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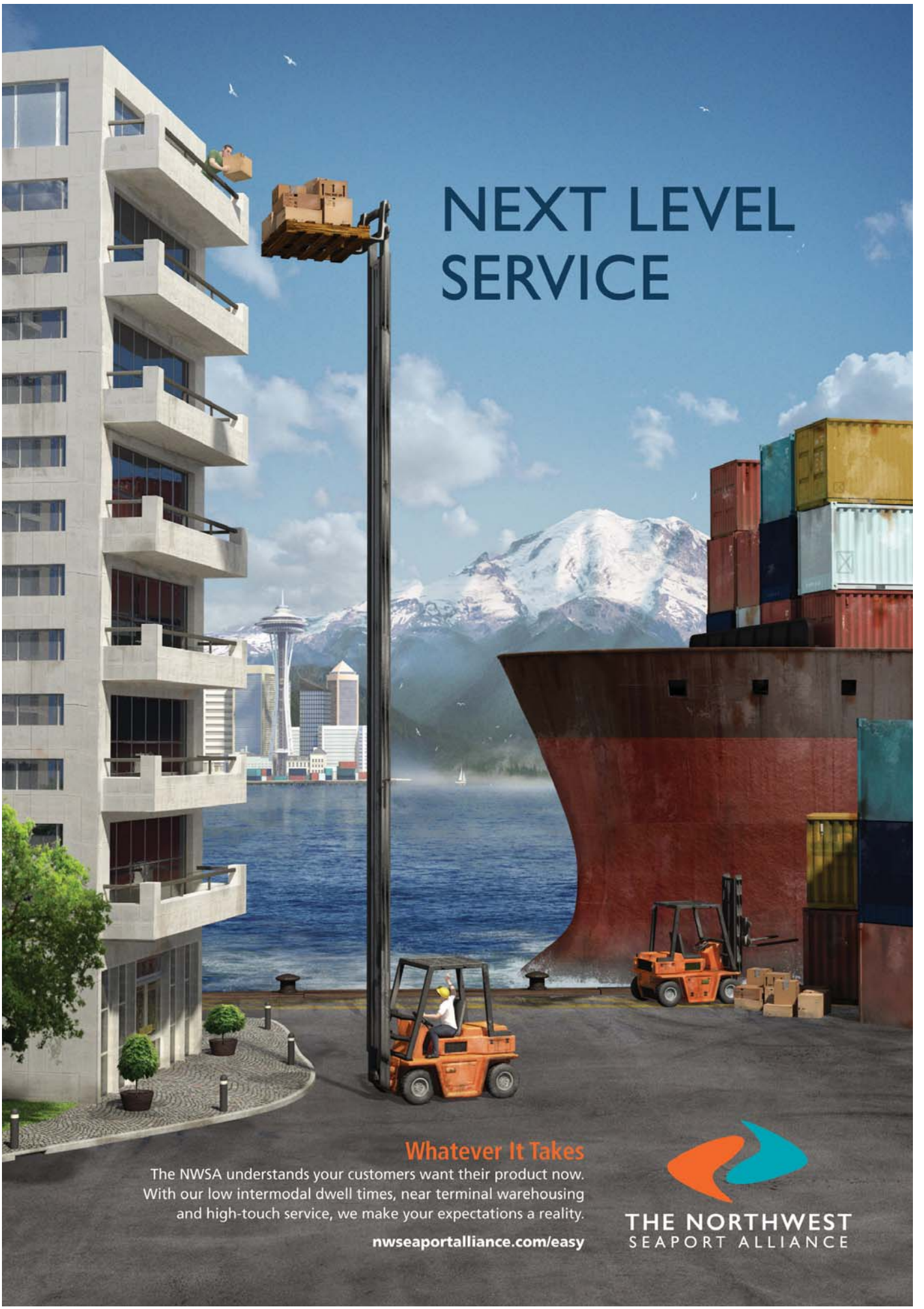
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– Thomas Rucker,
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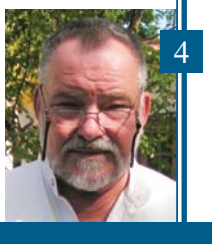
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3 After graduating with a degree in Business Informatics, **Alexander Buchmann** worked for software company Trigonon at the Hansa Treuhand, where he first gained an insight into the internal processes of shipping companies. He founded Hanseaticsoft in 2009 and developed Cloud Fleet Manager. Today Hanseaticsoft has more than 30 employees and develops software solutions for shipping companies. Since March 2017, Lloyd's Register has held a share in the software company.

4 **Rick Eyerdam** is an award winning journalist and editor. Formerly, he was Editor of Florida Shipper Magazine. Additionally, he was Executive Director of the Miami River Marine Group and Captain of the Port of the Miami River. He is a graduate of Florida State University with majors in English and Government. His articles have appeared in myriad shipping magazines and newspapers since 1970.

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ON THE COVER

The nation's container ports collectively recorded a banner year in 2018, with many setting all-time records for cargo volume and TEU's. Starting on page 26, Rick Eyerdam's in-depth look at the sector provides a unique window into what will come next, and why.

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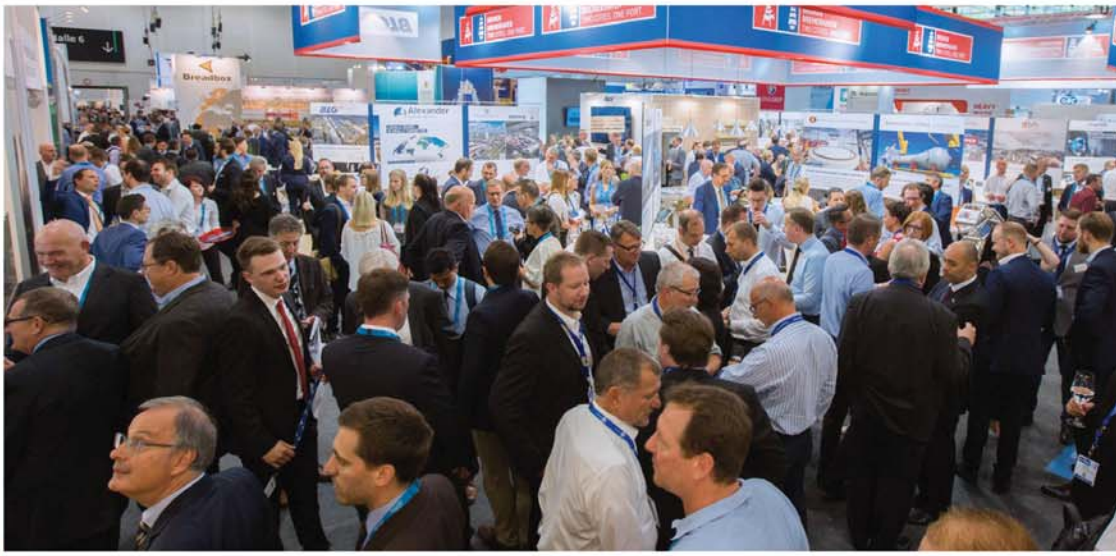

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Editor's Note

Take me out to the ballgame

If 2018 was a banner year for most of North American container ports, and the numbers indicate that it was, then it is also true that the reasons for that success were many; some more clear cut than others. In no particular order of importance, box traffic soared in North America because of an undeniably robust economy, the (arguable) rush to import aggressively ahead of the threat of tariffs stemming from the U.S.-China discord, the advent (and maturation) of the Panama Canal expansion and, finally, improved port infrastructure and authorized channel depths, especially here in the United States. All that said; yesterday's home runs don't win today's ballgames.

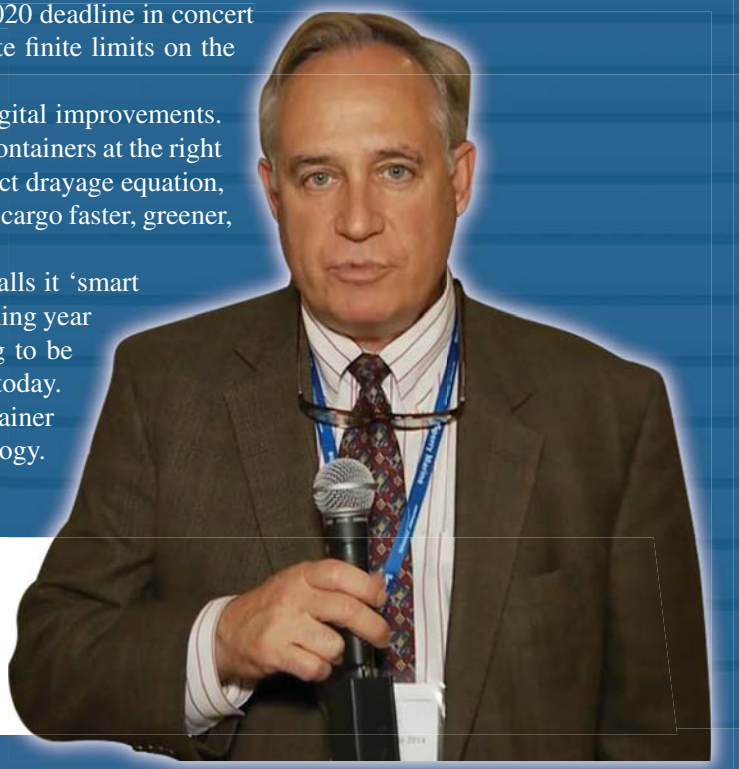
Well into the New Year, the early returns for those same ports are mixed. The trade spat between the United States and China lingers on like a bad staph infection, and some prognosticators say that the economy is showing signs of slowing. Nevertheless, with rare exception, North American boxports continue to build, dredge and prepare for that massive explosion of freight growth that Marad says is sure to come. In this edition, starting on page 26, Rick Eyerdam's very fine assessment of America's boxports captures the essence of what's transpired, as well as what's likely to happen next.

Also becoming more apparent to all stakeholders is the fact that bigger, deeper and wider won't mean much in the years to come, unless all those infrastructure improvements can interface with an increasingly digitized global supply chain. That means making sure you have the right terminal operating system (TOS) in place; one that is capable of navigating and controlling the futuristic, autonomous box handling yard that's not just coming: It's already here. That story begins on page 16.

A quick glance through the balance of this folio only reinforces the notion that technology will be the real driver for future growth. That's because infrastructure can only accomplish so much in the way of improved efficiencies, the boxships can't get much bigger – there, I said it right out loud – and the arrival of the so-called IMO 2020 deadline in concert with the perfect storm of the ballast water regulations all create finite limits on the entire supply chain. Or, do they?

To my mind, we've only scratched the surface in terms of digital improvements. Emerging startups tout software to match shippers with empty containers at the right time and place, software to help alleviate the pain of an imperfect drayage equation, and a dozen other 'port optimization' tools all designed to move cargo faster, greener, and more economically.

Hanseaticsoft's Alexander Buchmann (starting on page 20) calls it 'smart shipping.' Regardless of what the economy looks like in the coming year – or ten – most stakeholders agree on one thing: there's going to be a lot more cargo. We need to get ready for that eventuality, today. I don't know much, but I am quite sure that, for today's container ports, tomorrow's game won't be won using yesterday's technology. You can take that straight to the bank.



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

Fifty Shades of Preparedness for IMO 2020

When January 1, 2020, arrives and the global 0.5% sulfur cap comes into force, it will trigger the biggest and most sudden change the shipping industry has ever seen. Overnight, about 90% of global demand for bunker fuel must switch from HFO to low-sulfur alternatives and no one knows quite what will happen. The closest event in terms of seismic change was when the sulfur emission control areas (SECAs) came into effect in January 2015, but that only affected about 6 to 7% of total fuel consumption.

It is impossible to be fully ready for something that has never happened before and every shipowner and operator must assess their own risks and make their own preparations. Each will be unique with its own nuances; there will be at least '50 shades of preparedness,' so to speak.

What Can you Expect?

Some owners and operators have installed scrubbers and plan to continue using heavy fuel, but they need to consider where they will find HFO in the future. Ask yourself: "If I were a fuel supplier, would I really stock a fuel whose price is expected to crash as its demand slumps?"

The majority of ship owners plan to use low-sulfur fuels, but there is currently no agreed specification for these new fuels – apart from the maximum sulfur content. And anyone hoping to conduct early trials to assess the suitability of a particular new fuel will have been sorely disappointed: none is as yet readily available. As this is a new product, each refinery will produce a product which has its own unique composition that will need to be tested. The onus is on shipowners. Some of the oil majors say they are ready to begin supplies, but they will only do so on a contract basis; they are not offering it on the spot market.

While low-sulfur fuel will start to become available later this year, there are about 350 locations worldwide where bunkers are supplied and the logistics needed to transport the new products to each of them by January 1 simply does not exist. This means that, with the exception of about 10 to 15 major ports, there will inevitably be shortages in the first half of 2020 – certainly in small and remote places. That means bunkering will not be cheap; where supplies are limited, they will go to the highest bidder.

Any owner or operator that has not yet started planning their low-sulfur fuel procurement strategy should begin now. It is essential to have a robust plan in place by the end of the second quarter of this year, as low-sulphur bunkering will commence around September 1, giving four months to bring the strategy into effect. A key component involves assessing whether any modifications are needed to their ships, but the biggest impact for most companies will be on how they buy their bunkers and interact with suppliers.

Until now, the marine bunkers market has been a niche sector – little more than a sulfur sink for oil refineries. HFO has effectively become a commodity and although bunker buyers might be spending huge sums of money each year, they are working with an established supply chain that is geared to deliver an established product.

With the arrival of low-sulfur fuel, all of that will change dramatically. The process of buying and trading bunkers will resemble the global oil markets and will attract new entrants with a more sophisticated approach to business. In many cases, today's bunker managers will struggle to compete unless there is a recognition that the bunker buying is evolving into energy management.

In oil market trading, for example, if the quality of oil delivered is better than that contracted, a premium would be paid. Or if the delivered product is worse, a discount would be expected. That is light years away from how bunkers are bought and sold. We not expect bunker trades to ever match that particular level of comparability, but shipping companies need to use some of the time over the next few months to prepare their bunker buying strategies to be able to compete in this new environment. This requires a complete behavioral change; it will not be possible to continue current practices and expect the same results.

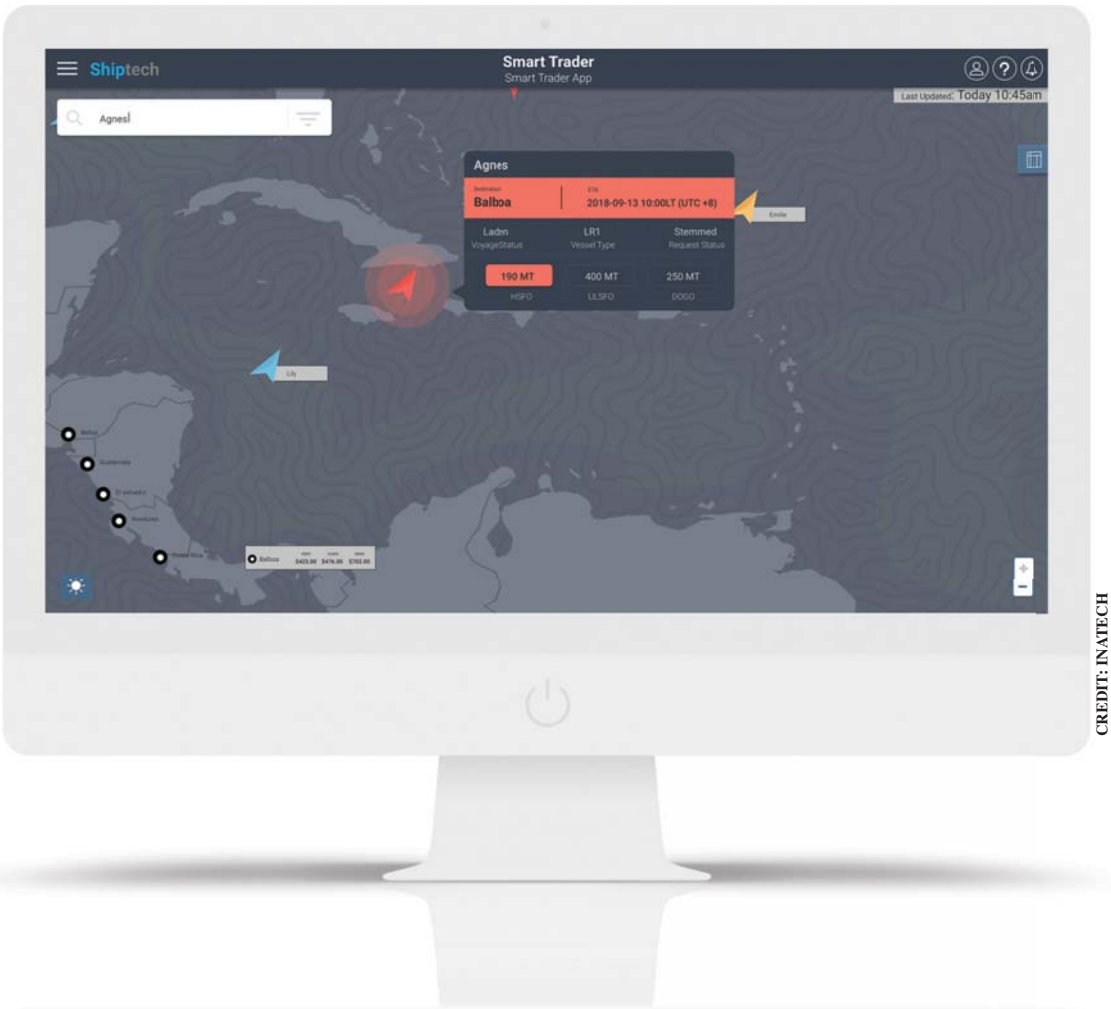
The Way Forward

Inatech provides system solutions to both the marine bunkering and oil trading sectors. As bunker management becomes more like oil trading, new risks will need to be managed, such as price volatility, product availability and complex supply chains. Last minute bunkering will lead to increased working capital being required and this will impact the bottom line. Additional market data will be required and systems and resources must be put in place to analyze this data and to manage new workflows.

One practical change is to move away from buying on spot. That makes bunker managers simply price-takers, with no influence over the price that the supplier gives. Instead, they should establish contracts with suppliers.

For ships on regular liner services, this is straightforward, but tramp ships can also benefit since these vessels buy roughly 70%

Get ready for unprecedented disruption as 2020 nears, says Alok Sharma, Senior Vice President at Inatech.



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of their fuel from about 10 ports of origin. On that basis, they should set up contracts with suppliers in those locations. It requires a more disciplined and transparent approach to bunker buying but it is worth it: the cheapest fuel tends to be in the major ports.

Away from the office, owners need to prepare their ships in good time, especially if their bunker tanks need cleaning. There are two ways to blend the new compliant fuel: either from dirty residual fuel or from gasoil. In either case, a lot of work will be needed, since the ship has been loading what is effectively a dirty product and must now accept a much cleaner fuel.

Choosing fuel will become more complicated, because blending bunkers is like blending wine. There are many ways to do it and every supplier tries to minimize their costs by spending as little as possible on materials, feedstock and the blending process. As a result, we are entering a brave new world where we will have no idea how our fuel has been produced or to what specification it will arrive at the market with.

Defining that specification is not as simple as, for example, taking the ISO parameters for a 3.5% sulfur fuel and expecting to keep them all the same but with less sulfur content. Because the new fuels are blended, it will not just be their sulfur content that is affected in the manufacturing process. This makes compar-

"It is very unlikely that these costs could be passed on to customers. Most of the big shippers are global corporations such as IKEA, Nike, big steel and industry, which focus on how their suppliers are reducing CO2 emissions and are therefore unlikely to accept a 'green surcharge' to recognize a change from one fossil fuel to another."

ing offers difficult and it will no longer be enough simply to take the cheapest.

Instead, bunker negotiations should center on 'energy procurement' by taking account of the energy content and factors such as their calculated carbon aromaticity index (CCAI), which is a measure of ignition quality. All of this data should be available from the supplier. This approach is the only way to create a level playing field on which to compare fuels that have been blended using different techniques.

The market will take time to adjust its pricing and supply chains but it will soon settle. There is no shortage of oil so, in the long term, supply will not be an issue, but watch for availability. It will be the period from the fourth quarter of this year and into the second quarter of 2020 when we will see the most disruption, with more stability emerging from June next year. By then, it should be clear which regions will see the greatest demand for these fuels and the supply chains will be in place to avoid congestion at the busiest bunker ports.

What is certain is that these new fuels will be more expensive, but how much their price will rise and whether it will peak and fall back remains to be seen. But with new supply chains needing to be established, the premiums over crude oil are likely to remain high. Globally, the industry's total extra costs for complying with the sulfur cap will be an estimated $60 billion in 2020, according to S&P Global Platts Analytics.

It is very unlikely that these costs could be passed on to customers. Most of the big shippers are global corporations such as IKEA, Nike, big steel and industry, which focus on how their suppliers are reducing CO2 emissions and are therefore unlikely to accept a 'green surcharge' to recognize a change from one fossil fuel to another.

This makes the need to prepare even more urgent if the extra costs are to be addressed in time. With a strategy in place, there's no reason for the sea change in regulations to leave anyone drifting aimlessly at sea.

The Author **Alok Sharma**

is the Senior Vice President at Inatech, a Glencore company that provides oil trading and bunker fuel management solutions for the marine and oil industry. For Shipping, Inatech's Shiptech platform, with the Smart Trader module, is the market leading system for bunker fuel procurement, with daily usage by a combined fleet of over 2,000 vessels. For more information, go to www.shiptech.com

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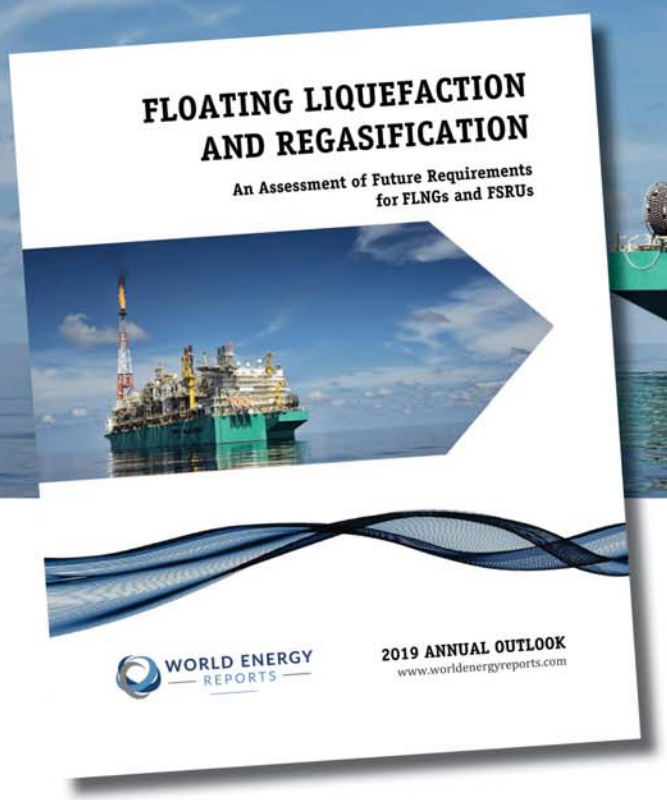

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Transportation Industry Outlook 2019:

The driver shortage will once again shape the trucking industry in the coming year. For ocean shipping, that's a real problem. Any transport mode is only as good as the one that immediately follows or precedes it in the intermodal supply chain.

For trucking, the outlook hasn't changed much in the last two years: Too much freight and not enough drivers to haul it. It's both the best and worst of times all at once. True, this means the U.S. economy is still very healthy. But, it also means that carriers struggle to recruit and retain quality drivers – and that can be frustrating. More of the same can be expected in 2019. Here are a few predictions:

The driver shortage continues at full speed: As the critical truck driver shortage persists through 2019, new consequences will surface. For one, good drivers will see salary increases of as much as 20 to 50 percent over what they were paid just five years ago. The shortage will drive significant growth for last mile carriers to the point that Amazon will begin hiring their own dedicated fleet. Driver recruiting efforts will ramp up to include a push for ex-military personnel as well as government lobbying to lower the commercial driving age to 18. Fleet carriers will put pressure on insurance companies to take a risk on these non-traditional, younger recruits.

Fatalities decrease, severe crash litigation increases: While fatalities per mile driven have decreased in the last decade, there's been an increase in the amount of severe crashes at the same time. This contradictory data can be attributed to increased speed limits and use of safety equipment in vehicles. This has led to more litigation, which has caused severe bodily injury settlements to rise from an average of $1.2M to approximately $2.8M per claim. Having taken the insurance industry somewhat by surprise, these increased costs will be passed onto the fleet operator in higher premiums and deductibles in 2019.

Long wait times and chassis condition at shipping terminals: Drivers are still frustrated by long wait times and chassis that could have problems passing a roadside inspection. This will continue to

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be compounded in 2019, and beyond, as drivers are not compensated on an activity basis and therefore, they feel some container movements are barely worthwhile. As the number of ports able to take on mega ships expands, the need for more chassis is warranted to pick up and deliver more containers. Port operators are attempting to address the congestion by increased gate hours, automated gates and appointment systems. Chassis owners can help by installing GPS to better monitor its equipment location at the ports and on the road. Other initiatives include telemetry systems for the chassis that monitors lights, brakes and tire conditions that can help drivers address possible equipment issues before a breakdown happens on the road. With ELD's closely tracking time and movements, any significant loss of time can have an impact on pay and push drivers to look for fleets with their own chassis or an improved client base.

Championing compliance reduces risk: Rising insurance and litigation costs will put increased pressure on fleet carriers to reduce crash frequency, avoid litigation and improve DOT compliance. The result? ISS scores, drivers, maintenance and ELD equipment will be a major focus for insurance carriers in 2019. Best-in-class fleet carriers that champion compliance will turn to alternatives like member-owned insurance captives and risk retention groups, which can put the brakes on premium costs.

Independent Contractor Status: The use of independent contractors as truck drivers across the US has come under increasing public scrutiny and legal threats. The California State Supreme Court ruled that any independent contractor must be able to pass an "ABC Test," that sets an incredibly high bar to avoid an employee-employer relationship. Other states and the federal government are also looking closely at employee misclassification with several claims resulting in multi-million dollar settlements. Additionally, the January, 2019, Prime vs. Oliveira decision in which the Supreme Court unanimously upheld the right of owner/operators to have employment conflicts heard in a court of law, as opposed to forcing it into arbitration, will not only increase the number of employment issues brought to the courts, but will significantly increase industry litigation costs as a result.

2019 Growth and Beyond

Eventually the current freight capacity crunch will resolve itself. Whether it will be in 2019 or beyond is the question that remains unknown. What is certain is that when supply and demand converge, the profitability of the trucking industry will slow, and there will be a real conflict between insurance underwriting and the ability of fleet operators to pay increased premiums. At that time, trucking lines that have failed to control their CSA scores and manage drivers appropriately will face significant insurance cost increases without the additional revenue from increased rates. Until then, the industry will enjoy continued growth.

The Authors **Michael Birge & Steve Bojan**

Michael Birge is president of Hub International Transportation and Steve Bojan is Vice President of Fleet Risk Services for Hub International.

The Future of TOS

Can Your Technology Compete in Today's Terminal Operating Landscape? When it comes to terminal automation, 'failing to plan means planning to fail.'

By Joseph Keefe

Automation is not a one-size-fits all solution. And, while future terminal operations will necessarily involve technology and autonomous operations, is it also critical that operations are automated in a way that will best fit a terminal's size, location and overall needs, meet customers' changing expectations, while also providing ROI to shareholders. That's a lot to ask. Nevertheless, it will be the benchmark that all terminals have to meet in order to remain competitive in the global supply chain.

Thomas Rucker is the president of Tideworks Technology, a title he has held since 2017. When it comes to modern terminal operations, Rucker has 'been there and done that.' Likewise, the name Tideworks has been a ubiquitous part of the terminal operating system (TOS) landscape since almost the very moment that the concept of introducing technology to the intermodal supply chain was born. The firm's penetration into its primary market sector is proof enough of that.

Tideworks is one of the bigger TOS providers in industry today. Rucker told ***MLPro*** in May, "When we start digging into the details of it, it's about 350 thousand to 400 thousand users on the TOS. We do have some JV partnership out there in the community systems space which exponentially raises that number. But for Tideworks proper; 100 sites, about 350 thousand to 400 thousand users globally, on every continent, other than Antarctica." Today, Tideworks boasts deep penetration into the Latin America markets, a lesser presence in Europe, a few sites in Vietnam, and of course, the United States.

TOS & Automation: Navigating the Interface

Beyond Terminal Operating Systems, the march towards terminal automation is as much driven by safety as it is for better operational efficiencies. For TOS providers, that's meant navigating the interface between the existing TOS, and the automation

Vessel Operation

that typically follows. Rucker agrees, explaining, "That's correct. There is a lot of interfacing with third party systems. Ensuring that you have a stable, solid integration platform is the measure of success. You find folks that are dealing with these monolithic style data sources; they can be challenged by integrating with all of these different third party vendors. And, many are moving towards more of these targeting cohesive data sources, and that's something we're doing as we modernize our TOS platform. But getting all the data and getting the work flow to work in a more process-driven application is important."

Rucker continues, "If you think of a conventional terminal that's not running any automation at all, a lot of these departments within the terminal run in a very 'siloed' fashion. As you start automating – whether it's even semi-automating or completely automating – it's no longer siloed. The data from one department is so dependent on the next that it has to flow very, very naturally. If those systems are not working in relative harmony, it just falls apart."

At the heart of automating today's intermodal terminal, a big part of what a Terminal Operation System does involves marrying siloed data streams. In practice, says Rucker, the complexity of that task depends on the amount of automation. Tideworks attacks the challenge by sending an experienced team of business and process analysts who first look at the scope of what the terminal is looking to accomplish. Next, the Tideworks team maps out a plan.

"We walk through that part with them to ensure that we're all on the same page because the moment you start writing code, you really need to have that up front piece working well," explains Rucker, adding for emphasis, "If you mess that piece up, then everything from that point, obviously, is broken."

Similar to the challenges that ship operators face when setting up remote interfaces between various OEM equipment and technology, the interface between the TOS and what the terminal hopes to run in an autonomous fashion, is quite important. Hence, the TOS must be able to communicate with terminal equipment in the same fashion. To that end, Tideworks works closely with a wide range of terminal equipment providers – from container cranes to reach stackers – to do just that.

"For those vendors that come in and might not have a standardized API, we offer standardized application programming interfaces (API) through our TOS platform. Sometimes those need small modifications; other times, depending on the actual client (the terminal). If they already have a long-standing crane vendor that's got APIs into other parts of the operation and we're coming in after the fact, sometimes we have to adhere to their APIs, which we've done. We still have a shielded standard API that sits in front of our applications. This ensures that we're not going to introduce any code that might impact the TOS."

For the TOS provider, all of that is important. That's because automation for box terminals isn't a one-size-fits-all solution. For example, some terminals will automate certain aspects of their terminal; other will try to do all of it.

Thomas Rucker, President of Tideworks Technology

Rucker agrees, saying, "It really depends to the length in which they want to automate. We have a good case study within CSX and also one in Panama; one with automation in it and one being less automated than the other. But we can cover the gamut in terms of automation: if they want to fully automate, we can do that. Most of the time what we're seeing is more of a semi-automated facility where they're looking to automate a certain set of rows, or a certain function, and we handle that."

SHOULD YOU AUTOMATE YOUR TERMINAL?

Tideworks helps terminals determine if automation makes sense, and ultimately assists in selecting an automated solution. For various reasons, however, automation may not make sense for a particular customer. If that's the case, Rucker insists, the Tideworks team will say so. "It comes back to the beginning of any engagement that Tideworks has with their client. Being born out of an operating company, we have people that have run terminals for many years. Actually, we recruit heavily from the operating units. But we put them on the ground, we go through the operation with the customer, and if they're in a situation where the investment doesn't really have an ROI attached to it in terms of what they're looking for, we'll recommend that they stay with the conventional operation and that they can reduce their overall exposure to IT and software costs and business risk continuity."

Rucker adds, "There have been situations where we've said, 'we don't really think you need to automate. You could, but your ROI is 30 to 40 years out. Is that something that your business partners want to entertain? That's fine. We'll be along with you in that journey. But otherwise, we think it's probably best to stick with a conventional operation.'"

WHAT'S (DRIVING) AUTOMATION?

The case for terminal automation should be compelling and it should emanate from at least one of three drivers. According to TJ Rucker, safety is a big part of that decision process. All operators want all of their personnel to go home at the end of the day. "Any terminal operating company that publishes, or even talks internally about, what they yearly goals might be, you'll see safety at the very, very top. So safety is absolutely number one."

Also high on the list is economics. The ever-increasing pressure that the lines are putting on the terminals now with bigger, post-Panamax tonnage, forces terminals to raise their cranes, be more efficient in the yard and do a lot more with the same footprint. Beyond the obvious quest to improve margins, the third driver is 'predictability.' Rucker explains further, saying, "Often, people think that they're going to automate and it's going save money. It might not – it might displace some of the monies from one side to the other, or you just actually might slow down a little bit, but get some predictability out of it. And depending on if you're a gateway or a transshipment terminal, there might be some advantages in predictability. Those are the three main factors: *safety, economics, and predictability."*

Ultimately, predictability is directly related to economics. As a terminal looks at its book of business, they are also trying to achieve optimal berth utilization. Better predictability through technology is the key. "If you're very reactive to the schedule, this is where terminals get themselves into trouble. Not only from a service reliability perspective, but also just over-utilizing assets, and eventually costing the terminal too much money. If you can predict what's going to happen on your terminal with a good amount of foresight, then you have a better chance of running your facility much more efficiently," adds Rucker.

AUTOMATION ... AND RISK

Terminals come in all shapes and sizes. And, Terminal Operating Systems must adjust for that reality.

Tideworks therefore offers a variety of ways in which to implement a TOS. Tideworks can host it for the customer, or some terminals will actually want to host it themselves. That depends, of course, on the level of IT support that they have in house. Sometimes, this is a function of local risk tolerance, where a particular customer might run it onsite within a bunker on the facility. And, that can also be driven by the location of the facility.

Rucker sums it up by saying, "Whether you're a terminal that's running 50,000 containers or you're running 3 million containers, we find a way in order to size the TOS to meet your needs. We work with customers to determine what licensing and what type of subscription services work for them the best."

Once again, the biggest risk for any terminal that chooses automation on any level involves the failure to properly organize the move from the very outset. To that point, Rucker again stresses the need for front end engagement, analysis and getting it right from the beginning. "We're really big on the front end of the engagement. We need to understand where they're at now, where they want to be in one year, three years, five years, really scaling the system to meet their needs, setting them up for future automation if that's something they want. And so in terms of the biggest risk, if you don't get that front end piece right with the terminal, you really might box them in. That's because, once you semi-automate or fully automate, there's not a lot of wiggle room for error after that because so much more is process-driven."

The old adage of *'failing to plan means planning to fail'* really is an apt fit for the modern container terminal. When it comes to terminal automation, it's as simple as that.

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Using Technology to Streamline Operations in Container Shipping

The container shipping industry faces many challenges, particularly when it comes to increasing uncertainty in the global political and economic environment. The issues between the US and China over trade relations and Brexit in Europe are testing the industry, plus increased regulations and market fluctuations are having a big impact.

How container shipping companies operate now and in the future is changing and staying ahead of the curve is crucial for survival. Predictions suggest there will be far less container shipping in the future as the trend for consolidation continues. Smaller operators are being pushed out as larger global carriers take over. Last year it was suggested that the 10 largest operators control 60-70% of the global capacity.

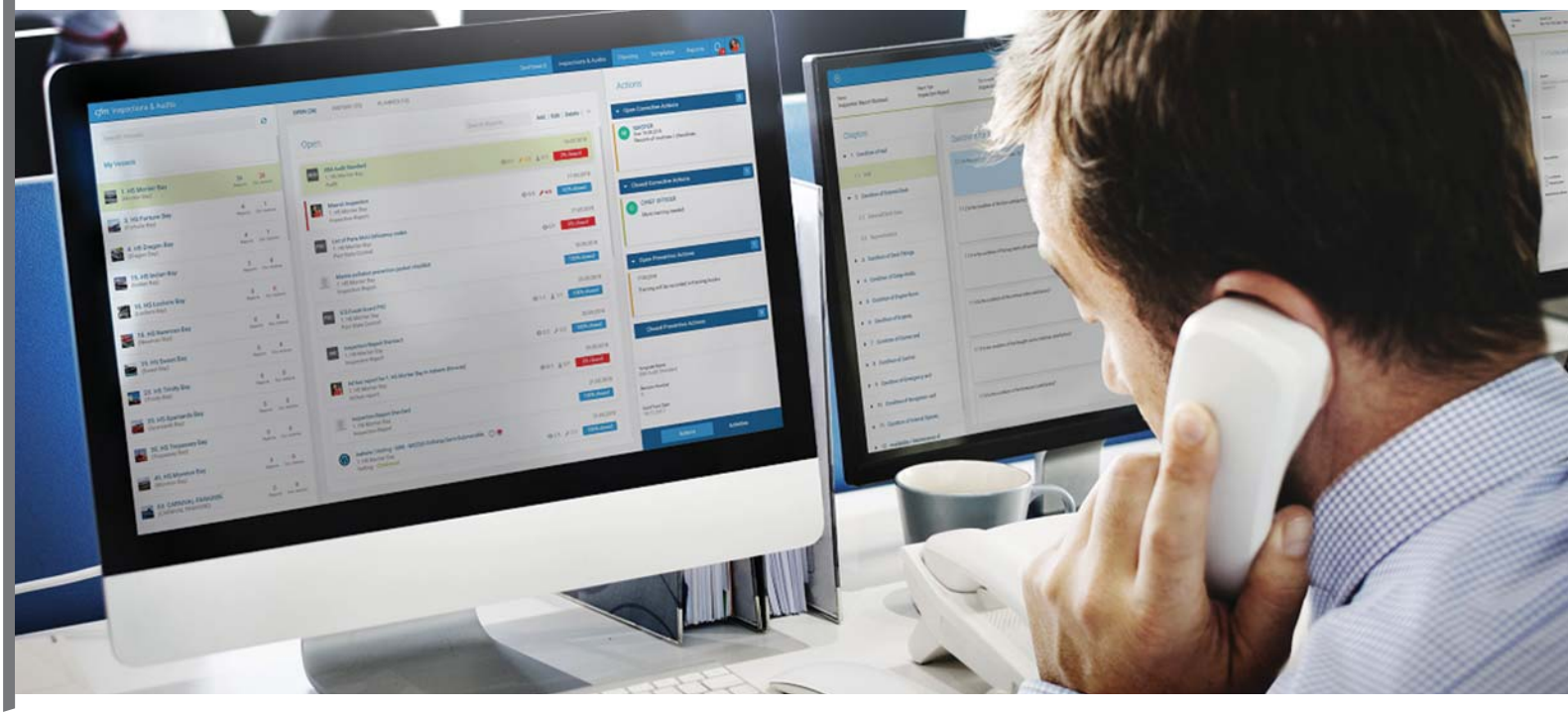
Further consolidations are expected in 2019. The trend towards more goods being bought and produced locally, rather than coming from China, means there is likely to be far less container shipping needed in the future. Technologies such as 3D printing are also having an effect as they enable companies, for example engine manufacturers, to produce engines locally rather than shipping them from elsewhere.

As a result container shipping companies need to look at innovative ways to become more efficient and streamline their operations to remain competitive. With 90% of all cargo being delivered across the oceans, technology has a vital role to play in connecting vessels and office teams. Technology can help cut costs and facilitate process optimization and is something companies should embrace.

The Future of Shipping Technology

Technology is reshaping the container shipping business, helping to improve efficiency and streamline processes. One of the hot topics just now is 'smart shipping' – highly automated or autonomous vessels. The Clyde Co and IMareEST Technology in Shipping Report found that most respondents forecast the introduction of smart shipping in the next 10 to 15 years.

Companies such as Rolls-Royce even suggest autonomous



That 'Cloud' on the horizon is closer than it looks.

shipping is the future of the maritime industry. They say it's as disruptive as the smartphone and the smart ship will revolutionize the landscape of ship design and operations. And yet, some though are taking a 'wait and see' approach when it comes to adopting smart shipping technologies and it could be some years before the true impact of this on the container shipping industry is known.

On the other hand, while the industry has been described by some as operating in the "stone age," there are signs this is changing as cargo companies look to other industries for inspiration. One technology in particular that has had a big impact on business in the past ten years and is now causing big waves in the container shipping industry is the Cloud.

The cloud facilitates the access of business data and applications from anywhere at any time and with any mobile device. Investing in cloud technology is improving collaboration between teams on shore and at sea and creating a connected workplace culture that supports strategic business goals. Increasingly, container shipping companies are recognizing this can bring tremendous benefits to their operations.

One of the main advantages for companies who are technology wary because of the perceived costs and lack of knowledge within their crews is that cloud software doesn't require big expense on new infrastructure. It's straightforward and easy to implement, plus staff don't need to have advanced IT skills as shipping cloud software is intuitive and requires minimal training.

The recent Technology in Shipping Report highlighted that the skill set and competencies of crew to use new technologies was a concern when it came to smart shipping. This has also been a concern with the cloud and some companies have been hesitant to implement it. It's true to say that companies willing to adapt their processes and procedures, hire tech-savvy staff and take advantage of technology to change the way they work, will benefit the most. However, the lack of technology skills needn't be a barrier for companies looking to streamline operations through the cloud.

"The cloud facilitates the access of business data and applications from anywhere at any time and with any mobile device. Investing in cloud technology is improving collaboration between teams on shore and at sea and creating a connected workplace culture that supports strategic business goals. Increasingly, container shipping companies are recognizing this can bring tremendous benefits to their operations."

How the cloud is changing operations

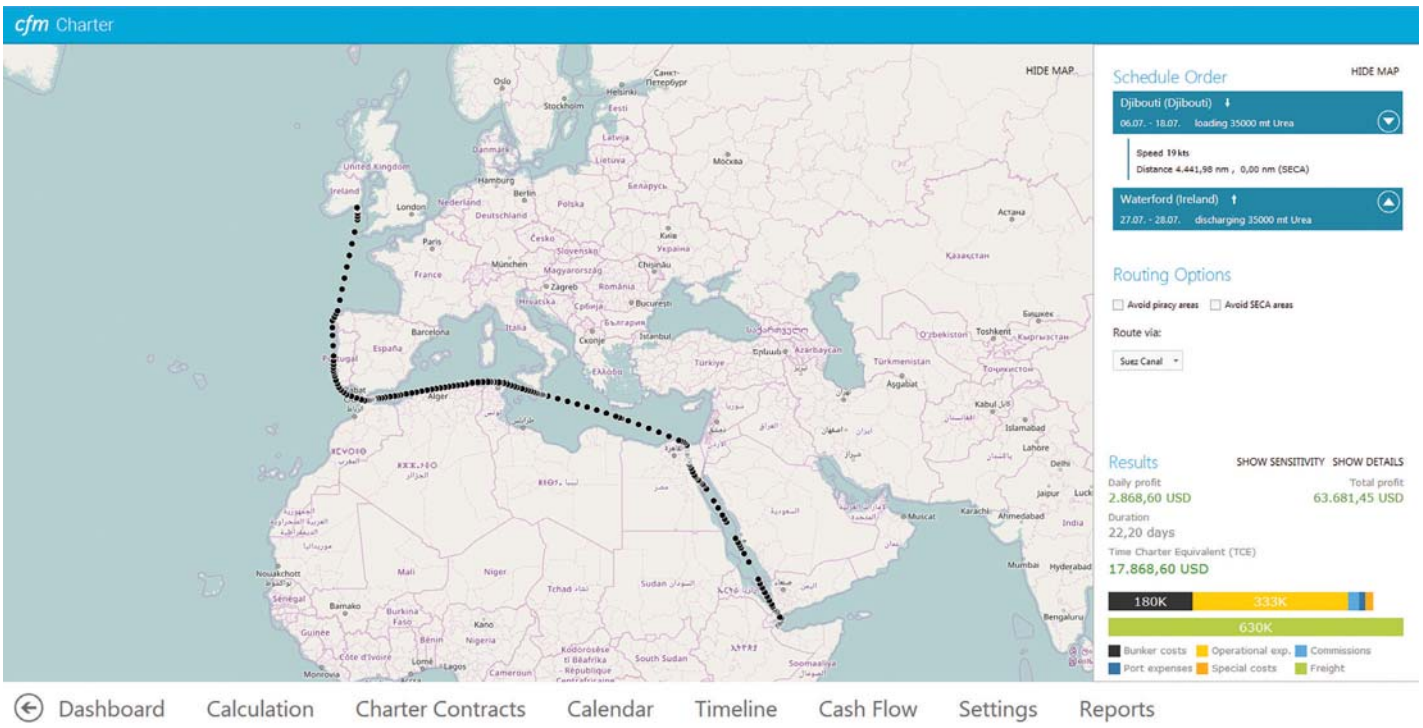
A report by the Seafarers International Research Centre found that at least a part of the effective operation of a modern vessel is determined by the quality of the relationships between shoreside personnel and sea staff. The report recommended companies take steps to address the gulf between ship and shore personnel in order to improve ship-shore relations.

Cloud-based software is enabling companies to do just this and optimize the management of their entire fleet, automate their processes, improve their communications, increase their business performance, improve operational efficiencies and drive down costs. A major benefit is the improved communication between staff on board ships and those in head office. Whether that's crew planning, the execution of payroll or the evaluation of seamen, digital data is always up-to-date and available where it is needed.

Without the cloud, it would be difficult for crews, head office teams and other parties to keep up to date with processes and other management and administrative issues, making companies less agile and able to deal with issues immediately. In today's fast-paced business world, this is a definite disadvantage.

Cloud solutions also enable companies to reduce overheads by having smaller offices around the world instead of one large office. For instance, instead of sending employees to travel across the world to carry out jobs such as on-board inspections, having a cloud solution means ships can hire external personnel locally who can log in, carry out jobs and send the results direct to those that need it.

A major challenge for container companies currently is the integration of systems and processes from different departments to a central data source. The same information might get requested several times from the captain, which forces him to respond manually to each request.



As to tasks being carried out by both land and sea teams, a lack of integration has previously meant less transparency across the business. The cloud is resolving this. It's enabling information to be centralized in one place and made accessible no matter where staff is based. It is ensuring that systems and processes are integrated and data silos removed – allowing operators to gain a complete 360-degree overview of their fleet and entire operations.

Most importantly the cloud is changing how information is exchanged and accessed. There is no more need to send emails back and forth, requesting or forwarding information. Data that is entered at one end is automatically available to everybody else using a cloud-based solution. Information is available in real-time regardless of time or location, reducing time spent on administration.

This is a big change for an industry that still uses a lot of clipboards to take down information and manually transfer to Excel to send on to ship managers. Collecting data for instance on board this way is very 'admin' heavy but the cloud enables this to be done using mobile technology which can then be accessed anywhere in the world.

Often data and documents are saved on multiple servers too that are not connected to vessels, so there are difficulties accessing and finding relevant documents. With the cloud all vessels and shore teams are connected so information can be easily filed and accessed by the entire company.

The cloud is also helping automate and improve tasks such as purchasing and stock planning, as well as complying with regulations such as keeping track of waste, sewage and sludge disposal. Even staff wellbeing can be addressed using cloud applications, as crew shifts and rest periods can be tracked to ensure companies comply with industry guidelines and standards.

A key benefit of using cloud applications is that they are constantly updated and improved as new technologies become available. These updates are automatically installed with no need for manual effort and can help container shipping companies' future proof their business.

With the container shipping industry becoming increasingly

competitive, it is imperative that companies innovate now to reduce costs and improve efficiencies. Adopting the cloud is one way to do this.

Cloud platforms are increasingly affordable and accessible and enable companies to implement smarter, faster and more effective processes to streamline their operations and remain competitive. The cloud is changing the way container companies work and is one technology that any company with an eye on the future needs to embrace.

The Author Alexander Buchmann

After graduating with a degree in Business Informatics, Alexander Buchmann worked for software company Trigonon at the Hansa Treuhand, where he first gained an insight into the internal processes of shipping companies. He founded Hanseaticsoft in 2009 and developed Cloud Fleet Manager. Today Hanseaticsoft has more than 30 employees and develops software solutions for shipping companies. Since March 2017, Lloyd's Register as held a share in the software company.

MARITIME LOGISTICS PROFESSIONAL

A Closer Look

Credit: Port of Los Angeles

CONTAINER PORTS

Boxed in or Busting Out?

Benchmarking the Nation's top container ports in 2018 and looking ahead to what comes next.

By Rick Eyerdam

The nation's major ports finished 2018 and began 2019 setting monthly and yearly container volume records, but agitated trade activity in the White House raised questions about what corrections would be permanent and which would not.

President Donald Trump said on Febuary 24 he is delaying the scheduled March 1 increase in the tariffs on $200 billion in Chinese imports. The president said on Twitter he wants to give negotiators more time to reach a comprehensive trade deal with Beijing. Tariffs on Chinese goods are set to increase to 25 percent from 10 percent unless the U.S. and China reach an agreement.

Research by the American Association of Port Authorities (AAPA) shows the trade sanctions will impact nine percent of the total volume of products imported and exported to the United States. Trade with China accounts for 16 percent of items moved in and out of California ports, 13 percent in Georgia and 12 percent in Washington State.

All that said, there is much to be happy about at the nation's collection of boxports, and plenty more is happening in terms of infrastructure development. And, if the U.S. Department of Transportation's projections that total freight tons moving on the nation's transportation network will grow 49 percent in the next three decades, while the value of freight will almost double, are even close to being accurate, any short term uncertainties wrought by the prospect of a trade war will be eclipsed by the inertia of inevitable growth.

All that said; what's happening in some of the nation's busiest boxports is even more important. A selected look at the current landscape is an eye-opener:

San Pedro Bay Ports

Los Angeles, the nation's busiest port in TEUs and fourth in value began 2019 on an accelerated pace, with a record 852,000 containers in January, a 5.4 percent increase over the same period last year when employees moved nearly 809,000 TEUs. January marked the seventh consecutive month the port handled more than 800,000 TEUs. The Port of Los Angeles finished 2018 processing a record 9,458,748 TEUs, compared with 9.34 million in 2017.

More recently, Los Angeles handled 650,977 TEUs in March, an increase of 12.7 percent compared to 2018. For the first quarter of 2019, container volumes grew 4.6 percent. Despite global trade uncertainties, the port experienced strong first quarter growth, in part due to local supply chain stakeholders who achieved efficiency gains with a Port Optimizer that was rolled out in the first quarter. In total, for the first three months of 2019, the port's volumes have increased 4.6 percent compared to the same period last year.

Port of Long Beach: Eclipsing 8 million TEU

The Port of Long Beach, the fifth largest U.S. port in terms of value, processed nearly 657,300 TEUs in January, down 0.1 percent from January 2018 when the port handled 657,800 TEUs. Despite lingering trade uncertainty, the Port of Long Beach had the second-busiest first quarter in its history, moving more than 1.8 million twenty-foot equivalent units (TEUs) January through March.

Long Beach finished 2018 by also setting a record, moving the most cargo in its 108-year history: 8.1 million TEUs compared with 7.5 million in 2017. The achievement was a particularly impressive feat considering that cargo volumes slowed substantially in the second half of the year, illustrating the strength of cargo in the beginning of the year.

Port of NY & NJ breaks All-Time Annual Box Record

During 2018, the Port of New York and New Jersey handled more than 7 million TEUs for the first time in its history. The 7,179,788 TEUs handled allows the port to maintain its position as the busiest on the East Coast and the third busiest in the nation following Los Angeles and Long Beach. This was bolstered by an 8.2 percent increase in imported goods including clothing, furniture, electronics and other everyday products over the previous record for imports set in 2017. The Port handled one third of all containers on the East Coast of North America; an increase in market share of 2.8 percent over last year. Notably, the port also set a new all-time record for cargo handled by rail, moving 645,760 containers by rail, up 13.8 percent over the previous record set in 2017.

The growth in part can be attributed to the completion in June 2017 of the Bayonne Bridge Navigational Clearance Project, which raised local air draft from 151 to 215 feet, allowing the world's largest container ships to pass under it. Since the bridge project was completed, a dramatic increase in the size of vessels calling on the port means that 30 percent of containerized cargo now arrives on 9,000 TEU capacity tonnage, or larger.

Houston: new Port Chairman, new priorities

The Port of Houston also finished on a record note, moving 2.7 million TEUs in 2018, up 10 percent compared with 2017.

Credit: Port of Long Beach

San Pedro Bay, the location of the Port of Los Angeles and the Port of Long Beach, side-by-side.

January 2019 has seen a slight drop in TEU volume from 221,000 TEUs in 2018 to 215,000 last month.

New Port Houston Chairman Ric Campo wants to fast-track the widening and deepening of the Houston Ship Channel and to harden and strengthen the resiliency of the port to withstand the impact from major storms and hurricanes.

In terms of container shipping, the Port of Houston Authority has voted to impose limits on large container ships calling on Houston Ship Channel terminals after petroleum shippers complained that the big ships would threaten export growth. The impact of that edict is yet to be determined, but the interim solution is intended to ensure unencumbered access to upper channel reaches.

Georgia on my mind

The Georgia Ports Authority, which operates the Port of Savannah, moved 430,000 TEUs in January, up more than 90,000 TEUs from 2018's 339,000. 2018 also closed with a record 4.35 million TEUs, compared with nearly 4.05 million in 2017. Most recently, Savannah handled more total containerized cargo and more intermodal rail volume, with greater connectivity and velocity, than any March on record, the Georgia Ports Authority reported.

While the port handled more than 410,000 twenty-foot equivalent container units, an increase of 15.5 percent, rail volumes spiked by 26 percent for a total of 82,135 TEUs. In addition, GPA achieved a record low dwell time for intermodal boxes in March, with containers averaging just 27 hours from vessel to outbound rail. Savannah is leveraging its inland intermodal connections to expedite both volume and growth.

South Carolina Shines

The South Carolina Port Authority said January was a record, up 12.5 percent from 2018, making it the strongest January ever. The facility handled 205,700 TEUs compared with 167,000 TEUs in 2017. For 2018, the port processed a record 2.3 million TEUs, the third consecutive calendar year of record TEU volume for SCPA.

"A strong February contributed to the Port's continued growth, with container volume nearly six percent ahead of our financial plan for the first eight months of our fiscal year," said Jim Newsome, SCPA president and CEO. Inland Port Greer handled 11,245 rail moves in February, bringing the facility's fiscal year-to-date volume to 84,761 moves. Inland Port Dillon saw 2,688 rail moves in February and has handled 18,709 rail moves in FY2019. South Carolina is betting heavily on inland port infrastructure for the future, and recently signaled that it is exploring shortsea options to alleviate road congestion.

Calling on the Commonwealth

The Port of Virginia set a new annual record for container cargo volume, handling more than 2.85 million TEUs in calendar year 2018, a slight increase (0.5%) over last year's total. The port saw increases in volume at both Virginia Inland Port and Richmond Marine Terminal – the port's two inland facilities – and truck and barge volume.

"Our growth in 2018 was less than what we had planned for, but as construction proceeded at Virginia International Gateway (VIG) and Norfolk International Terminals (NIT), we made the decisions to temporarily hold some cargo and limit the movement of empty containers," said John F. Reinhart, CEO and executive director of the Virginia Port Authority.

The Port of Virginia continued to move near-peak season cargo volumes, thanks in part to the completion of all 13 new container stacks at VIG, bringing the total number of stacks at the terminal to 28. The terminal has also nearly doubled its capacity for refrigerated cargo – growing from 452 plugs to 888 plugs. Four ship-to-shore cranes that arrived in January are scheduled to be placed into service by the end of March, and completion of the rail expansion is slated for June 2019.

Across the river at Norfolk International Terminals (NIT), 12

Credit: Port NY/NJ

The growth in part can be attributed to the completion in June 2017 of the Bayonne Bridge Navigational Clearance Project, which raised the clearance under the bridge from 151 feet to 215 feet, allowing the world's largest container ships to pass under it and serve port terminals in New York and New Jersey.

new stacks are handling cargo and the second phase of construction is now underway. The efficiencies gained from the new capacity; combined with the metered flow of cargo via the port's Truck Reservation System is providing the port with much-needed breathing room after managing the most difficult aspects of the expansion.

Port of Jacksonville

SSA Marine will expand its footprint in Jacksonville, Florida, with the signing of a new 25-year lease extension that will also expand the Blount Island Marine Terminal to a total of 80 acres and includes a $28 million infusion towards a harbor-dredging project.

The larger terminal and 47-foot depth at mean low tide will allow Jacksonville to handle up to two post-Panamax vessels simultaneously by 2023, enhancing the port's ability to handle domestic container service to Puerto Rico, north-south routes, and trans-Pacific strings.

Loaded container volume at the Port of Jacksonville jumped 6.8 percent year over year to 879,934 TEU in 2018. The port handled 351,984 TEU of loaded imports last year, making it the eighth busiest import gateway on the US East Coast, with a 3.26 percent share of the market.

The Jacksonville Port Authority (JAXPORT) set a new record in March with the arrival of the largest boxship to ever call Jacksonville. The 11,000-TEU boxship is operated within the 2M alliance, which is comprised of Maersk, MSC, Hamburg Süd and strategic partners HMM and ZIM.

The port's Asian container volumes continue to show significant growth, up 17 percent YTD, and JAXPORT's Asian trade has grown robustly at 14 percent annually over the past five years. But JAXPORT faces a potential 10 percent decline in Asia import cargo since its terminal operator announced earlier this year that it entered into an agreement with Port Tampa Bay, and will cease working with the Port of Jacksonville in May. CMA CGM was responsible for almost 12 percent of Jaxport's Asian container volume last year and for about 1.3 percent of Jacksonville's $68 million in revenue last year. CMA CGM is removing Jacksonville from its Pacific Express 3 route, the same route it will use in connecting to Tampa.

"We are confident that a significant amount of this business will stay in Jacksonville," Jaxport Chief Commercial Officer Kristen DeMarco said, adding, "Moving it through another port would significantly add to the over-the-road transportation costs associated with trucking the cargo across the state."

SeaTac Surges

The Northwest Seaport Alliance handled a record-breaking 775,522 TEUs in international volumes in the first quarter of 2019, a 12 percent increase over the same period last year. Total volumes from January through March equaled 932,288 TEUs and are up 11.1 percent, the second-highest first-quarter performance ever. Total container volumes for March reached 336,828 TEUs, an 11.3 percent increase from last year, with import and export volumes growing 16.7 percent and 8.6 percent, respectively.

NWSA's Managing Members also voted to approve lease agreements and authorize construction on Terminal 5 in Seattle. Once completed, the 185-acre terminal will be able to handle the ultra-large container vessels increasingly calling at West Coast

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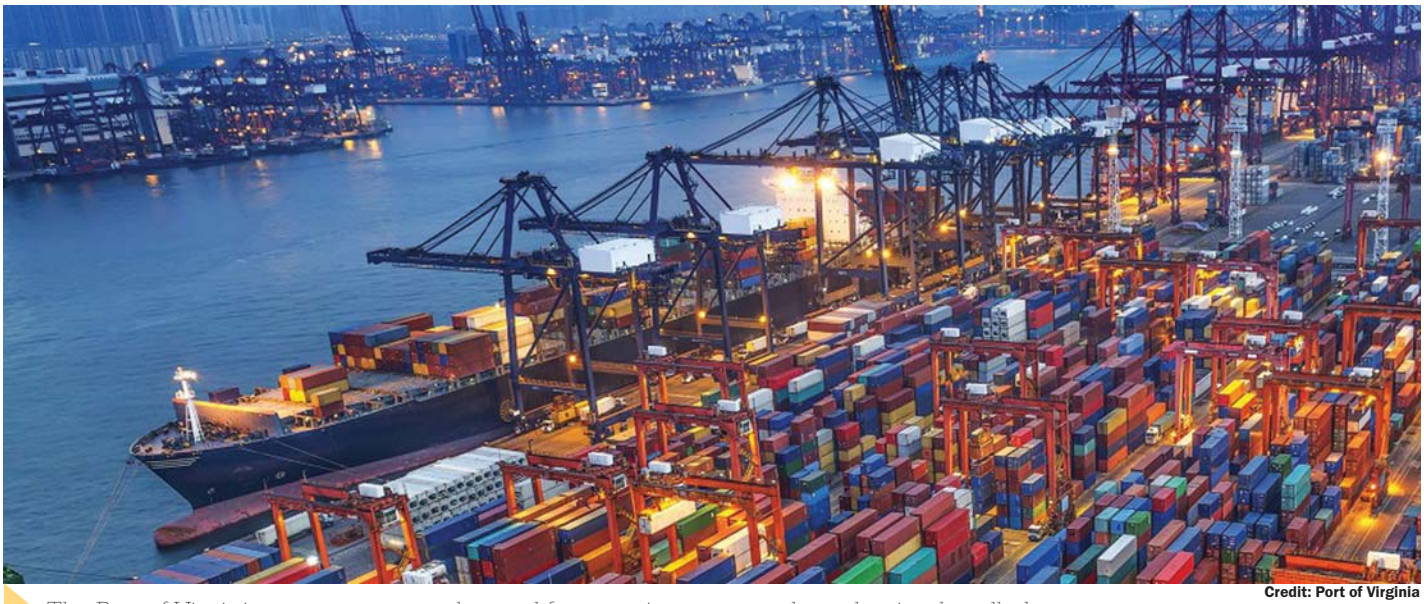


Credit: Port of Virginia

The Port of Virginia set a new annual record for container cargo volume having handled more than 2.85 million TEUs, in calendar year 2018.

ports. The deal potentially represents approximately a half-billion dollars of private and public investment in the region's economy.

Notably, the NWSA also received four additional super-post-Panamax container cranes in March. The cranes will allow two 18,000-TEU vessels to dock simultaneously at Husky Terminal in Tacoma.

Oakland's Historical High

The Port of Oakland, the nation's seventh-busiest facility, processed nearly 209,500 TEUs in January, compared with 205,800 in 2018. For all of 2018 the port moved more than 2.5 million TEUs, compared with 2.4 million in 2017. 2018 was the busiest year in the Oakland history. Scrap paper shipments were up 3 percent in the first 10 months of 2018, contrasting with a generally challenging environment for U.S. exports. That's important because waste paper is the largest export commodity, measured by container volume, shipped from Oakland.

The Port said that it shipped the equivalent of 110,400 20-foot containers of wastepaper in 2018 through October; nearly 18 percent of Oakland's total export volume, with much of that headed for Asia.

The good news was balanced by a local proposal to build a baseball stadium and thousands of housing units in close proximity to the port's gates. Stakeholders fear that the proposal, if it comes to fruition, could negatively impact the port's growth plans and efficiencies.

Wilmington, NC sets record

The Port of Wilmington set a record for container moves in the 2018 calendar year, NC Ports reported in a news release. The port had 175,500 container moves in the 2018 calendar year, up 23 percent from nearly 143,000 in the 2017 calendar year, according to numbers released by the port.

Modest, though its box volume might be in comparison to other regional ports, NC Ports is banking heavily on leveraging the state's considerable, multi-billion dollar agricultural trades, much of the output of which today goes to other regional ports. Port officials attributed the Port of Wilmington's efficiency in moving trucks and cargo through the port, as just one of the reasons for its overall increase in the movement of containers in 2018. A planned increase in reefer plug-ins as well as the arrival of the first-ever 12,000 TEU vessel to the Port of Wilmington, says port officials, bode well for the port's future.

A nod to NOLA

The Port of New Orleans (Port NOLA) moved more containers in 2018 than at any time in its history, totaling 591,253 twenty-foot equivalent units (TEUs), up 12.3 percent compared to one year ago. Most importantly, those numbers included a 58 percent surge in containers moved by barge on the Port's growing container-on-barge service operated in conjunction with the Port of Greater Baton Rouge.

A recently announced Marad grant of $3.1 million will support the barge service, allowing them to purchase purpose-built vessels that will increase the viability of the service. As Louisiana's chemical industry grows, the barges are essential to increasing the capacity of the shuttle, intermodal efficiency and reducing costs. The existing container on barge service currently moves approximately 16,800 FEUs between Memphis/Baton Rouge and New Orleans, operating twice weekly to deliver export cargo that will be loaded on deep-draft container ships.

Also of note, the New Orleans Public Belt Railroad, which the Port acquired in 2018, realized a 15 percent growth in intermodal cargo and new connections with domestic markets.

PhilaPort: open for business

The Port of Philadelphia (PhilaPort) saw cargo volume growth

The Jacksonville Port Authority (JAXPORT) set a new port record on March 18 with the arrival of the ZIM vessel Cape Sounio, the largest container ship to ever call Jacksonville, at 11,000 TEUs.

Credit: JAXPORT

accelerate in advance of the completion of a $392 million project to deepen the port's primary channel and the implementation of a $300 million capital improvement project. PhilaPort has seen a 166 percent container growth in the past decade and in 2018 handled a record 600,000 TEU.

David Whene, president of Greenwich Terminals, operator of the Packer Avenue Marine Terminal, said, "With ship productivity as high as 140 gross moves per hour, turn-times of under 40 minutes, and an abundance of available chassis, Packer Avenue offers carriers unparalleled efficiency in reaching the Mid-Atlantic region and beyond."

The upcoming completion of the Delaware River Deepening Project will provide a 45-foot shipping channel through Philadelphia, allowing vessels as large as 14,500 TEUs to call at the port. That deepening project is timed perfectly with the arrival of new Post-Panamax cranes, bringing the total operational cranes on the terminal to six (a seventh will arrive in August).

The Author

Rick Eyerdam

is an award winning journalist and editor. Formerly, he was Editor of Florida Shipper Magazine. Additionally, he was Executive Director of the Miami River Marine Group and Captain of the Port of the Miami River. He is a graduate of Florida State University with majors in English and Government. His articles have appeared in myriad shipping magazines and newspapers since 1970.

Benchmarking IMO 2020

A look at the looming deadlines for global shipping also means benchmarking the preparations of the refining, storage and worldwide bunkering supply chains. It's definitely a work still in progress.

By Barry Parker

Credit: TORM

"One of the biggest shake-ups in the product markets is right around the corner — the IMO 2020 regulation bans high sulfur fuel oil (HSFO) from the bunker pool. Although the shipping and refining industries have been preparing for the new rules for several years, there have been fears of shortfalls when the rules come into effect." So says the International Energy Agency (IEA – a part of Organization for Economic Cooperation and Development), in its just-released Oil 2019 report.

There are multiple ways for ship operators to cope with the new rules which push down maximum permitted sulfur levels in fuels from the current 3.5% (in effect in most geographical regions) down to 0.5%. They can install "scrubbers" and continue to purchase high sulfur fuel, they can consume very expensive marine gasoil (with typical sulfur levels at or below the 0.5%), or they can consume low sulfur blends – a new category of fuels emerging now. LNG is another low sulfur alternative – though uptake by shipowners has been limited.

The uncertainties about fuel availability are focused on the short-term, meaning 2020 and perhaps further out into next year. The IEA, in their report, suggest that "Demand for HSFO (high-sulphur marine fuel oil), the main vessel fuel since the 1960's, will fall from 3.5 mb/d to 1.4 mb/d in just one year." The IEA also calculated that by end 2020, scrubber fitted vessels (approximately 4000 units, mainly on larger ships) will be consuming 700 kb/d of HSFO.

– and Beyond

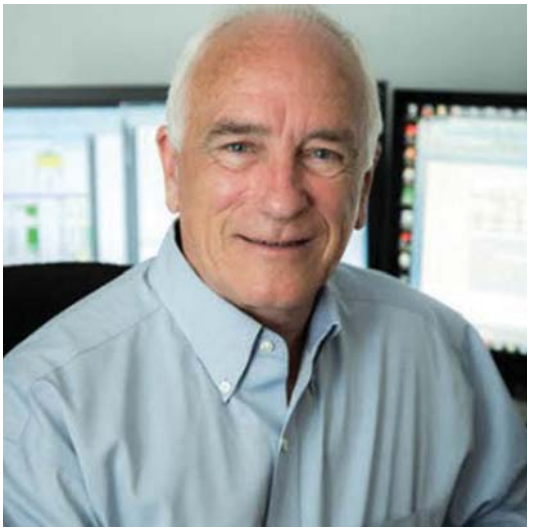
Follow the Money

From a financial standpoint, the voyage has already been treacherous. Mr. Chris Hudson, from commodities specialist Freight Investor Services (FIS), wrote that: "It's fair to conclude that the market is still unsure of how to prepare financially for the changes." In late March, 2019, less than 10 months until the new rules came into effect, FIS wrote: "The market is pricing the difference between the HSFO and VLSFO at around $185-200/ton, yet these values can change like the wind and are current prices for future dates." These wind currents will depend on actual availabilities.

The oil majors, though mum on their specific refinery configurations in the face of changed requirements, are now beginning to assuage the concerns about actual availability of VLSFO. Like any new product roll-out, supplies will be available at major bunkering hubs and the invariable discussions of haves and have-nots will place outports in the "might have" basket.

'Refining' the Supply Outlook

Consultants EnSys, based in Houston (which, along with Boston-based Navigistics, has been a leading investigator of the IMO 2020 related issues) explained to ***MLP***: "We analyze marine fuels supply and the impacts of the IMO 2020 Rule by simulating and projecting the total global petroleum 'liquids' supply/refining/transport/demand system. This approach captures all the interactions in the system and means all the num-



"The USA is expected to have the largest supply surplus and export potential, followed by China and Russia. Conversely, we – and other analysts – project Europe will be in deficit on 0.1%/0.5% supply; also, and critically, the Pacific region that includes Singapore, although increasing intake into Asia of US low sulfur crude plus new refining projects should limit the deficit there. For bunkers markets, these changes have significant implications for setting up supply arrangements and for substantial changes in the logistics of supplying 0.1 and 0.5% marine fuels into the 800+ coastal ports worldwide that will need them."

– EnSys President Martin Tallett

bers have to add up." EnSys President, Martin Tallett, explained, "What has become apparent in a series of recent assessments is that the IMO Rule will have a major impact on regional marine fuels supply/demand balances. Under the 3.5% sulfur standard, IFO was the lowest quality liquid fuel produced by refineries and so was the easiest to supply and could be produced essentially anywhere. Tightening the standard to 0.5% sulfur dramatically changes the picture.

Scrubber uptake will mean some of the supplied IFO can stay as 3.5% but the majority of fuel will need to be 0.5% from 2020 on, unless and until scrubbers become widely accepted. EnSys and marine partner Navigistics project at least 3.5 mb/d of HS IFO will need to be switched to 0.5% fuel to achieve full compliance in 2020. We project supply will be a mix of 0.5% distillate and HFO products, potentially more distillate initially because of fuel incompatibility concerns trending to more IFO over time as this is lower cost."

Separately, an early March 2019 announcement from BP, quoting the Global Head of BP Marine, Mr. Eddie Gauci, said: "We have undertaken a comprehensive test campaign, conducting ship-board trials of our new very low sulfur fuel oil. Following the success of these sea trials, and working closely with our customers, we believe we now have a robust commercial offer." To that end, BP will have their new low sulfur blend available at ARA, Panama, Seattle (on the USWC), Singapore (the world's largest bunkering entrepôt), Hong Kong, China, Australia/ New Zealand, and at Oman.

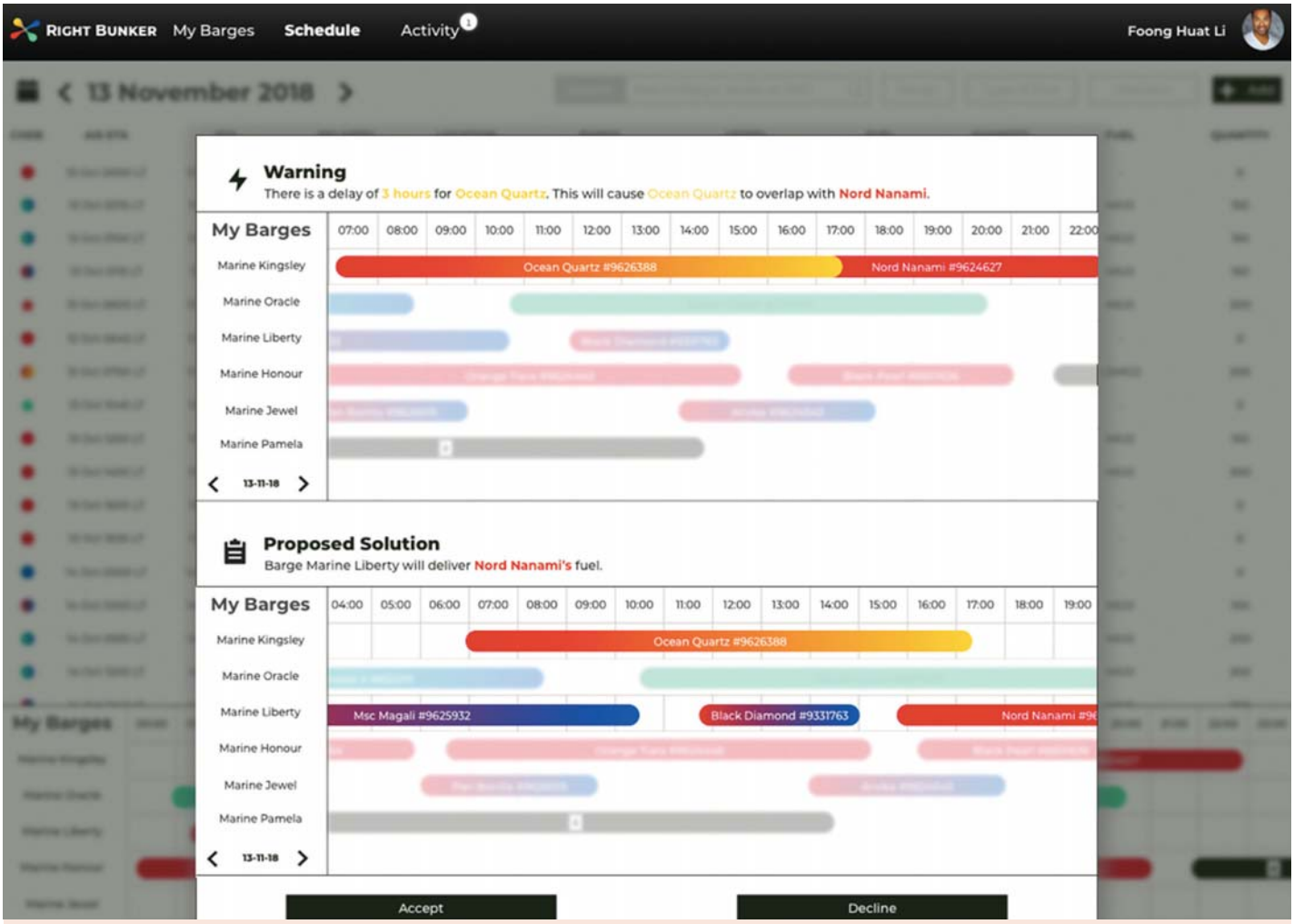
Meanwhile, ExxonMobil announced in 2018 that it would be supplying compliant VLSFO in Asia- Singapore, Thailand and Hong Kong and in continental Europe (ARA) and the Mediterranean. They expect that sales of compliant fuels would begin in Q3 2019. Supporting that projection, ExxonMobil also announced a massive upgrade of its Singapore refinery complex, predicated heavily on the needs to produce low sulfur fuels for the maritime industry.

For its part, Shell was projecting that VLSFO supplies would be available in the U.S. Gulf (New Orleans and Houston), Freeport, Bahamas, and in North Europe (ARA and Danish Strait) as well as in the Med. Farther to the east, locations are set to include Fujairah, Hong Kong and of course, Singapore.

Martin Tallett, from Ensys, described regional implications of shipping's interaction with the refinery system: "From a refining perspective, 0.5% marine fuel, be it distillate or IFO, requires low sulfur blendstocks which must come from either low sulfur crude streams and/or significant refinery processing centered on 'cracking', such as via the coking process, plus desulfurization. EnSys projects the effects of this will be to substantially concentrate 0.5% fuel supply geographically. Two thirds of the total low-sulfur marine fuel supply (0.1% ECA fuel plus 0.5% marine distillate and IFO) will come from just eleven countries and much of the balance from a further twenty-five or so." Tallett continued, "The USA is expected to have the largest supply surplus and export potential, followed by China and Russia. Conversely, we – and other analysts – project Europe will be in deficit on 0.1%/0.5% supply; also, and critically, the Pacific region that includes Singapore, although increasing intake into Asia of US low sulfur crude plus new refining projects should limit the deficit there. For bunkers markets, these changes have significant implications for setting up supply arrangements and for substantial changes in the logistics of supplying 0.1 and 0.5% marine fuels into the 800+ coastal ports worldwide that will need them."

A Look Ahead: Uncharted Waters

There are many uncertainties about the days following Jan 1, 2020. The IEA, in its report, comments: "The quantity of VLSFO produced will initially be limited to 1 mb/d because of reduced availability of low sulphur blending materials. Some shipping companies may also be reluctant to adopt a new fuel immediately,



Ocean Freight Exchange

A slightly different take on fuel availability, with a decidedly info-centric approach, comes from Ocean Freight Exchange, a vessel chartering platform, utilizing advanced statistical modeling, online at www.theofe.com. Its CEO, John Hahn, told ***MLPro***, "Right Bunker is our bunker delivery optimization platform which increases turns for the bunker tanker and reduces waiting time for both the bunker tanker and the vessel. We don't do procurement, but only focus on the delivery." When asked about port selections, he said: "We believe that the desired fuels will be available in all of the major bunkering ports, including Singapore, Fujairah, Rotterdam, Antwerp, Shanghai, Ningbo-Zhoushan, Hong Kong, Gibraltar, Panama, Houston, and LA/Long Beach. For more niche routes, vessel operators may adjust where they bunker, but it won't be a big deal." He acknowledged some of the difficulties that may lie ahead, telling ***MLPro***, "By adding more grades, less tankers in service due to tank cleaning, 'spec' problems like water content, quantity shortages, and other complexities, the logistics and delivery of bunkers will become more difficult than it already is. We hear that maritime lawyers are excited for the many claims to come."

New strategies for fuel availability.

In March 2019, EURONAV, one of the largest public shipping companies with a fleet of mainly VLCC and Suezmax tankers, provided a different take on fuel sourcing. It announced that its 442,000 ton Ultra Large Crude Carrier Oceania (acquired in 2018), anchored in the Mediterranean, would be used as a storage vessel for EURN's low sulfur fuel needs. Tanker tracking sources noted that a 30,000 shipment, presumably of low sulfur fuel oil, had moved on a smaller tanker from ARA to Oceania, parked near Malta.

Maersk, a large vessel operator across multiple sectors), has taken a different approach; that is to say, securing long term physical supplies from a refiner in the northeastern United States. In January, A.P. Moller-Maersk and PBF Logistics LP (PBFX) jointly announced that PBF would process crude oil at a terminal facility in New Jersey and supply it to an oil trading company within Maersk. Specifically, "The agreement enables Maersk Oil Trading to supply IMO 2020-compliant 0.5% marine fuel to its customers on the US East Coast. Annual production will be around 1.25 million metric tonnes, the equivalent of approximately 10% of A.P. Moller-Maersk's annual fuel demand." In late 2018, Maersk also announced that had entered into a leasing agreement for storage of 2.3 Million mt of 0.5% compliant fuel (equivalent to roughly 20% of Maersk's annual fuel demand), at the Vopak Europoort Terminal in Rotterdam.

Meantime, COCSO Shipping announced that it would be working with fuel supplier Double Rich Ltd (an affiliated company) to secure suitable low Sulphur fuel supplies.

Credit: EuroNav

and would prefer to use MGO until they have confidence that VLSFO will be easily available in ports and stable and compatible with similar grades." The compatibility issue looms large; there is a concern that VLSFO fuel blends produced at different facilities will be in congruity. Another set of issues concern a proposal to extend the European Emissions Control Area (ECA) to include the Mediterranean is currently being considered at the IMO. Such a measure that would bring about an even tougher 0.1% marine fuels sulfur limit in European waters, with a likely additional tightening of middle distillate supplies.

Over time, after the IMO2020 issues are sorted out, there are further milestones to consider. In 2023, the IMO will be implementing a Revised Strategy on Greenhouse Gas Emissions (following up on the Initial Strategies launched in 2018- which include deepsea vessels' reporting of fuel consumed). As the IMO begins to look out to 2030, and then to still more distant horizons to 2050, talk will turn increasingly to new types of fuels. Hence, and at that point, the potential dislocations of 2020 may seem inconsequential, in comparison.

The Author

Barry Parker

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

KONECRANES

Automated RTG System points the way to the future of terminal efficiency and safety

Edited by Joseph Keefe

Terminal Petikemas Semarang (TPKS) in Semarang, Central Java, is the second-largest container terminal in the Pelindo III Group, which is an Indonesian State-Owned Enterprise (SOE) that manages 43 ports throughout seven provinces in Indonesia in order to ensure a smooth flow of goods throughout the archipelago. About 70 percent of its container traffic consists of international cargo.

TPKS recently extended the world's first commercially operated fleet of Konecranes Automated Rubber Tire Gantry (ARTG) cranes with nine new ARTGs, as it boosts the safety and efficiency of its expanding operations. The new cranes bring TPKS' fleet of ARTG cranes to 20, with the earlier ARTGs already operating successfully for more than two years. TPKS' fleet is the first ARTG installation in the world to be operated on such a wide commercial scale.

Meet the Konecrane ARTG

TPKS' ARTG cranes utilize a next-generation automation platform, including fully automated stacking in the yard, Remote Operating Stations (ROSs) for truck handling and the related container yard infrastructure. The automated RTG system is built around Konecranes' 16-wheel RTG, which Konecranes says is

the only RTG in the world with the technically advanced features that enable it to maintain the highest level of performance whilst totally automated or remotely controlled.

With its holistic design and built-in tolerance for local variations, this crane was made for automation, says Konecranes, which has delivered more than 1000 RTGs of different types globally.

The Konecranes Automated RTG (ARTG) system is available for greenfield and brownfield RTG-based container terminals. Built around the now familiar Konecranes 16-wheel RTG and its unique ability to tolerate rough yard surfaces, the system includes a complete package of truck guidance infrastructure, a Remote Operating Station with a specially developed GUI and an IT system that interfaces with any Terminal Operating System (TOS).

The holistic design combines an intelligent steel structure and Konecranes active load control technology, which enables the RTG to tolerate local variations in areas such as the run-way service, the stacking area and in the rubber tires themselves. This creates the conditions for RTG automation and results in a safe, productive and predictable automated stacking operation.

"The Konecranes 16-wheel RTG is ideally suited to automation and provides an example of how to design for widely applicable future benefits. Not only can the crane be installed in

its automated ARTG form, but also existing versions of the widely used 16-wheel RTG can be readily retrofitted. You can start with your current yard infrastructure as you move to fully automated RTG operation – step by step, block by block, to a fully automated yard," says Konecranes Port Service APAC Regional Director, Jukka Tukia.

More than a Machine

Thomas Gylling, Marketing Director, Port Solutions, Konecranes, says the automation technology represents a turning point. "We can now automate all our RTG's. Even the oldest models. The RTG is a great machine, but it's more than just a machine. It is a system. It is a new category of container handling."

This system will change the industry for the better, he says, because the benefits of automation are well-known and proven in automated rail-mounted gantry (RMG) operation: cost savings; greater productivity; greater predictability and safer operations. These benefits are now available for RTG-based container terminal operations that already use 16-wheeled Konecranes RTG's, which can be automated without major changes to the cranes themselves.

Rail mounted gantry systems have already demonstrated the benefits of automation, which is now applicable to rubber tire gantries.

Konecranes' Vice President of Technology, Port Solutions, Hannu Oja says: "It's not just about adding components; it's about the whole yard infrastructure. The ARTG offers process stability and greater safety. If you think about the container yard with several RTG's, the automation operation will fundamentally change the yard operation."

The business value will be significant. "When you combine automation benefits with the flexibility of Konecrane's RTG's, you'll get something new. A new level of container handling," says Mr. Oja.

The Konecranes ARTG system comprises Konecranes 16 wheel ARTG, equipped with active load control and autosteering, a remote operating station with an advanced graphical user interface, IT architecture that is seamlessly interfaced with the terminal operating system, and an intelligent gate, that acts as the traffic control of the ARTG container on the block.

The ARTG's anti-collision technology is built on lasers and real-time relative positioning. Trucks are guided safely by a system that integrates truck-scanning and lights. Container picking and placing accuracy is ensured by an innovative scanning system. Automated gantry travelling is accomplished with dual antenna DGPS autosteering.

For existing RTGs converting to automation, electrification is recommended as part of the automation upgrade. Cable reel power is one option, but a busbar option is also applicable – and the company's diesel fuel-saver technology is also available. The range of different automation options are particularly useful

for fleets considering modernization or drive upgrades to existing cranes, to add automated functionality to reliable existing RTGs.

Widely Applicable

The automation process is flexible and widely applicable. But given that automated RTG operation is a powerful thing – which can deliver cost-savings, improved safety, more predictable productivity and greater reliability - why have only a few container terminals implemented automated RTGs so far?

Tukia says one reason was the difficulty of safely separating man and machine within the automated container handling process. Another was how the technology must handle the rough operating conditions of RTG yards.

"The technology involved needs to be able to be retrofitted in a brownfield scenario. And it needs to be proven and ready in a greenfield scenario. You get all of this in the Konecranes 16-wheel ARTG system, which went into service successfully in 2016, with other sites following since."

"Now you get the latest technology for fully automated truck handling, carried out in a supervised operating mode. The remote supervisor can easily handle up to five ARTG's at the same time. Even inexperienced remote supervisors can land containers accurately and quickly on the truck trailer."

Konecranes was the first company in the world to introduce an Automated Rubber Tire Gantry (ARTG) System on a wide commercial scale. The Konecranes ARTG system version 2.0 offers new advantages.

"Konecranes is taking the RTG automation process a stage further with its ARTG Version 2.0, which can be retrofitted into any brownfield container terminal. It can fit any container stack envelope because it uses space very effectively. Additionally, truck handling is automated, with remote supervision. One remote supervisor can handle up to five ARTGs simultaneously," says Mr. Tukia.

ARTG version 2.0 cranes are equipped with the latest wireless communication technology, including control signals and video signals that are now wireless. This means that the ARTGs can be diesel-powered and there is no need for cable reels and fiber optics.

"With Konecranes ARTG 2.0, there's no need for truck lane fencing. ARTG 2.0 has a redesigned safety concept built on the ARTG. "We like to call it the 'street bogie'. It fits in your current yard envelope. This enables free truck flow with a bypass lane as you know it in conventional RTG yards," he says.

Trucks flow freely, going under the ARTG's and using the bypass lane to go in and out. The ARTG's have wireless video and control signals. This enables automation for RTG's, powered by diesel gensets, which are still today the most common power choice.

"Being able to switch between container blocks without recalibration is a major commercial advantage. Additionally, it's advantageous for maintenance, including component changes," he said.

Proven in Service

The new ARTG cranes in service at TKPS have demonstrated automation's benefits in service. "TPKS is constantly striving to improve our facilities to meet customer needs and boost our

The Konecranes 16-wheel RTG is ideally suited to automation and provides an example of how to design for widely applicable future benefits. Not only can the crane be installed in its automated ARTG form, but also existing versions of the widely used 16-wheel RTG can be readily retrofitted. You can start with your current yard infrastructure as you move to fully automated RTG operation – step by step, block by block, to a fully automated yard."

– Jukka Tukia, Konecranes Port Service APAC Regional Director

competitiveness. Konecranes is constantly innovating to meet container terminal needs, and by choosing them to provide new ARTG cranes, we have taken our operations to the next level of safety and efficiency," offered Recky Julius Uruilal, General Manager, TPKS.

"The new ARTG cranes minimize the risk of workplace accidents, which not only improves our workplace, but gives our customers greater confidence in us," says Mr. Recky. "As Pelindo III updates to the latest and most modern equipment in line with the needs of its customers, we know there will be lots of new knowledge to acquire. Konecranes' neat and detailed documentation, plus their experienced and helpful staff, have been very helpful in this process," he says.

Konecranes TRUCONNECT remote monitoring technology provides usage data that optimizes service activities and visualizes maintenance and application compliance. Data can be accessed by mobile devices such as smart phones and tablets.

"Konecranes' customer focus is on entire service solutions. Once cranes are delivered to customers like Pelindo III and TPKS, we can take complete responsibility for the service and maintenance of the equipment, to optimize its performance and safety over its entire lifecycle," adds Tukia.

With more than 600,000 pieces of lifting equipment under service contract worldwide, Konecranes continues to provide advanced – and proven – service to any organization using cranes or lifting equipment. Terminal Petikemas Semarang (TPKS) in Semarang, Central Java, is just one of them; no less important to Konecranes than all the rest.

CONTAINER xCHANGE:
matchmakers for lonely containers

Avoid empty container moves and save environmental costs in shipping.

It is an all too common scenario in container logistics: A carrier has 100 empty boxes in Hamburg that must be transported to China for export cargo. None of the carrier's northern European customers' needs these containers to ship goods to China. So, the carrier must pay USD $500 per container (mainly fees charged by terminals and trucking companies), to transport its empty boxes from Hamburg to Shanghai.

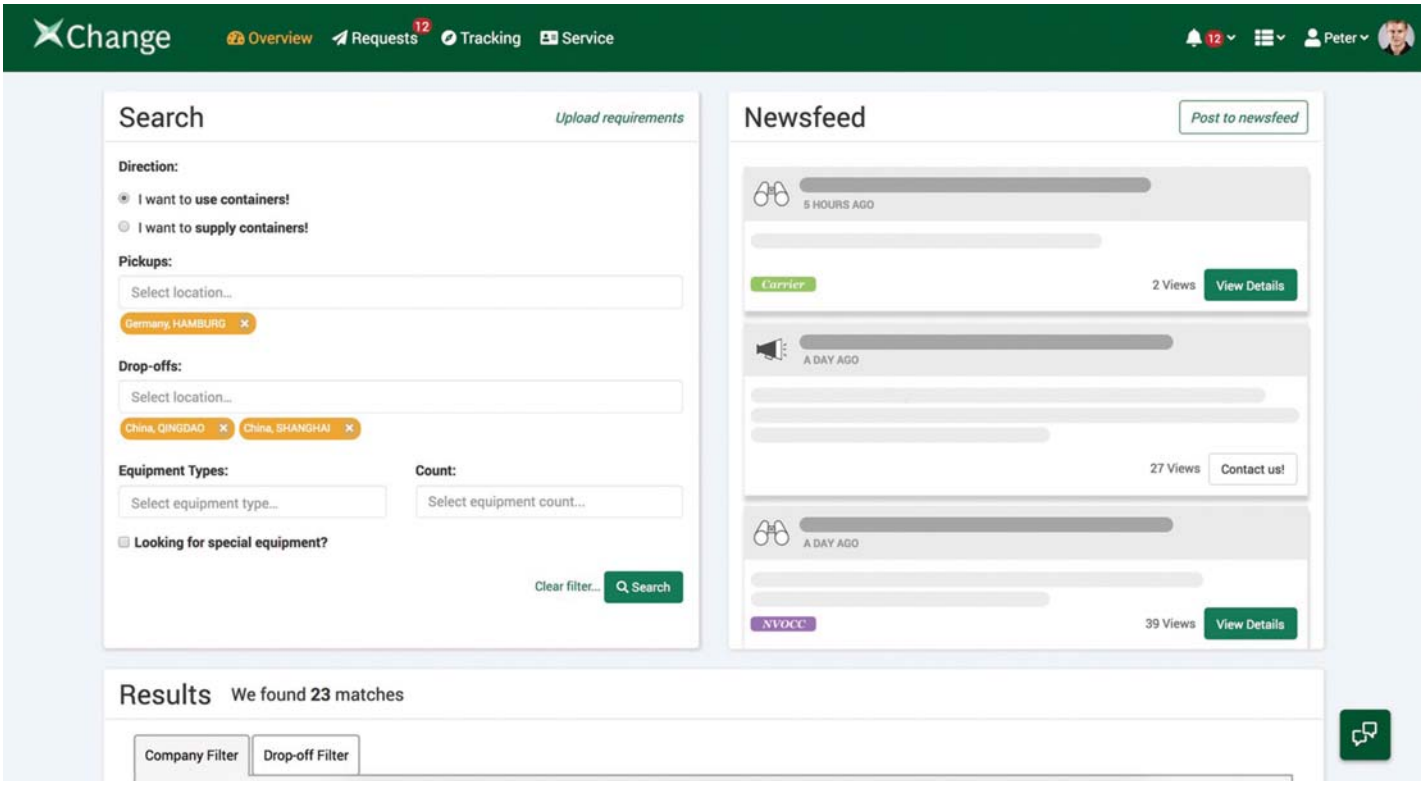
On average, the CO2 emission per container handled from China to Europe amounts to 1.913 kg. Combining these numbers with the fact that every third container is shipped empty on the seas, it becomes evident that the environment is experiencing excessive and unnecessary pollution. There is room for improvement in these numbers and carriers can decrease their environmental footprint significantly. This would not only apply to carbon dioxide but also other greenhouse gases dangerous to marine – and bird life.

THE IMPACT OF EMPTY CONTAINER REPOSITIONING

Containers are methods of moving goods globally from exporting countries to importing. After unloading the full container, a new return transport stretch has to be found, as moving an empty container costs almost the same as moving a full one. A large number of containers are repositioned empty every year because of failed attempts to find a new transport stretch. This comes at an estimated industry wide cost of $15-$20bn annually, according to BCG, in addition to the unnecessary associated pollution.

Arising from a mixture of structural trade imbalances and liner and network inefficiency, a lot is to be done about the latter, but not much to do with trade imbalances. Being the most important source of global empty container accumulation, trade imbalances happen when countries' trade balances are either in significant surpluses or deficits. Systematic accumulation of containers will take place when a region imports more than it exports, while regions that export more than they import will face container shortages.

Roughly one-third of repositioning costs relate to carrier-specific imbalances. A carrier whose customers are scattered among port and inland destinations within a given country or whose portfolio of export and import business within the country is imbalanced will likely end up having to move empty containers. Sales forces contribute to imbalances by focusing on increasing



Christian Roeloffs, Managing Director of Container xChange

head-haul volume, rather than optimizing overall container flows across services. Issues within a carrier's network, such as delays and the absence of direct vessel – or inland-network links between locations served – can also promote imbalances and make them harder to correct. Moreover, most carriers are not able to forecast their positioning needs with sufficient accuracy to fully optimize flows before imbalances arise.

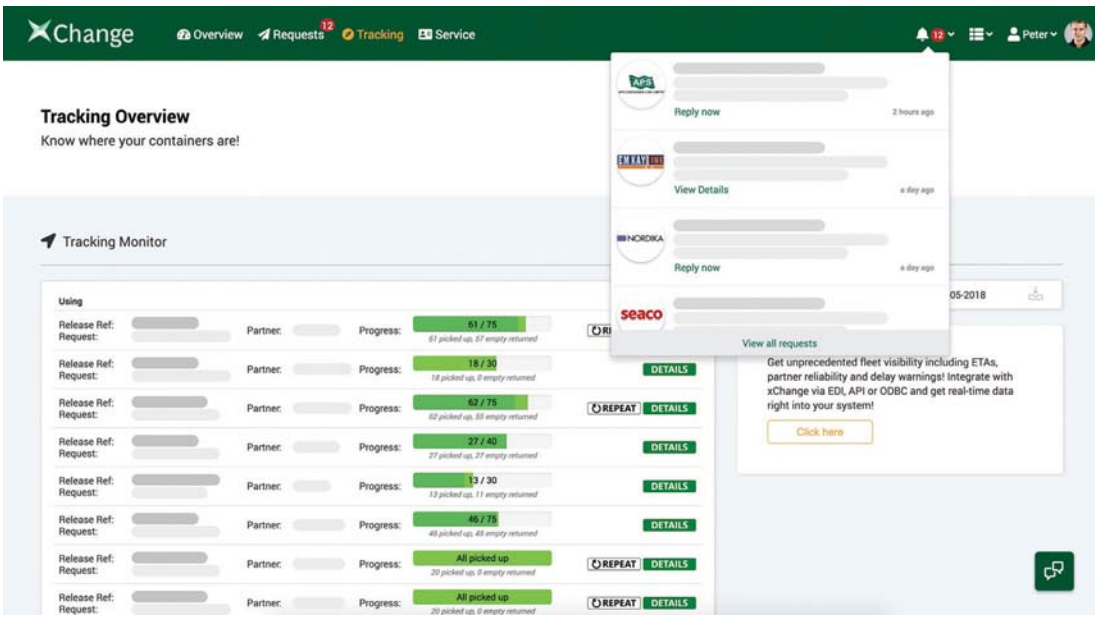
It is estimated that more than 6.4 million TEUs are repositioned empty every year, and with them, a cumulative resulting 12,243,200 kg of CO2 annually.

CONTAINER XCHANGE OFFERS A SOLUTION FOR EMPTY CONTAINER REPOSITIONING

Technology is beginning to tackle the problem. Launched in 2017, Container xChange created a neutral online market of empty containers that members can use to match loads and third-party equipment for one-way container moves.

"The benefit of the platform is that you are not limited to your personal network, you can engage with more than 300 companies right now," Florian Frese of Container xChange said. Users sign a multi-party interchange agreement that speeds up the contracting process by days or weeks. Container xChange has more than 300 users on its platform, including ocean carriers, container leasing companies, container traders, non-vessel-operating common carriers and freight forwarders. The service covers 2,500 locations worldwide and offers more than 300,000 boxes every week.

Users set their own rates and terms and conditions such as the container value and damage protection plan. Users search the listing for containers in locations where they are needed and with a destination close to where the container owner would like the boxes to end up. Over time the system learns an individual's search patterns.



"Once the system gets to know the customer, we can approach them proactively," says Christian Roeloffs, managing director of Container xChange. Container xChange is a one-stop shop for SOC containers and empty container repositioning covering container tracking, insurance, payment handling and many other services. Solving your empty container issues may just be a 'click' away. https://container-xchange.com

The Top 25 Ports in 2018

Everyone who likes a simple view loves a list. Top five scrubbers, top 10 cities, top 15 funny movies, top 20 ports. And so last year at this time we provided a list of the top 10 U.S. Ports by TEUs and value. That information was provided to us by the diligent folks at Descartes Datamine, one of the best maritime data crunchers on the planet.

Notably, the top 10 ports are the same for 2018. But the actual numbers for 2018 are larger, just as the numbers for 2017 are vastly larger because Descartes counts only loaded inbound containers, not all containers. So, the number of outbound containers in Los Angeles for 2017 was 1,900,000, and the number of empty containers handled in LA totaled 2,227,200; both were not counted in the Descartes survey. That's just the way they do things.

This is but one reason the exercise of counting containers, TEUs, (Twenty-foot equivalency units) handled by each port each year has become relatively meaningless, except to those ports who wish to, or need to, show some measure of growth. Unless you can count all TEUs plus the additional millions of tons of other cargo and its relative value, you are only getting part of the story.

Those Who Aspire

"The Port of New Orleans (Port NOLA) moved more containers in 2018 than at any time in its history, totaling 591,253 twenty-foot equivalent units (TEUs), up 12.3 percent compared to one year ago. The record marks the fifth year in a row Port NOLA has surpassed the half million TEU-mark at its Napoleon Avenue Container Terminal, which is operated by New Orleans Terminal and Ports America," according to the port's president.

"The expansion of the Panama Canal and growth in containerized exports, namely resin and frozen poultry, have buoyed Port NOLA's containerized cargo to record levels. In addition, loaded imported containers rose 7 percent, which continues to be a focus of Port NOLA's marketing efforts," said Brandy D. Christian, Port NOLA President and CEO. "We anticipate further growth, as direct all-water carrier services to Asia, Europe and the Mediterranean attract larger vessels."

Houston, number one in the U.S. in foreign tonnage and just ahead of New Orleans in total foreign tonnage, still aspires to top container port designation. At the end of August last year it could finally and truthfully make the claim: *"Houston Jumps To Top 5 U.S. Container Ports."*

The port of Houston release said, "Due to continued strong growth in loaded containerized cargo, Port Houston has surged higher in the rankings of the top container ports in the United States. Port Houston, which has been expanding rapidly in recent years, has climbed to become the fifth largest container port in the U.S., according to JOC Piers data covering the second quarter of 2018. Port Houston handled 1,057,964 twenty-foot-equivalent-units (TEUs) during that period and catapulted up from the sixth spot."

It added, "Port Houston is No. 1 in the U.S. in foreign tonnage and is now is in the Top 5 for containers with Los Angeles, New York, Savannah and Long Beach. Houston continues to close the gap. Port Houston is the largest container port in the U.S. Gulf of Mexico, handling about two-thirds of all the containers that move through the Gulf," it added.

In the 2018 time period Houston was first in the nation in terms of total cargo tonnage and third in total cargo value, far ahead of second place New Orleans in total tonnage and second place Port of New York, New Jersey in terms of cargo value, according to a study conducted by the Maryland Port Authority which has been

Top 10 U.S. Ports by TEU Ocean Imports 2017

Rank	Port	2017 TEU	2016 TEU	% TEU Change	2017 Value ($)	2016 Value	% Value change
1	*Los Angeles*	4,676,839	4,529,944	3.14	250,342,104,160	240,853,202,220	3.94
2	*Long Beach*	3,809,418	3,430,794	9.94	66,173,355,146	55,571,495,815	19.08
3	*NY, NY*	3,342,028	3,159,963	5.45	165,229,277,523	156,707,019,597	14.27
4	*Savannah, GA*	1,866,419	1,669,365	10.56	64,324,438,856	59,263,763,789	8.52
5	*Norfolk, VA*	1,239,561	1,160,247	6.40	64,244,702,895	56,416,150,185	13.88
6	*Houston, TX*	1,066,351	887,665	16.76	59,838,277,029	49,763,257,282	20.25
7	*Charleston, SC*	950,930	887,682	6.65	47,116,189,181	46,050,082,331	2.32
8	*Oakland, CA*	880,821	860,195	2.34	46,053,101,948	44,170,773,449	4.26
9	*Tacoma, WA*	822,211	950,332	– 5.58	40,522,155,131	43,773,762,429	– 7.43
10	*Seattle, WA*	624,567	513,479	17.79	38,210,599,053	35,919,618,827	6.38

(*) Source: Descartes Datamyne

doing this a long time and prefers to count all its cargo in tons and total value. *Here is the definitive port picture from Maryland:*

Rank	U.S. Port	2018	2017
1	*Los Angeles*	$ 297,048	$ 283,940
2	*Port of NY/NJ*	$ 206,827	$ 189,740
3	*Houston*	$ 159,249	$ 131,474
4	*Georgia Ports*	$ 119,516	$ 107,675
5	*Long Beach*	$ 109,166	$ 99,897
6	*Virginia Ports*	$ 79,336	$ 77,757
7	*SeaTac*	$ 77,510	$ 75,245
8	*SC Ports*	$ 72,690	$ 69,754
9	*Baltimore*	$ 59,723	$ 53,962
10	*New Orleans*	$ 53,371	$ 50,171
11	*Oakland*	$ 49,203	$ 47,790
12	*Corpus Christi*	$ 29,506	$ 22,733
13	*Jacksonville*	$ 25,678	$ 25,322
14	*Miami*	$ 25,665	$ 23,894
15	*Philadelphia*	$ 24,598	$ 22,561
16	*Port Everglades*	$ 24,404	$ 23,173
17	*Port Arthur*	$ 21,205	$ 15,338
18	*Gramercy*	$ 21,100	$ 19,203
19	*Beaumont*	$ 18,777	$ 13,240
20	*Mobile*	$ 18,703	$ 16,905
21	*Lake Charles*	$ 14,291	$ 11,178
22	*Wilmington, DE*	$ 13,821	$ 11,367
23	*San Juan*	$ 12,218	$ 9,902
24	*Baton Rouge*	$ 11,907	$ 9,930
25	*Portland, OR*	$11,843	$ 10,485
ALL	***	$ 1,761,609	$ 1,602,201

Rank	U.S. Port	2018 Tons	2017 Tons
1	*Houston*	201,540,173	180,855,210
2	*New Orleans*	127,643,304	127,795,757
3	*Port of NY/NJ*	85,170,792	81,626,497
4	*Los Angeles*	80,378,413	78,551,891
5	*Gramercy*	80,219,057	75,737,847
6	*Virginia Ports*	69,827,662	63,156,849
7	*Corpus Christi*	66,840,666	63,060,655
8	*Long Beach*	53,709,451	53,571,196
9	*Port Arthur*	52,920,432	50,534,141
10	*Lake Charles*	44,050,520	37,874,562
11	*Baltimore*	42,993,122	38,213,697
12	*Georgia Ports*	42,939,903	40,077,356
13	*Beaumont*	41,836,443	34,358,309
14	*SeaTac*	40,812,658	39,884,751
15	*Baton Rouge*	37,123,012	33,419,070
16	*Mobile*	36,589,914	36,178,686
17	*Philadelphia*	26,240,705	25,543,116
18	*Wilmington, DE*	25,108,054	25,704,747
19	*SC Ports*	22,768,642	25,050,692
20	*Freeport, TX*	21,139,140	19,556,790
21	*Texas City*	20,463,403	22,336,398
22	*Morgan City*	18,786,765	23,725,942
23	*Richmond, CA*	18,187,199	18,877,707
24	*Oakland*	17,670,989	17,942,979
25	*Portland, OR*	17,005,087	15,005.087
TOTALS	***	1,600,723,570	1,527,434,07

San Pedro Bay

Another reason we need to be cautious when reading lists of ports by containers is that individual shipping lines or, more so today, the big shipping alliances chose which terminal at which port receives a box of cargo, not the shipper or the port.

Any one container carried on any of Ocean Network Express (ONE) carriers, for example, could mean that a shipper's box transported on any one of the alliances members (NYK Line, 'K Line, and MOL) could be delivered to any one of seven terminals in the "Los Angeles–Long Beach complex," which is another way of saying the two ports at San Pedro Bay.

Each of the Japanese carriers had its own terminal at the Southern Californian complex, with 'K' Line's International Transportation Services and NYK's Yusen operating facilities at Long Beach, and MOL's TraPac operating the TraPac facility at Los Angeles. And now that they have merged, ONE's containers could go to either port at any time. The same is true for any of the containers carried on any of the other alliances.

The same is also true with the Port of Seattle and the Port of Tacoma, which now do business as a consolidated port: the Northwest Seaport Alliance. To the north, the Northwest Seaport Alliance has nine container terminals between Seattle and Tacoma ports. Alliance CEO John Wolfe said it will eventually reduce the number to four, with two in the North Harbor and two in the South Harbor, the new inside names of Seattle and Tacoma, called locally SeaTac.

The same is true for containers carried to the Port of New York/New Jersey, which offers seven different cargo terminal operators along a coastal area that includes 25 miles and two states. The ports' 2018 growth is attributed to the raising of the Bayonne Bridge clearance in 2017 from 151 feet to 215 feet, allowing the

world's largest container ships for the first time to pass under it and serve terminals in New York and New Jersey.

The top 10 global shipping lines control 84 percent of the world's container capacity, up from 53 percent in 2006. And consolidation is sure to continue. As Maersk CEO Soren Skou said to the Financial Times, "The industry is expected to consolidate further leaving about 5-6 major global carriers in the next decade or so to run the market."

Already, many lists by TEU include Los Angeles/Long Beach together as San Pedro Bay. They include SeaTac or Seattle/Tacoma as one port, the NWSA or Northwest Seaport Alliance. And they count NY/NJ as one giant port. As you can see from the next list that would reduce six ports among the top 10 to three, and move others up.

To portray an accurate picture of TEUs at the ports including import TEUs, export TEUs and empty TEUs we have decided to use the little known Port Performance Freight Statistic Report to Congress 2017 to report the 2017 totals. To report the 2018 totals we have used the ports' own statistics from 2018 as described in each of their press releases.

Shipping Alliances 2018

Alliance	Members	Details of Alliance
2M	MSC, Maersk, HMM	*223 ships with a capacity of around 2.4 million TEUs operating 25 weekly services globally covering 1327 port pairs*
Ocean Alliance	CMA-CGM, Cosco Group, OOCL & Evergreen	*323 ships with a capacity of around 3.5 million TEUs operating 40 weekly services globally covering 1571 port pairs*
ONE / One Network Express	Hapag Lloyd, NYK, Yang Ming, MOL, K-Line	*241 ships with a capacity of around 3.3 million TEUs operating 32 weekly services globally covering 1152 port pairs*

(*) These 3 alliances, covering 11 lines, include all 10 of the Top 10 container liners in the world + number 15 in the world, K-Line.)

Port	TOTAL TEU's 2018	TOTAL TEU's 2017	Import	Export	Empty
Los Angeles	**9,458,748**	*9,343,200*	*4,716,000*	*1,900,000*	*2,727,200*
Long Beach	**8,100,000**	*7,545,000*	*3,863,000*	*1,471,000*	*2,211,000*
NY/NJ	**7,719,788**	*6,710,000*	*3,396,000*	*1,415,000*	*1,899,000*
Savannah, GA	**4,350,000**	*4,046,000*	*1,876,000*	*1,372,000*	*798,000*
Norfolk	**2,850,000**	*2,961,000*	*1,276,000*	*1,135,000*	*550,000*
Houston	**2,700,000**	*2,459,000*	*1,076,000*	*966,000*	*417,000*
Oakland	**2,500,000**	*2,421,000*	*920,000*	*931,000*	*570,000*
Charleston, SC	**2,300,000**	*2,177,000*	*955,000*	*804,000*	*418,000*
Tacoma WA	**1,972,268**	*2,012,000*	*866,000*	*726,000*	*420,000*
Seattle, WA	**1,825,358**	*1,690,000*	*651,000*	*597,000*	*442,000*
Port Everglades	**1,108,465**	*1,074,000*	*359,000*	*442,000*	*273,000*
Miami, FL	**1,084,000**	*1,047,000*	*395,000*	*390,000*	*262,000*
Baltimore, MD	**1,023,161**	*963,000*	*474,000*	*241,000*	*248,000*
Jacksonville	**879,934**	*1,108,000*	*294,000*	*436,000*	*378,000*
Philadelphia	**600,000**	*923,000*	*268,000*	*277,000*	*378,000*
New Orleans	**591,253**	*526,000*	*114,000*	*274,000*	*138,000*
Wilmington, NC	**350,000**	*247,000*	*75,000*	*115,000*	*57,000*
Boston, MA	**298,036**	*271,000*	*130,000*	*88,000*	*53,000*
Palm Beach	**230,390**	*275,000*	*134,000*	*141,000*	*0*
Wilmington, DE	**215,000**	*376,000*	*188,000*	*72,000*	*116,000*

(*) The Port Performance Annual Report to Congress 2017:
Data provided by US Army Corps of Engineers Waterborne Commerce Statistics Center was used to identify the top 25 ports.

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