clicking: https://absinfo.eagle.org/

Table I: Injury Event Type in the ABS/Lamar and American Club Data Sets

Event Type	ABS/Lamar Injury Events	American Club (2013-2017) Events	American Club (2013-2017) Cost	American Club Cost Per Event	American Club Cost Per Event Excluding Zero Cost Events
Slips & Falls	29%	34%	32%	US$ 88,000 (fall) US$ 56,000 (slip)	$182,000 (fall) $137,000 (slip)
Burns and Explosions	5%	3%	8%	$145,000	$275,000
Other	13%	6%	11%	$106,000	$197,000
Caught in Equipment	3%	8%	9%	$91,000	$178,000
Struck by and Falling Objects	37%	19%	23%	$98,000	$221,000
Suffocation Asphyxiation	0.3%	2%	3%	$108,000	$219,000
Lifting Events	13%	28%	14%	$48,000	$112,000

Table 2: Percentage of near miss events based on more than 100,000 near misses in the ABS/Lamar data set grouped by type of near miss with totals for the groupings in bold.

Door Open/Closed	2.6%
Enclosed Spaces	1.8%
Railing	0.2%
Unauthorized People	1.7%
Access Total	6.3%

Electrical	1.8%
Power Failure	0.2%
Lighting	0.8%
Near Power Failure	0.1%
Electrical Total	2.9%

Equipment Condition	8.8%
Equipment Failure	4.3%
Improper Use of Tools	0.8%
Incorrect Use	0.1%
Equipment Total	13.9%

Fire Protection Systems	2.3%
Near Fire	5.2%
Smoking	0.5%
Fire & Fire Hazard Total	8.0%

Housekeeping	5.9%
Stowing Objects	2.8%
Housekeeping Total	8.6%

Cell Phone	4.0%
Communication	1.6%
Illness & Medicine	0.7%
Inadequate Planning	0.6%
Hazard Awareness	0.1%
Labeling	0.8%
Lack of Training	0.2%
Weather	0.2%
Other	3.3%
Personal Violence	0.0%
Other Total	13.9%

Bunkering & Oil Transfer	0.2%
Line Handling	3.7%
Vessel Movement	1.7%
Near Collision	0.6%
Near Steering/Propulsion	0.5%
Navigation, Mooring & Line Total	6.8%

PPE Condition	0.7%
PPE Incorrectly Used	1.1%
PPE Missing	0.7%
PPE Not Used	11.4%
PPE Other	0.1%
Electrical Total	14.0%

Lifeboat Issue	1.4%
Safety Device Missing	0.6%
Safety Device Not Working	0.1%
Safety Equipment Total	2.1%

Fall or Near Fall	5.2%
Gangway	0.4%
Near Slip/Trip	3.5%
Slip/Trip	1.5%
Unsafe Movement	0.0%
Slip/Trip/Fall Total	10.7%

Chemical	0.7%
Oil/Fuel	2.3%
Unspecified/Other	2.6%
Water	1.4%
Spill/Leak/Release Total	7.1%

Cut	1.5%
Falling/Flying Object	3.6%
Sprain/Strain/Over Exertion	0.7%
Struck By	5.7%
Struck By/Cut/Strain/ Sprain Total	11.5%

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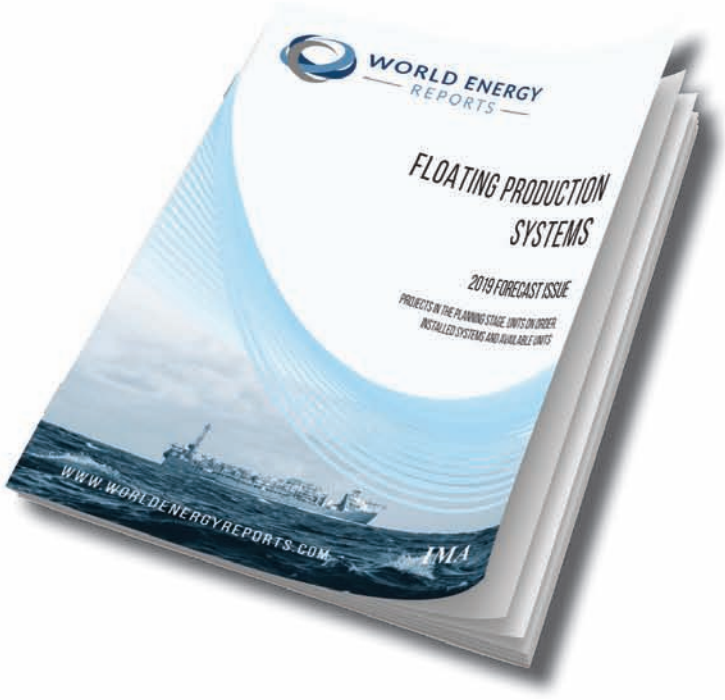

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