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Tessa Major and Patrick Verhoeven discuss how ports serve as

how ports serve as regional employer and social enterprise Photo: Port of Açu

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Doing more

Recent disruptive events have shown the need for IAPH to help members prepare for them

Santiago Garcia-Milà IAPH President

The tragic explosion at the port of Beirut in August, which cost so many lives and injuries and has destroyed and deformed major parts of the Beirut cityscape, is of a magnitude that would appear exceptional. While the investigation into the root cause(s) of the incident is still ongoing, a similar incident would indeed be unlikely to happen in most ports around the world. Still, port authorities would do well to account for major disruptive events, whether they are of a global nature, such as a pandemic or rising sea levels, or whether they are related to the specific physical, economic, or political circumstances in which the port operates. Port authorities need to look beyond their own daily operational risks and set up a business continuity policy, which considers the unexpected. That means they should also be taking a close interest in the risks posed by their tenants and other business partners.

The 21st century has had three major global crises so far, set off by terrorist attacks, excessive financial risk-taking, and a pandemic. Add to that a multitude of local disruptive incidents

Port authorities would do well to account for major disruptive events

of a varied nature and it should be clear that – given the vast strategic, economic, and social interests that are at stake in a port – a business continuity policy is anything but a luxury. Yet there are indications that few port authorities around so far have such a policy, let alone that they would have someone fully dedicated in their senior management team.

Therefore, the IAPH board has decided to add 'risk and resilience' to the strategic priorities of our organisation, in addition to 'climate and energy' and 'data collaboration' on which we can already build on a consistent legacy. These three areas align with the themes of the World Ports Sustainability Program, where IAPH is best placed to lead, focussing on truly global issues and the specific role and responsibilities of port authorities, the hybrid agencies that we proudly represent.

The board has not just identified the priority themes, it has also decided to put the money where its mouth is, by reallocating the resources that are available to us. Our people will from now on work in two complementary operational units: the Policy and Strategy unit, led by the managing director, and the Finance and Administration unit, led by the secretary-general. As always, I count on your engagement and support in fostering the future of our organisation. PH

Port updates

COVID-19 sets to change cruise sector dining With some cruise ships leaving ports again with passengers on board, Christian loannou, managing director of cruise catering specialist MCTC Leisure, said life on board would be very different post-COVID-19. Costs will increase due to limitations in passenger numbers because of social distancing restrictions, and there will be an increase in hygiene procedures and extra precautions in place to provide a safe environment, he added.

"The overall client experience is changing, as table service will be limited and buffets will no longer be allowed. The tide is turning towards digitalisation and away from human contact. Menus will be displayed digitally, and orders placed online to limit exposure to others to help increase safety levels. In turn, it means that prices will increase in dining experiences as cruise lines need to cover their operating expenditure regardless of client numbers," he added. "I believe we will see an increase in high-end dishes, not in respect to expensive ingredients though, because we need to substitute the loss of the dining experience. A la carte service will be the heart of the restaurant and menus will need to entice diners inside and away from room service. Overall, the expectation for fine dining shall be a necessity for the industry to keep catering on board afloat," he said.





The aftermath of the explosion in the port of Beirut, Lebanon

Calls to ensure safe storage of cargo amid Beirut aftermath

Questions remain on how the devastating explosion at the port of Beirut, which happened on 4 August 2020, could have been prevented. Some of the answers from port officials indicated that they were not aware of just how dangerous the ammonium nitrate was, where it was stored in a warehouse. Additionally, efforts to get the material moved, mandated to be stored in the port by a court following the abandonment of the cargo owner, were not taken seriously.

As a first measure, port officials who are responsible for safety and storage of the cargo have been placed under house arrest.

The explosion shows that more needs to be done to ensure safe storage of dangerous goods (DG) and other cargoes in ports. According to insurer TT Club, "Apart from the recent devastating explosion in Beirut, there has been a spate of ro-ro/car carrier fires in recent months, leading to fresh calls for improvements, scrutiny, and control in relation to DG. Container ship fires are always in mind," Peregrine Storrs-Fox, risk management director of TT Club, said.

The US National Cargo Bureau (NCB) published a white paper looking into the safety of cargo just a month before the explosion. In conclusion, it "recommends a comprehensive, holistic dangerous goods programme that sets a high, minimum bar for achieving regulatory compliance requiring a robust internal safety culture with strong management backing".

During a recent container safety inspection initiative, "55% of inspected containers failed to comply, including 43% for poor securing of cargo within the container. Approximately 6.5% of the DG containers contained cargoes that had been misdeclared," the NCB said in the white paper. "Interestingly, for DG containers exported from the US, the failure rate was 38% which, when compared to the annual average of 7.9% for regular inspections, may be a strong indication that shippers and consolidators are more likely to comply with applicable regulations if there is a reasonable chance their shipment will be inspected."

Meanwhile, Beirut port has been fully operational again since 11 August. "We are proud to announce that within days of the catastrophic explosion at the port of Beirut [POB], the handling operations have fully resumed. POB is seeking contributions or professional support from local and international professionals willing to lend their solidarity and support to the port in the major reconstruction," a statement on the port website read.

The IAPH has extended its condolences to the port director, Hassan Kraytem, following the deaths and destruction caused by the explosion. President Santiago Garcia-Milà has also offered the association's unstinting support to the fellow IAPH member port.

Strike backlog takes up to four weeks to unload

Montreal port employers said at the end of August it will take two to four weeks to recover from about 11,500 container backlog caused by a month-long series of labour strikes, after they and longshore workers announced a seven-month truce on 21 August.

The end of the strike marks the beginning of the end for costly cargo divisions to other container ports. But it remains to be seen whether the strike has eroded Montreal's competitive edge for cargo headed to and from the US Midwest and the greater Toronto region, as eastern Canadian ports vie for discretionary cargo. Starting in early July, port longshore workers launched two four-day strikes before launching an indefinite strike on 10 August, which damaged the economy of the port more than COVID-19, Pierre Fitzgibbon, Quebec's minister of economy and innovation, had warned.

Port Klang gives incentives to mitigate COVID-19 effect

The Port Klang Authority (PKA) will provide incentives of MYR17 million (USD4 million) to terminal operators in 2020, as container volumes are predicted to shrink by more than 16% y/y to 11.4 million teu, due to the COVID-19 pandemic.

Port Klang is Malaysia's busiest container port, having handled more than 13.6 million teu in 2019, making it the world's 12th busiest port.

During a visit to Port Klang on 9 July 2020, Malaysia's Transport Minister Wee Ka Siong said that cargo volumes in the first half of 2020 dropped by 9.3% y/y, as supply chains and industrial production were disrupted by the COVID-19 pandemic. The minister said that the latter half of the year is not expected to be better.

Wee disclosed that the government's three economic stimulus packages and a short-term economic recovery plan, which were launched between March and June, are beginning to pay off.

Since June, Port Klang's volumes have been rising, and were better than the March–May period.

With the economy getting



Port Klang, Malaysia

better with time, Wee said that the government hoped that Port Klang's 2020 throughput will show only a mild contraction.

Extra help is coming in the form of extended free docking periods for containers. The complimentary period has been stretched from four to six days for container imports, and from five to seven days for outbound containers.

The PKA will also waive various government levies and fees by removing the need for various licences and permits, but this will be discussed with the relevant government agencies, said Wee.

Furthermore, Northport and Westports, Port Klang's two main

terminal operators, will also offer discounts to liner operators and shippers. The PKA will also provide subsidies and tax relief for the terminal operators, amounting to MYR3.23 million by the end of the year. Tenants in Port Klang Free Zone (PKFZ) may also defer up to 30% of rentals payable between July and December 2020. The total amount of the deferment is expected to come up to MYR14 million.Wee emphasised that the PKFZ is one of the port's businesses and achieved a surplus of MYR79 million in 2019.

Wee said the PKA will continue to promote digitalisation to improve Port Klang's efficiency.

Port updates

Mexico defies COVID-19 impact on exports Using bill of lading data, IHS Markit has analysed trade disruptions in Mexico caused by the COVID-19 pandemic. IHS Markit analysed data from late March to June 2020.

Mexico did not impose large-scale quarantines until the last week of March (week 13), therefore export volumes were relatively flat through that week even as the quarantines affected trade for many other countries worldwide. However, export contraction reflected significantly in April (weeks 14–17) and worsened into May (weeks 18–21) as well as most of June (weeks 22–26).

However, the last three weeks in June (weeks 24–26) reflected a pronounced reversal of the export contraction, trending just 14.54% lower than 2019 volumes in week 24 and 7.74% lower in week 25. By the completion of week 26, containerised exports to the US had actually grown 26.48% over 2019 volumes for the same week. The week 26 containerised export count of 139,761 teu was the highest weekly volumes reported so far, including 2019 and 2020.

Most cross-border containerised goods are moved by truck (83.5%), followed by rail (12.5%), and sea (4%), with little change year on year despite the pandemic disruption. The focus of exports is on automotive, digital processing machines, and crude oil.



Port **updates**

Taipei and Kaohsiung ports offer fast-track customs clearance

Pent-up demand for rigs should benefit 2022 While 2020 started out with hopes of being a turnaround year after a lengthy downturn that began in 2014, those hopes were dashed by the fastspreading COVID-19 virus and the oil price war that started in March between Saudi Arabia and Russia. Therefore, the global offshore rig market once again finds itself in a downturn. However, given the short, slow recovery that was under way before March, the industry has had little time to build itself backup.

Eighteen drillships are under construction, all of which have scheduled delivery dates by the end of 2022. "However, given that only two have firm charters in place at this time, we anticipate some of these delivery dates will be pushed out until market conditions warrant their addition to the global supply. We are expecting weakness in drillship demand this year, most of which is currently pushed into 2021," said Cinnamon Edralin, senior offshore rig market analyst at IHS Markit.

Recovery started for Japanese crude oil imports Japan crude oil imports increased by 13.6% m/m in July 2020, but remained around 29% lower than a year ago. The country's appetite for crude oil seems to be slowly recovering after reaching a record low in June, when imports dropped below 2 million barrels per day (million bpd). Data by IHS Markit Commodities at Sea for the first 10 days of August suggested imports continued to slowly but steadily recover, with activity so far standing at 2.35 million b/d. A 7.7% m/m growth was observed in the first 10 days of August, but volumes were still significantly below normal levels. Japan imported more than 25% in August 2019 compared with August 2020.

The Taiwanese ports of Kaohsiung and Taipei have opened express customs clearance facilities, as COVID-19related lockdowns have resulted in more e-commerce retail sales.

Commercial aviation has nearly stopped due to travel restrictions and the lack of international flights has caused e-commerce merchants and postal services to turn to shipping.

Therefore, there is a need for expedited customs clearance to ensure the goods get to the consumers in the shortest time possible.

Taipei port launched an express customs clearance facility after Taipei Port Container Terminal (TPCT) did so on 18 May 2020.

TPCT is a joint venture between Taiwan's three largest liner operators: Evergreen Marine Corporation, Yang Ming Marine Transport Corporation, and Wan Hai Lines. TPCT's facility was built in the warehouse in the terminal, using x-ray machines, synchronous displays, and dynamic weighing systems to speed up customs clearance.

On 3 June, Kaohsiung, Taiwan's busiest container port, opened an express customs clearance facility, which was built by port operator Taiwan International Ports Corporation (TIPC).

TIPC selected logistics company First Union Postal Transport to operate the facility through an open tender. The facility has two x-ray machines for dual-angle imaging of cargoes, two sets of synchronous display devices, conveyor belts, video surveillance, and sniffer dogs. The Taipei and Kaohsiung

facilities each have two



Kaohsiung express customs facility

customs clearance lanes in the initial phase.

Each lane can clear seven to eight 40 ft containers each day. Depending on market demand, more lanes may be created in the future.

TPCT's management said, "Through working with various liner operators, we can offer vessel berthing, unsealing of containers, customs clearance, and transportation.

This allows e-commerce companies on both sides of the Taiwan Strait to enjoy faster, more convenient, and safer logistics customs clearance services."

The management added that Taipei port is near Taoyuan International Airport, which makes it possible for goods to be transported through a combination of air and sea freight.

Therefore, Taipei port can become a logistics

hub for international e-commerce in future.

TIPC noted that East Asia and Southeast Asia have a large population and, in recent years, economic growth has already fuelled regional consumption, making these regions the fastest growing e-commerce markets in the world, the port authority estimated.

Both regions also have the highest mobile internet access rate in the world, which indirectly feeds e-commerce.

Kaohsiung's express customs warehouse facility is near wharves 63 and 64, which is operated by Wan Hai Lines.

Road traffic around the facility is smooth, allowing containers to be trucked along Xinsheng Expressway, which connects to National Freeway 1, Provincial Highway 88, and National Freeway 3, making transportation quick and cost-efficient.

Energy storage critical in supporting network

As renewable penetration increases, transmission and distribution (T&D) infrastructure will require significant reinforcement, IHS Markit analysis has shown.

"Battery energy storage is becoming a key alternative to traditional ways of reinforcing network infrastructure because it's fast to deploy, can provide multiple services, and often comes at a lower capital cost," Oliver Forsyth, IHS Markit energy storage market analyst, said. IHS Markit predicts that 5.4 GW of battery energy storage will be installed for T&D enhancement between 2020 and 2025. However, the services that a T&D-enhancing energy storage system will provide are influenced by location of the system, local regulation, and conditions of the network.

COVID-19 impacts US trade

Overall, the US has experienced a significant impact from COVID-19, despite the fact not all states have adhered to strict lockdowns.

States that had stricter lockdowns were having a faster slowdown in trade and port activities.

In early July, much of the world was slowly returning to a new sense of normality following the COVID-19 pandemic. The US is no exception, with many states having been open since early May and US President Donald Trump actively pressing for schools to reopen and business to return to normal.

However, in the US, the number of COVID-19 cases had risen above five million and deaths will have risen above 200,000 by September, according to the US Centers for Disease Control and Prevention. Congress is currently seeking to extend financial aid and the number of new unemployment claims has topped one million for the last 17 weeks.

The situation in the state of California, for example, is serious with more than 400,000 COVID-19 cases confirmed. California was the first state to use stay-at-home orders at the end of March, while the rest of the nation were still carrying on



An aerial view of oil tankers anchored near the ports of Long Beach and Los Angeles amid the COVID-19 pandemic on 28 April 2020

a business-as-usual approach. Consequently, Californian imports are well below that of 2019, with a continual decrease from January to April. There was a slight increase in trade in May, coinciding with the lifting of lockdown restrictions; however, given the reinstated lockdown, IHS Markit estimates trade to be hit again.

"Most of the imports are mineral fuels, which have been hard hit throughout COVID-19 with a lack of demand globally causing record lows in crude oil prices," said Alice Gladen, who works as senior regional operations/ SME analyst at IHS Markit.

For the calls to ports in California, the levels were relatively stable until April and May, in which the levels were down by about 18% from March levels and dropping below the 2019 levels.

This coincides with the introduct ion of lockdown and then drop in imports in April and May, suggesting a likely correlation. "The ongoing monitoring of port callings and trade data will provide an interesting insight into the impact of COVID-19," Gladen said.

Port updates

EU focusses on decarbonised hydrogen A new European Commission communication proposes an EU hydrogen strategy.

Together with five recently announced national strategies and a strong statement from the Pentalateral Energy Forum, this represents a new and positive framework for companies that are now developing hydrogen projects as a key part of their energy operations.

The timing is significant. All the strategies were published after the start of the COVID-19 pandemic, between March and July 2020.

These strategic proposals give a strong signal that hydrogen and decarbonisation of gas are integral to medium-term green recovery packages and are needed to meet Europe's 2030 and mid-century netzero carbon targets, Shankari Srinivasan, vice-president of energy, gas, and power at IHS Markit, said.

"The strategies clearly describe governments' intentions for hydrogen; they each propose specific project support measures, and all stages of the hydrogen value chain are covered," she added.

The strategies envisage a major role for low-carbon gas in the energy system of the future.

"Moreover, they anticipate the development of an intra-EU and internationally traded market for hydrogen within 10 years," Srinivasan concluded.



New kid on the block

Tessa Major, of the Brazilian Port of Açu, and Patrick Verhoeven, IAPH, tell *Ines Nastali* about the COVID-19 response for ports and how it is helping to form the association's future work

when I started in the position of regional vice president for Central and South America within IAPH, it was with the commitment to show that a young port can be a proactive leader," said Tessa Major, director of international business and innovation at the Port of Açu in Brazil, describing her vision of what she wanted to achieve with the port. Before she took on her current role, Major already served as commercial director for two years at the port, which became operational in 2014.

She got the chance to prove herself and the port's work sooner than she anticipated. "I didn't imagine that the vice presidency of Port of Açu would be able to make such a global impact in such as short term," she admitted.

This was possible because COVID-19 hit and Major stepped into action. Not only did she start up a new department at the port, focussing on international business, after two years as commercial director, the Belgian national also became member of the IAPH board at the beginning of 2020.

"Communication with the board is important to ensure the needs of the Latin American members are reflected," she said.

"Latin American ports were underrepresented in IAPH," said Patrick Verhoeven, managing director of policy and strategy at the IAPH, adding that following the appointment of Major, the continent has made a strong contribution. He is referring to her involvement with the IAPH COVID-19 taskforce, which she helped to set up as a first step in her new role. The taskforce equipped the port community with two tools: a weekly barometer showing the impact of the virus on daily operations and a guidance document to help ports deal with implications of COVID-19 (see page 40).

The guidance was born out of curiosity of the Port of Açu's leadership team "to see what was going on in other ports where COVID-19 had arrived earlier", Major said. She added, "Rather than just sitting on that information for the benefit of the Port of Açu, we generated the first guidance document, which was then shared with IAPH members and led to the formation of the COVID-19 taskforce."

Working together

For Major, the taskforce has been a success because "everyone is making time for it, the amount of work that that's been done is incredible".

"It is amazing to be able to call Jens Meier at the Port of Hamburg and Luc Arnouts in Antwerp and the next day you have a C-level meeting where they explain how



Port of Açu in Brazil. It has been operational since 2014



they deal with COVID-19 in their respective ports," she described an example of a quick response from fellow IAPH members. "This collaboration ended up being the core nucleus of the taskforce," Major explained.

As a result, although Brazil has been badly hit by the virus and countries around the world now face holidaymakers returning, potentially endangering stable case numbers, ports have plans in place to deal with COVID-19. For Major, this means she can now focus on enhancing collaboration among IAPH members.

Part of this has been to work on IAPH's new organisational structure, with a new risk and resilience focus. "This was something that we didn't have on our agenda in the past," Verhoeven said. "This has really opened our eyes to question the way we have dealt with other committees."

He added, "Previously, we have left everything to the chair, but you need both, leadership and backing from the organisation." In the end, the board decided to go back to three core areas: climate and energy, data collaboration, and risk and resilience (see page 36).

Major is currently discussing the scope of work for the risk and resilience committee, including clear deliverables. Going forward, she would like to see "maximum involvement" and participation from all six IAPH regions. "I am looking for the commitment to move the needle," she illustrated her vision.

For Verhoeven, it is vital that associate members also get involved for IAPH to have representation from across the supply chain. "They are an untapped resource," he said. In addition, he would like that experts join the discussion and bring their expertise to the table. "With the COVID-19 taskforce, we had people with operational knowledge and an economics background," he said.

Working with the community

It shows that co-operation is important in times like these. "We see our role as a port developer and community builder, being the economic engine of the region," Major said, which comes with a certain responsibility for the people living there. So, while the port itself was able to remain open and continue its business, Major and her team ensured that citizens were cared for by, for example, donating personal protective equipment and tonnes of food. The port also sponsored the repair of lung ventilators to ensure proper equipment was available in the region.

Regarding the port's future business, some of the deals that Major had arranged when she served as commercial director, have now come into fruition.

Part of this are two new deals the port was able to strike in August 2020. The first one is with engineering company OceanPact to set up one emergency response as well as a general offshore logistics hub within the port, including dredging and berth construction works.

With this deal, the port confirmed its status as oil and gas hub, but it also looks to expand away from pure fossil fuels. One of its other clients, GNA, together with the port's strategic development group Prumo, energy players BP, Siemens, and SPIC, will further develop existing liquefied natural gas (LNG)-to-power projects. This GNA I–IV project series is expected to be fuelled by a combination of LNG and gas from Brazilian pre-salt reserves. "I can't begin to explain how proud I am of my colleagues that we were able to facilitate these deals in economically challenging times," Major said.

Future plans include the production of green hydrogen and ammonia in the port. For Major, sustainability is a business model. "We see sustainability as a business differentiator towards competitors and it's part of the value proposition of the Port of Açu," she explained.

At the same time, she said, the topic does not yet have the same level of importance in Latin America than it has in, for example, Europe or North America.

With contingency plans in place for ports to deal with COVID-19 and her port set-up for the future, Major now focusses on fostering further collaboration among the IAPH membership. **PH**

Tessa Major, and Jacques Vandermeiren (Port of Antwerp), will speak at the IHS Markit/IAPH ports as community builders webinar on 16 September. Register here: ihsmark.it/c7Es50B4n9q



Driven by data

Increased digitalisation and data analysis can bring the maritime sector a wealth of benefits provided that companies are willing to work together to progress towards a shared goal, says **AI Tama**, vice-president and general manager, container and port solutions/technology at ORBCOMM

he ongoing global COVID-19 pandemic has thrust digital technology into the spotlight of the maritime world, accelerating conversations about large-scale change that would ordinarily have taken a backseat to other operational concerns.

The need to pivot to a digital-first model wherever possible has built an airtight business case to boost transparency along the supply chain and facilitate remote monitoring of assets. Given that the average person is now used to tracking their assets in real time, whether this is an Amazon package or an Uber vehicle, this change is long overdue.

Making use of technology

It is not that this technology does not exist. The automatic identification system (AIS) is one of the most established and comprehensive maritime data streams available today. In fact, many organisations already harness this data for a variety of uses, from vessel tracking and maritime safety to fleet management and enforcement of regulations. Furthermore, we have been talking about big data, internet of things (IoT), blockchain, and more in a maritime context for many years, and there are already test cases for harnessing these tools that have demonstrated tangible benefits.

We at ORBCOMM have long been advocates for increased transparency in the maritime industry and have assisted shipping, fishing, port, and containers sectors. Clients use our thousands of satellite and terrestrial data sources to construct an accurate, time-sensitive picture of the supply chain. Merging various data streams to allow real-time asset management in the supply chain is the obvious direction for the maritime industry to take, so that we close the gap with other transport sectors.

The fly in the ointment is digital cohesion, where the industry must agree upon



standardisation of data terms and then create interoperable technologies that can work as an effective whole.

The maritime industry is currently extremely fragmented, and getting various stakeholders to agree to industry-wide data standards and terminology will take considerable time and effort to overcome. Afterall, even in the case of shipping, you not only have different vessel categories but within individual categories, company size and access to capital for investment will all vary. When you take a step back and consider additional stakeholders such as ports, charters, ship managers, equipment manufacturers, and more – each with their own priorities - it is easy to understand why the maritime industry has been slower to digitise than many other sectors.

True change

However, we are on the cusp of change and, despite the challenges to align digital input from so many different sources, we

The maritime industry is currently extremely fragmented

Al Tama

Vice-president and general manager, container and port solutions/technology at ORBCOMM

have recently seen a number of highprofile efforts out to break down the digital silos between stakeholders.

In June 2020, the Digital Container Shipping Association, whose membership consists of some of the leading international container lines, published IoT connectivity interface standards for shipping containers. The standards are designed to level the playing field across the supply chain and enshrine interoperability between smart container solutions at the radio interface level. It applies to shipowners, ports, terminals, container yards, inland logistics providers, and other third parties. The fact that these standards, and others released by the association, are being championed by the container lines virtually guarantees their wide adoption and overcomes the hurdle of industry buy-in.

Another victory for data synergy came in the form of a joint policy document submitted to the International Maritime Organization (IMO) in June by a group of extremely highprofile industry associations, including the IAPH. Titled Accelerating Digitalisation of Maritime Trade and Logistics: A Call to Action, the document aims to accelerate the adoption of the IMO's single maritime window initiative, harmonise data standards, and push for the adoption of port community systems.

The IMO, which has been making digital inroads for over a decade with projects such as the Electronic Chart Display and Information System (ECDIS), drew a line in the sand in 2019 by mandating electronic ship-to-shore communication through amendments to its Facilitation of International Maritime Traffic (FAL) regulation. Most recently, its publicprivate partnership Global Industry Alliance released a just-in-time arrival guide that will facilitate port call optimisation by allowing vessels and ports to exchange data (see page



39). This will permit vessels to match their operating speed to the availability of berths at their destination ports – an effort that brings cost and environmental benefits.

There are multiple projects by private shipping companies that have been in place for years; new efforts are also are emerging virtually every day. The pandemic has irrefutably highlighted the risk management advantages to identifying where vessels and cargoes are at every stage of the transportation journey, as being a victim of bottlenecks in the supply chain has serious financial and reputational implications (see page 18).

Going further

These various efforts are music to our ears as we truly believe that data is the fuel that will propel us to the next stage, and we support all efforts to create a level digital playing field with ease of access for innovators. We acknowledge that there will almost certainly be teething issues as the industry adjusts to a new technology. Verifying the veracity of the data, cyber security, and accurate analysis are just some of the hurdles that will follow in the wake of harmonised standards, and companies must protect and future-proof themselves with the help of experts such as ourselves.

As a company with a long-term investment in the maritime sector, we know the benefits of advancing as a unified industry outweigh any advantages that fragmented growth can bring. We look forward to the collaborative opportunities that arise as more people identify the opportunities that data analysis and IoT grant them access to and stand ready to embrace what the World Economic Forum has termed the Fourth Industrial Revolution in 2016 – the power of data. **PH**

It works – if it works

Viable carbon-capture projects around the globe are picking up, opening up new possibilities for ports to reduce carbon emissions, reports *Charlie Bartlett*

hy is the carbon dioxide (CO₂) emitted from burning oil heavier than the oil itself? The answer is that during combustion, each carbon molecule combines with oxygen (O₂) thus making for a compound, which is almost four times the atomic weight of a carbon atom. This explains

the confusing fact why 1 tonne of fuel burned in an engine will result in more than 3 tonnes of CO_2 emissions. It is also a huge problem for those looking to carbon capture and storage (CCS) as a solution to climate change.

The proposition of CCS is twofold, since it actually



consists of two massive engineering problems which, at the time of writing, do not have definitive answers: extracting the CO_2 already in the atmosphere or from engine exhaust, and finding a way to store the gas so that it cannot escape.

Some have theorised that large underground caverns are the solution. It is here that humanity finds its miraculous yet world-sickening energy source in the first place. Having paid oil and gas companies exorbitant subsidies to find and extract this carbon, we could now pay them to put it back in again, using a technology that has already been used for some time – albeit far from perfected.

In fact, the process of stimulating oil wells by squirting CO2 into them – or enhanced oil recovery (EOR) – is already well understood. The gas displaces the oil, forcing it to the top of the well where it can be accessed and extracted. But today, every one of these initiatives use CO_2 extracted from underground reservoirs – not sequestered from the air. This is a problem – extracting and using CO_2 from ambient air for this purpose will boost oil extraction – that will ultimately feed the larger problem.

Under the rug

Five major oil companies such as BP, Eni, Equinor, Shell, and Total have formed a consortium to bring carbon sequestration options to the market. One of these is the Net Zero Teesside project. The initiative involves developing infrastructure necessary to compress CO_2 and bury it underneath the North Sea. The project will capture an annual 6.61 million tonnes of CO_2 , which covers the energy consumption of 2 million UK homes.

0294

The initiative, and others like it, is geared towards the United Kingdom's target of net zero CO₂ emissions by 2050. There are 29 million homes overall and there is virtually no chance of preventing CO₂ emissions to support the nation's power-generation needs by this date. The UK Department for Business, Energy, and Industrial Strategy estimated that it contributed 18% of UK carbon emissions versus 33% from the transport sector. However, it is hoped that carbon-capture technology will offset this sufficiently to balance it.

If the notion is taken seriously, this implies a huge growth market for carbon-capture projects over the next three decades, and the North Sea region is getting a great deal of attention, which will bring a massive economic boost to the UK's northeast coast.

Meanwhile, the Northern Lights project plans to store large amounts of CO_2 on the Norwegian continental shelf. Norwegian authorities conducted various tests in which a well was drilled. Now, the Norwegian government has committed to the construction of a CO_2 -receiving terminal in Øygarden, on Norway's west coast. The facility would capture some 1.5 million tonnes of CO_2 annually, transport them out to sea, and store them in a chamber 2.5 km below the seabed. Due to come online during 2024, Phase One amounts to an initial investment of NOK6.9 million (USD752,000), which is expected to be followed by others in series, with investment originating from industries across Europe.

A joint effort

The Port of Rotterdam Authority in the Netherlands is forging ahead with a project to store captured carbon in various disused natural gas wells. Its Port of Rotterdam CO_2 transport hub and offshore storage (Porthos) project will harvest CO_2 from industrial emitters in and around the port itself – accounting for about 16% of the Netherlands' CO_2 emissions. The CO_2 will then be transported to a compressor station and a pipeline linked with an offshore platform will send it out to be buried 20 km out to sea, at a rate of 2.5 million tonnes per year. The wells are said to have a capacity of 37 million tonnes, giving 14 years' storage – assuming no other arrangement can be made.

We need both a political and a technical approach to reducing greenhouse gas

Kazuki Saiki, deputy manager of Ship and Ocean Engineering department, MHI

For shipping's part, the International Maritime Organization (IMO) has targeted a 50% reduction in emissions by 2050 compared with 2008 levels. Therefore it is not surprising that the maritime industry



is making various inroads into carbon capture, as it is generally understood that there is no workable alternative to hydrocarbon fuel for powering the largest ultra-large container vessels (ULCVs) and very large crude carriers (VLCCs).

While separating CO_2 from ship exhaust and storing it on board appears to be possible, unfortunately it is extraordinarily expensive.

Mitsubishi Heavy Industries (MHI) recently estimated that adding four cooling towers, a liquefaction plant, and carbon storage tanks – a system called Carbon Capture-Methanation Cycle (CC-Meth) – to a VLCC would offset 2% of cargo capacity on board, and add a capital expenditure cost of USD45 million for a newbuilding vessel.

"I think we would need to ask industries beyond ours to help bear the costs, because shipping may not be able to do this alone," said Kazuki Saiki, MHI deputy manager of the Ship & Ocean Engineering department. "We need both a political and a technical approach to reducing greenhouse gas emissions."

However, on a slightly more hopeful note, Saiki added, "The costs can be reduced dramatically with competition, and I am confident that shipbuilders can overcome the technical challenges of scaling down the carbon-capture unit."



Countries and the shipping industry are aiming to cut down CO₂ emissions through various initiatives

Reverse the polarity

New ideas may indeed be able to change this. In October 2019, Sahag Voskian developed a new concept, which he dubbed "Faradaic electro-swing reactive adsorption for CO_2 capture" during his PhD study at the Massachusetts Institute of Technology in the United States. It would involve running a stream of air – or exhaust – over a set of charged electrochemical plates coated with a carbon-reactive compound called polyanthraquinone, which is composited with carbon nanotubes. According to Voskian, this material "has either a high affinity for CO_2 or no affinity whatsoever", depending on its state of electric charge.

Each plate would function like a battery, absorbing carbon while it charges, and releasing it when discharging. The device would cycle between charging and discharging, producing outputs of CO_2 -free exhaust on the one hand, and a side stream of pure CO_2 – which could then be easily sequestered – on the other. An industrial installation would comprise two sets of cells operating in parallel, with an inlet of exhaust being directed at one or the other in turn, to match their charge-discharge cycles.

"For example, if the desired end-product is pure carbon dioxide, then a stream of the pure gas can be blown through the plates. The captured gas is then released from the plates and joins the stream," he said.

Voskian claimed the technique uses about 1 gigajoule of energy per ton of CO_2 , which compares favourably with other methods requiring as much as 10 gigajoules per ton. Manufacturing the electrodes would be less difficult than it sounds. Voskian foresees them being fabricated in large rolls, similar to a printing press, for tens of dollars-per-cubic metre of electrode. Cheaper energy costs in making and operating such systems will be paramount, as it is vital that new renewable energy capacity be used to offset fossil fuel-fired power generation, not as support for CCS.

Torpedo, torpedo, torpedo

On the zany end of the scale, the DecarbonICE project posits it may prove possible to sequester and store large volumes of carbon from ship exhaust without any intermediary transportation or storage infrastructure required. That is, as long as fashioning it into massive dry ice projectiles does not seem too outlandish.

Each carbon descent vehicle (CDV) would be manufactured aboard ship and entails a hydrodynamically streamlined block of frozen CO₂ being dropped towards the seafloor to penetrate it like a torpedo. For a larger vessel, these CDVs could amount to 2 tonnes each, dropped every 15 minutes – mass that would otherwise be vented to the atmosphere as gas.

Once the vehicle is successfully embedded in the sand, its outer layer would, in theory, react with the sand to form a hydrate cement – a compound that would seal in the rest of the CO_2 , leaving it to gradually form a layer of containment around the vehicle. The cement

would then prevent it from leaking out into the ocean. Notably, CO_2 cannot exist as a gas at these depths.

"The pressure and temperature at the storage sites are such that the dry ice will be transformed first into liquid CO₂, which then reacts with pore water into CO₂ hydrate," DecarbonICE clarified in its literature. "CO₂ hydrate is not unknown to the seabed sediments, which already holds trillions of tons of CO₂ hydrate.

"The CO_2 hydrate is thermodynamically stable within the sediments, and it is prevented from raising in the sediments and potentially re-entering the deep bottom waters of the ocean. The CO_2 hydrate will be safely stored for a minimum of tens of thousands of years," the literature concluded.

The energy penalty for onboard manufacture of CDVs amounts to 10% of each vessel's total fuel burn. This is a high amount; however, it "still compares very favourably with what might be an investment of 300% or more for an alternative fuel system", Henrik O Madsen, head of the project steering committee, told reporters in February 2020.

"We are not the ones who will make prototypes, but we have partners who will pick it up and take it further," he said. "Shipping companies will have to challenge us over whether this is possible on real ships, and in relation to real freight."

Operating on liquefied natural gas could entail a 3% efficiency gain by running a heat exchanger from the ship's tank to its engine exhaust. Meanwhile, Madsen suggested that – if an owner is conscientious enough – a ship could, in fact, become carbonnegative, with the use of electro fuels. If emissionstrading schemes are adopted on a massive scale, there may even be financial incentives to run a ship this way. However, "the idea is that we can use existing ships and propulsion systems, as well as existing fuel infrastructure, while introducing no heat sources or high pressure, chemicals, or consumables".

No longer optional

Some way of mitigating the CO₂ already existing in the earth's atmosphere will be necessary if there is to be any hope of meeting the United Nation's more favourable climate change scenarios; the 2015 Paris climate accord still entails a catastrophic global rise of 3°C.

As offbeat as many of the solutions may seem, CCS is unfortunately not optional. It is rather, a mandatory step in any serious plan to mitigate extinction-scale global warming, along with the cheapest forms of energy in history such as wind and solar power. Similar with those industries, the immature carbon sequestration technologies of today will not be quite the same as those deployed on a global industrial scale by 2045.

However, it is encouraging that CCS is one such area in which climate change action could become a profitable business model, offering a slender hope that humanity might be able to avert disaster as quickly as we have invoked it. **PH**

Charting a route to the future

Climate change, resilience, and sustainability are in focus and choices made now will dictate competitiveness in the future, **Tony Slinn** reports

> Through its World Ports Sustainability Program (WPSP), guided by the 17 UN Sustainable Development Goals (SDGs), the IAPH has mapped a path to fulfil its mission to "enhance and co-ordinate future sustainability efforts of ports worldwide".

> WPSP's 2020 report was to have been given at the IAPH 2020 World Ports Conference, which has been cancelled because of COVID-19, and will now take place on 23–25 June 2021 in Antwerp, Belgium. It is worth looking at what WPSP has achieved and the current focus.

"When we launched WPSP, our prime objectives were to create an online portfolio of port sustainability projects and to set up a platform that would also offer a think tank and breeding ground for new, sustainability initiatives," stated IAPH managing director policy and strategy Patrick Verhoeven. "We've delivered on these objectives. With 120 projects from 71 ports, covering 38 countries and five continents, the WPSP portfolio is becoming a global treasure trove of sustainable port development."

That was added to by the 2020 award winners (see *P&H* July–August 2020 issue) in six categories, covering resilience, climate change, energy, safety and security, governance, and ethics.

At the time of writing, WPSP's framework on how ports can implement each of the 17 UN SDGs is being further developed, with a gaming concept designed to train and increase awareness of port employees, port users, and port communities on their roles in achieving the United Nation's 2030 Agenda for Sustainable Development.

The American Association of Port Authorities (AAPA)

has similar aims, as public affairs director Aaron Ellis explained to *P&H*.

"As ports look to make their operations more sustainable, they continue to reach out to stakeholders to include them in planning and problem solving – critical to help find solutions to community concerns and to craft a future vision that benefits seaports, their neighbours, and their employees. Through this process, AAPA, its members, and port communities are working towards a more sustainable future," Ellis said.

Consultancies' advice

UK-based engineering and environment consultancy HR Wallingford said climate change will likely increase coastal flood risk throughout the 21st century.

"Ports need to plan and implement measures to upgrade existing infrastructure and build resiliency into new projects to reduce vulnerability," manager Tom Matthewson told *P&H*. "There is, however, uncertainty about such impacts' exact scale and timing, which also vary according to location. Adaptation measures for each port will need to be designed using site-specific assessments.

"Ports also need to take account of infrastructure lifetimes, operability, resilience under extreme conditions, and future adaptability. Traditional engineering allows for uncertainties by taking a conservative approach. If, however, projects are based on assumed worst-case scenarios, this can lead to an escalation in costs and potentially over-designed and unaffordable interventions. Risk assessment at an early stage, and an appropriately developed, port-specific approach that captures uncertainty and builds in flexibility, may well prove a prudent investment." Global consultancy Jacobs has no doubt ports need to build resilience to climate change impacts as well as mitigate those consequences.

"Hazards, including extreme weather, affect shipping's access to ports and the design of marine structures," Jacobs' ports and maritime global technology leader for energy Chris Hutchings explained to *P&H*. "Sea level rise requires adjustments to cope, along with measures to protect critical infrastructure against extreme storm surges and reduce flood risk. Improved weather forecasting and better ship handling and loading/ unloading systems are commonly introduced.

"Automation can improve resilience by removing human involvement in weather-sensitive operations and by increasing productivity. The supply chain and hinterland are also significantly affected by climate variability and need to be managed similarly."

Port initiatives

Hamburger Hafen und Logistik (HHLA) "remains firmly committed to its climate protection goals, halving its absolute carbon emissions by 2030, compared with 2018, and achieving climate neutrality by 2040", chairperson Angela Titzrath told *P&H*.

At DP World, group vice-president of health, safety, and environment Jason Pratt agreed, "Climate change is a key part of our global sustainability strategy and we're committed to tackling it." Market changes as a result, however, pose risks to its operations, "particularly our resilience in catering to the market preference shift."

"We've identified such a risk on the use of renewable energy, and as a response commissioned the Middle East's largest distributed solar rooftop project. Phases 1 through 3 include installation of 154,000 solar panels on the roofs of DP World and JAFZA buildings, parking lots, and warehouses," he said.

Ports of Auckland's general manager of public relations and communications, Matt Ball, talked to *P&H* about the financial side of upgrading facilities, "We've developed a long-term financial model that includes a detailed cash flow analysis and metrics for comparing the annual costs of the options against the

We've identified such a risk on the use of renewable energy

Jason Pratt

Group vice-president of health, safety, and environment, DP World

efficacy of carbon reductions. We've also developed a supply chain carbon calculator to help our customers understand their emissions profile."

Ball continued, "A big challenge we face is that as a first mover, we're finding zero-emissions technology not only relatively new and expensive, but requiring large capital investments."

Meanwhile, the Port of Vancouver in Canada is helping its customers to balance those investments via its standing annual Blue Circle Awards (BCA), which rewards clients contributing to emission reductions. The 11th BCA, which took place in April 2020, has recognised 18 shipping lines, 6 cruise lines, 4 coastal marine operators, and 2 terminal operators for their efforts in reducing emissions.

"We partner with BC Hydro in the Energy Action Initiative to provide port tenants with technical expertise in energy management and access to BC Hydro's financial incentives. Tenants participating in Energy Action are also eligible to receive financial resources and technical expertise from the port authority's industrial energy manager," said Ball.

Reducing road traffic

Finally, the Port of Virginia in the United States is proud of its ongoing effort to create more carbon-neutral operations while building up relationships with the citizens around the port – an essential component of creating a sustainable business.

"Several initiatives are under way, big and small, but all are part of a larger, planned outcome – to be a good environment steward and a good neighbour in our host communities," Joe Harris, the port's senior director of communications, explained to *P&H*.

"For example, we're reducing the time trucks spend idling at the gates and their time on terminal. Two primary success stories are the implementation of a reservation system that creates a consistent flow of trucks into and through the terminal, plus reconfiguration of Norfolk International Terminals' (NIT) north gate. We also linked the north gate investment with new interstate-grade access to local highways, which keeps trucks off city streets. That's combined with our container-on-barge service that links terminals in our Norfolk Harbor with Richmond Marine Terminal. It reduces congestion and carbon emissions by taking tens of thousands of trucks off the road annually," he said.

"At NIT and Virginia International Gateway," Harris concluded, "we're using 86 electric automated stacking cranes; updating our shuttle truck fleet to include hybrid units; and using tier 3 diesel engines – the cleanest available. Further, we move nearly 33% of our volume by double-stack rail – with a near-term target of 40% – and we're the first port in the US to join the multisector industry coalition aiming to accelerate the widespread adoption of liquefied natural gas as a marine fuel." **PH**

installed solar panels on the rooftops of its main office and carpark at Jebel Ali Freezone

DP World has

Brave new IoT world

Another part of digitising the supply chain is being accelerated by COVID-19: the tracking of containers, *Stephen Cousins* has found

he COVID-19 pandemic was an unprecedented shock to global trade, which is likely to result in major long-term changes to how supply chains are organised.

Manufacturers that rely on labour-intensive processes were disrupted by social distancing requirements, travel restrictions, and closed borders that played havoc with transportation and logistics and prevented scheduled crew changeovers from taking place.

The upheaval highlighted the need for a greater focus on cargo visibility and security, and greater uptake of internet-connected containers could be key to making that a reality.





Intermodal boxes fitted with internet of things (IoT) devices can provide real-time updates on their location and the condition of container contents across ships, trains, and trucks.

Current status

Investment in IoT technology has accelerated in recent years, with several major carriers pumping millions of dollars into new installations.

Last year, CMA CGM added 50,000 IoT containers to its fleet to give shippers information on location, external temperature, and shock intensity. MSC purchased 50,000 containers embedded with similar functionality, meanwhile Maersk offers an IoT service called Captain Peter that enables shippers to track that state of reefers anywhere in the world.

Capabilities are being pushed even further with the

development of new standards for interoperability that provide opportunities for ports and terminals to exploit IoT data.

The Port of Rotterdam is leading a new testbed for the "the smartest container on the planet" through its Container 42 project. This smart container will utilise advanced sensors and communication technology to collect new types of data as it travels around the world over the next two years.

Dilip Sarangan, senior director of research at business consulting company Frost & Sullivan, told *P&H*, "Over the next few years, we are going to see a larger number of containers start to utilise tracking technology, mainly because of the supply chain issues revealed by the pandemic. It is really going to change the outlook in terms of how people track cargoes and consider the entire functioning of the supply chain."

Container lift

The digitisation of the shipping sector is helping to drive the market for trailer and cargo container tracking solutions, which reached an estimated EUR1.1 billion (USD1.2 billion) in 2019, up from EUR857 million in 2018, according to the latest figures from IoT market research company Berg Insight. With a combined annual growth rate of 16.2%, the market is forecast to double to EUR2.2 billion by 2024.

The main beneficiaries of smart container deployments are container lines and shippers, who frequently complain about poor visibility of their shipments and a lack of guarantees on storage and transport conditions. Damage to goods can cost shippers a significant amount of money, particularly when cargo is uninsured, and IoT data can help identify packing issues and help with the development of better packing procedures.

• Over the next few years, we are going to see a larger number of containers start to utilise tracking technology

Dilip Sarangan, senior director of research, Frost & Sullivan

Most ports and terminals are not yet exploiting data from IoT containers, but there is a growing awareness that it could help streamline their operations, for example, by providing an early warning of container arrivals to ensure enough space is available in the yard or to mobilise cranes or forklifts well before a barge or truck arrives. It could also help ensure that containers are not misplaced or lost in the terminal.

"Containers often experience delays in ports, shipping manifestos may not match what's inside, containers may need to be opened by customs for inspections," said Sarangan. "Better tracking and monitoring capabilities within each container can minimise such delays."

Safety is another important factor, said Thomas Bagge, CEO of the Digital Container Shipping Association (DCSA). "You could imagine a use case of two containers with dangerous cargo inside that shouldn't be stowed next to each other, either on a vessel or on the terminal. IoT containers could send alerts to prevent an incident from occurring. There are quite a number of value drivers for ports and terminals," he said.

There are currently five major vendors of IoT container solutions worldwide: Malaysia-based Envotech, Chinabased ZillionSource, Traxens from France, and Sierra Wireless and Geoforce in the United States. Various other companies offer external tracking devices that are fixed to the container wall or door to provide visibility of individual voyages.

The market for dry containers is not as advanced

compared with refrigerated containers, mainly due to the specific requirements for the cargo and the cost of containers. Of the 1.5 million reefer containers worldwide, about 400,000 incorporate end-to-end IoT technology, whereas only approximately 1% of dry containers have a permanent IoT solution installed.

Sylvain Prévot, head of strategy at Traxens, which supplies IoT-based solutions for reefer and dry containers and other logistics assets, told *P&H*,"The cost of operation of a refrigerated container is much higher than of a dry container, so the benefits of IoT for fleet management efficiency are also higher, which makes it easy for the fleet manager to justify paying for technology. The proposition for dry containers is more complex and getting a return of investment requires monetisation of services on other use cases such as door-to-door transport monitoring. There are also technological challenges because a long-life cycle battery is required to avoid maintenance every two months and for that, we have developed specific technology"

Interest in smart container technology is expected to drive the volume of orders over the coming five years, said Prévot, at which point smart containers could make up 90% of all refrigerated containers and 25–30% of all dry containers. Through a digital approach inspired by the mobile phone market, Traxens is designing apps for different parts of the supply chain that add value based on the IoT data generated by containers.

In the realm of ports and terminals, the company's focus is on integration with existing terminal operating systems (TOS), such as the Navis N4, to enable them to handle new types of event, such as the anticipated time of arrival for a container passing through the port.

"All terminals utilise a TOS, so the key for IoT-related value creation is to enhance those systems by adding in new events for customers," says Prévot. "To make that integration simple, you need robust technology standards to ensure that messages coming from our containers, and those of our competitors, can be processed easily"

The DCSA published the first of three planned IoT standards for shipping containers in June, as part of efforts to streamline data transfer between vessel owners, ports, terminals, and others (see *P&H* July/ August 2020 issue, page 7).

Trials and testbeds

Some ports keen to boost their productivity, efficiency, and security have been trialling various IoT solutions, including smart containers, as part of their innovative smart port projects.

The Port of Valencia in Spain and the French Smart Port in Med project have provided trial sites for Traxens technology. The latter initiative, which Traxens joined in February, will see the company collaborate with a partner start-up or SME to develop a system to detect when a smart container's doors have been opened. An opened door might



With container ships transporting goods worth millions, tracking their movement around the world is important indicate theft or that a non-authorised person has stashed objects, substances, or goods inside without permission, such as drugs or weapons.

Traxens boxes attached to dry containers already use light sensors to detect when doors open, but the new system will add redundancy and detect in real time when it occurs, possibly using Bluetooth Low-Energy technology and ensure that no false alarms are generated.

Arguably pushing the boundaries even further is the Port of Rotterdam, whose Container 42 initiative will test a range of innovative connected technologies over the next two years, as a single container is transported around the globe. Sensors and communication technologies will collect data on vibrations, pitch, position, noise, air pollution, humidity, temperature, and more. An advanced locking mechanism will check when and where the container has been opened and by whom, with the ability to block access apart from at set locations, such as customs.

A lowered roof will be fitted with solar panels, designed to make the container's journey energy neutral. In addition, a variety of cameras will capture time-lapse images or start recording during specific events, such as when the container is opened. A mini version of a Tesla car will live inside the container, it will be equipped with sensors to measure any movement during the journey. The hi-tech box was due to set sail earlier this year, but the COVID-19 outbreak has forced a delay until August. A spokesperson for the Port of Rotterdam told *P&H*, "Due to COVID-19 we had to postpone the journey. Meanwhile, we've been running a lot of tests and are getting a NEN1010 certificate for electrical safety related to the reefer connection needed on board sea vessels."

This brave new IoT world is one of exciting potential, but it also poses challenges. Given more than 25 million containers are already in circulation, many carriers will be reluctant to make significant investments in new assets without strong data evidence to backup its value.

Closer real-time tracking of shipments raises new security concerns too, such as increased vulnerability to cyber attacks, which can cause major financial damage. When Maersk fell victim to a cyber attack in 2017, it reportedly cost the company hundreds of millions of dollars.

It also remains to be seen how smart containers will fit into ports' efforts around digital transformation. Strategic investments and decision making by governments and the wider industry could be the key to unlocking the full potential, said Sarangan.

"Container tracking and monitoring capabilities are the future, but governments and multinational organisations need to focus their efforts and prepare investments in the technology, which can be a force for the greater good of society and economies, not just providing monetary savings for individual companies in this space," he concluded. **PH**

Split image

Shem Oirere looks at obstacles and how to solve them before Africa's ports can go online with functioning port community systems

> Ports in East and Southern Africa (ESA) have in recent months recorded varied growth, with a general increase in cargo and container volumes, leading to public and private investments for deepening berths to accommodate the increased throughput and larger vessels.

> However, the investment has tended to be more in the development of physical infrastructure than in new technology to drive the ports' towards full achievement of smart community port status.

> Despite port operators such as Djibouti Port and Free Zone Authority (DPFZA), Kenya Ports Authority (KPA), Maputo Port Development Company (MPDC), Tanzania Ports Authority (TPA), and Transnet National Ports Authority (TNPA) being preoccupied with physical expansion programmes, with huge strides have been made in the process of automating crucial port operations, this only accounts for a small portion of the smart community port systems goal.

Status quo

A large share of the operations at ports such as Beira, Dar es Salaam, Djibouti, Maputo, Mombasa, and those operated by South Africa's TNPA are still paper-based and scattered across the port's separate workstations that necessitate high levels of movement to sustain the connectivity between the sea side and the land side of the export/import transportation.

"Current connectivity from ESA ports to hinterland destinations still depends primarily on a road network of variable quality and coverage," said a report published by the World Bank in 2019.

"A significant part of the ESA's railway network is in a poor state, and most lines are single-track and not electrified – the exception being South Africa," the report added.

At least 70% of the exports and imports in the ESA region are transported via road, with the report indicating road freight could go up to 90% if South Africa was excluded.

"Despite the importance of comprehensive information management systems, in a number of the ports the current modus operandi in the terminals is characterised by operational and administrative procedures for which approval and information exchange is carried out on paper, in offices at multiple locations inside the port operations area," the bank said.

The other side

At the same time, the bank observed some ports such as Port Louis in Mauritius and the Durban and East London ports in South Africa have embraced full port community systems (PCS) ahead of others in the region. Aside from these three, many ports are only providing "services that could be part of a port community system, such as single-window, tracking-tracing, automatic data interchanges, or truck appointment systems", the report stated.

Ports such as Dar es Salaam, Djibouti, and Sudan have implemented basic automation facilities that rely little on data-based systems in their operations.

However, at the Port of Mombasa, its operator KPA has achieved partial set-up of a PCS that paved the way for the launch of a complete paperless e-system.

"The introduction of modern ICT technology has been the key extra ingredient in KPA's ongoing investment in new hardware and additional facilities," said former KPA managing director Dr Daniel Manduku, who stepped down in March 2020 over alleged corruption claims.

"Full automation has been applied to containers, conventional cargo, and marine operations using the Kilindini Waterfront System [KWATOS]," he added.

KWATOS has been installed to automate cargo clearing procedures at Mombasa port and KPA's inland container depot in Nairobi, the capital city of Kenya. It ensures that a shipping line lodges importer information and manifest into the system and enables the importer to estimate the cargo's arrival time for easy pick-ups.

In Djibouti, the DPFZA, which operates major ports around the country, launched the Djibouti PCS initiative to support the migration of port operations to online services for the port and its stakeholders, hence, "leverage technology to simplify, connect, and streamline all processes linked to ports and trade in Djibouti", said the DPFZA. Under the Djibouti PCS, the DPFZA has created an electronic single point of entry integrating all the country's air, sea, land, and rail trades.

"It is fully aligned with the recommendations of both the World Customs Organization and World Trade Organization, ensuring that Djibouti's infrastructure services meet the highest international standards for foreign investors," the DPFZA said in a statement.

With the PCS, Djibouti port hopes to achieve "increased transparency and efficiency, lower costs for operators, and compliance with international standards".

As for the Port of Maputo in Mozambique, MPDC said "the port has made progress with introducing innovation by implementing automated systems, which are already contributing to improved operational efficiencies and safety".

Maputo port, which reported an 8% surge in throughput volumes to 21 million tonnes in 2019 from 19.5 million tonnes in 2018, had initially started the automation programme with the launch of an automated access control system.

"All access to the port will be via automated cards to

open the vehicle entry and exit gates and the turnstiles for pedestrian access," MPDC said at the launch of the access card.

For the Port of Dar es Salaam, the main achievement has been the automation of the grain handling facility that has made it possible for "grains to be discharged and bagged along the quay at an average of more than 2,032 tonnes a day".

TPA, which operates the port, had expressed interest in contracting Phaeros Group, which was later acquired by SAAB Group, for the installation of a single-window electronic system. The system was to be installed in other smaller ports in Tanzania. With the installation of the system, Tanzania's overall port throughput was to be increased from 15 million to 18 million.

But it is TNPA, a subsidiary of state-owned Transnet and that operates all major seaports in South Africa, which has made huge strides in creating a PCS with capacity to deliver a smart port.

The Port of Durban, the largest and busiest shipping terminal in sub-Saharan Africa that handles in excess of 31.9 million tonnes annually, is one such example. TNPA successfully integrated nearly 15 years of operating data into a single platform provided by German global information technology services and consulting company, T-Systems.

Previously, TNPA had four separate warehouses for data management "leading to data inconsistencies and excessive maintenance costs", the company stated.

T-Systems supported TNPA to migrate its entire operational data to an SAP Business Warehouse – a software that is powered by HANA database.

According to T-Systems, "At the heart of the project is an SAP HANA database that runs in the background. All the port systems, surveillance cameras, sensors, tracking tools, and the drones are connected to the database via Long-Term Evolution mobile communications."

"A business intelligence solution analyses the incoming data virtually in real time and displays this data on the screens in the control centre, and from here, the processed information is distributed – fully automatically in some cases – to the various target

groups in the port," the company said.

Being challenged

"In other ports, there is little movement towards a substantive PCS, with some terminals operated by the port authority still running inefficient, paper-based port authority/terminal operator systems, such as at the publicly operated berths in Dar es Salaam port," the World Bank highlighted in the same 2019 report.

Going forward, ESA ports, indeed ports across sub-Saharan Africa, would need to review what has already been achieved with the minimal automation steps already made, and if indeed their achievements have any bearing towards the much-touted substantive PCS.

Furthermore, the concerns by some analysts on the true impact of the shift towards automation need also to be looked into critically, if a wholesome progress is to be made towards transforming the region's ports into complete PCS.

For example, UK-based multinational professional services provider PricewaterhouseCoopers (PWC) observed in a report it published several years ago that "despite the call for more automation, many of the container ports and terminals that have pursued it have had difficulty achieving the levels of productivity they had before". PWC pointed out, "None of these container ports and terminals were able to fulfil expectations of lower operating costs or increased berth and yard efficiency," later adding, "Investment in highly automated systems may therefore not be appropriate for sub-Saharan Africa ports."

When it comes to the PCS, PWC said it "can bring improvements, but should be designed with the local community in mind". However, "merely adopting solutions that seem to work elsewhere, or taking a wait-and-see approach to investing in appropriate technologies, is not the right option," PWC advised.

Although Africa needs innovation in port operations, PWC argued that the innovation should "address the real bottlenecks with appropriate technologies in the SSA context to improve reliability and quality of service at ports" **PH**

Kipevu Oil Terminal in Mombasa, Kenya

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The workhorse comes of age

RSD TUG 2513 E

Tugs are the ubiquitous vessels vital to maritime operations. Seen as multipurpose port and ocean workhorses, yet tugs are somewhat overlooked when it comes to advanced technology. That, however, is changing rapidly, *Tony Slinn* reports

Climate change and the drive towards carbon dioxide (CO_2) neutrality is spurring changes in the maritime industry, but digitalisation, the need to focus on reducing costs and to conduct safer, more efficient operations has led to some remarkable projects.

In Brazil, Wilson Sons, which provides integrated port and maritime logistics services, is developing artificial intelligence (AI) technology for tug operations. The project is centred at Tuglab, Wilson Sons' in-house innovation laboratory, and began by importing data on tug manoeuvres from the company's Tugboat Operations Centre (COR). The COR collated the data from more than 350,000 tug manoeuvres. Established in 2012, the COR monitors a fleet of 80 tugs.

"Tuglab brings together a multidisciplinary team of experts who participate in the design of an algorithm capable of meeting tugs' operational needs," the company's representative, Mônica Pettinelli, told *P&H*. "The system is already up and running in the Ports of Rio de Janeiro, Vitória, and Santos, and assists tug allocation decisions."

The company's towage division north regional

manager, Elisio Dourado, added, "Our Al analyses 14 different parameters, including geo-location of the various players involved – tugs, customers' ships, the terminals – as well as vessel characteristics, tug fuel consumption efficiency, and port regulations. The programme is able to optimise its own operation. It records the pre-decision scenarios and the decision itself, and the algorithm continues to learn from those solutions."

Marcio Castro, towage division executive director, said, "The goal is to implement AI in all 37 port and terminal locations where we operate by the end of 2020."

The system has already contributed to Wilson Sons' safety record. In June 2020, the company announced a 95% reduction in the tug fleet accident rate over the previous 12 months.

In Europe, Novatug, an engineering consultancy based in the Netherlands, has developed the Carrousel Rave Tug, also in the name of safety. It provides enhanced control over large cargo ships. By placing the towing point on a freely rotating ring, the tug cannot capsize by towline force.

Auckland welcomes Sparky

The world's first fully electric ship-handling tug with 70 tonnes of bollard pull will be delivered to the Ports of Auckland in late 2021. Following a naming competition, the vessel has already been christened *Sparky* by the 8,000 New Zealanders who took part.

"Part of our approach to becoming zero emissions by 2040 is to trial a mix of technology and fuel-type solutions," Matt Ball, the port's public relations and communications general manager, told *P&H*. "We're exploring hydrogen and battery-electric solutions for our heavy plant, including tugs, but when we ordered *Sparky*, hydrogen wasn't an option. In fact, when we first started looking, there wasn't even a batterypowered option, so we were pushing the boundaries."

He added, "Sparky will be able to do three to four shipping moves on a full charge, or around three to four hours' work – one shipping move takes an hour on average. A fast charge will take about two hours, which is just what we need."

Sparky is under construction by Damen Shipyards Group and is based on its RSD 2513 design. Marc Baken, Damen's tug design and proposal engineer, explained that the company is involved in the entire process, including the 1.5 MW charging station. Damen took data from its ASD 2411's operational performance to work out the battery requirements for *Sparky*.

Damen's marine design engineering representative Olena Tsukanova told *P&H*, "We're also monitoring autonomous vessel technology developments. There's still a long way to go with regard to rules and regulations and acceptance by operators and the authorities, but it's one development that will probably have a sustainable future."

Autonomous operation

Tug autonomy began to take hold as a serious option in 2017, when Rolls-Royce and Svitzer conducted trials in Copenhagen harbor using *Svitzer Hermod*, a 28 mlong tug designed by Robert Allan. The tug berthed alongside the quay, undocked, turned 360°, and sailed back to Svitzer's headquarters under remote



operation - a world first for a commercial vessel.

In March 2020, under the IntelliTug project, Wärtsilä and PSA Marine completed full-scale autonomous sea trials in Singapore using the latter's 27 m long harbor tug, PSA *Polaris*. IntelliTug is part of the Maritime and Port Authority of Singapore's (MPA) Maritime Autonomous Surface Ships (MASS) initiative, which aims to accelerate research and development (R&D) in autonomous vessel technologies. Wärtsilä and PSA Marine first held trials in September 2019, and have verified IntelliTug's capability to avoid various obstacles, including virtual and real-life moving vessels, over hundreds of tests.

Singapore-based shipbuilder Keppel Offshore & Marine – backed by a SGD2 million (USD1.43 million) grant from MPA's Maritime Innovation and Technology fund – is also involved in autonomy, building a harbor tug to be operated by Keppel Smit Towage. Due for completion in the fourth quarter of 2020, the project involves modifying an existing tug by retrofitting systems such as position manoeuvring, digital pilot vision, and collision detection and avoidance.

Both are not Singapore's only autonomous projects, according to MPA CEO Quah Ley Hoon. She noted, "We're constantly looking out for the next new technology to pilot. This is one of five autonomous vessel projects MPA is supporting as part of our MASS test-bedding programme."

Singapore is also exploring what it sees as 'new normal'COVID-19 technology. In June 2020, PSA Marine and Bureau Veritas (BV) Marine Singapore successfully completed the first remote, fully accredited annual survey for PSA *Aspen*, a liquefied natural gas (LNG) dualfuel harbor tug.

Using mobile phones and a live-streaming application, *Aspen*'s engineers and a surveyor in BV's Singapore office were able to communicate seamlessly; the surveyor conveying instructions and being able to see and record responses while archiving material for the electronic survey report.

"The pandemic has accelerated an understanding of digitally delivered services' potential," said BV Marine & Offshore vice-president David Barrow. "Our work with PSA Marine, focussed on delivering pragmatic digital services, is helping to ensure operational continuity."

Moving to Tokyo Bay in Japan, ship operator NYK and its group companies MTI, Keihin Dock, and Japan Marine Science successfully tested remote tug navigation in May this year as a part of the Japanese government's Sea Trial Project on Remote Control Navigation project.

The tug was remote controlled from an operation centre in Nishinomiya City, about 400 km away, and was manoeuvred 12 km between areas off Honmoku and the Port of Yokosuka. The technology used sensors and cameras installed on board the tug to recognise surrounding conditions and create a collision avoidance route plan. Lessons were learnt and NYK will work to overcome ship-to-shore communication issues and further improve the system.



Brazil's Wilson Sons are using AI tech to make its tug operations safer

Hybrids and hydrogen

The Port of Antwerp has made orders for a hydrogenpowered tug called *Hydrotug* and a methanol-powered tug named *Methatug. Hydrotug* is being built by marine hydrogen pioneer Compagnie Maritime Belge and due for delivery in 2021, it will burn hydrogen in combination with diesel and comply with the European Union's Stage V emissions control.

Meanwhile, *Methatug* is a natural development following the port's move last year to build a plant that captures CO_2 emissions, using carbon-capture and utilisation technology, and combines them with green hydrogen to produce methanol.

The methanol path gained a boost in June 2020, with Antwerp joining the FASTWATER consortium to fast-track methanol as marine fuel. Comprising engine manufacturers, shipyards, naval architects, shipowners and operators, port and maritime authorities, classification societies, fuel producers, and research institutes, FASTWATER has EU funding and its aims include developing rules and regulations for marine methanol fuel use.

Back in Japan, tug operator Tokyo Kisen and propulsion specialist e5 Lab are jointly developing the e5 harbor tug powered by a large-capacity lithium-ion battery and a hydrogen fuel cell. e5 Lab is responsible for the power train, concept planning and development, design, and project management – drawing on Tokyo Kisen's operational experience.

Returning to Singapore, ABB announced a contract in April 2020 to power South Asia's first electric-LNG hybrid tug for Sembcorp Marine subsidiary Jurong Marine Services. It will operate in the city-state and is scheduled for delivery at the end of 2020.

ABB Marine & Ports managing director Juha Koskela explained, "The vessel will be able to deploy 904 kWh of battery power for zero-emission operation, as well as for peak shaving. Our scope of supply includes DC drives for the power take-in/power take-off variable speed shaft generator, integrated with the battery."

However, DP World is taking a different approach to tug building, as Maritime Services Division CEO Rado Antolovic explained to *P&H*, "Our Drydocks World shipyard is creating customised solutions to both meet the new IMO 2020 standards and customers' needs. It's currently building a 27 mlong asymmetric tractor tug that will be operated by P&O Reyser in the Port of Barcelona – it will be the first tug in the Mediterranean to comply with IMO Tier III, MARPOL Annex VI, when it enters into service this year."

What about training?

Does new technology demand a different approach? Yes and no.

"While we already have a programme covering hybrids, it's relatively easy for us to add new sections to the course about making the most of the latest hybrid and electric systems," Daan Merkelbach, training manager of Tug Training & Consultancy (TT&C), told *P&H.* Based in Rotterdam City, the Netherlands, the company is ISO 9001-certified.

TT&C signed a memorandum of understanding with the South African Maritime Training Academy (SAMTRA) in June this year, to train tug masters at SAMTRA's Simon's Town facility, which has a simulator centre.

"We teach masters how to set a force to get the wanted motion in a tug, that's the basic system," said Merkelbach. "In the advanced courses, we're dealing more and more with tugs' inertia in relation to mass and speed, which you need to optimise."

He continued, "We're also seeing a surge in requests for joint pilot/tug master training for both ports and offshore operations to increase safety and efficiency. Effective and efficient teamwork between pilots and tug masters is one of TT&C's key training programmes and will also be taught at SAMTRA. The aim is not only to offer students real-world insights into the challenges faced in the maritime industry, but also to equip them with the right tools for mitigating risk and overcoming odds through an in-depth understanding of situations they may face."

Finally, *P&H* turned to the IAPH for its views. "The development of tug technology is remarkable," IAPH secretary general Masahiko Furuichi said. "Including the automated experiment in Singapore this March, remote operation and automation experiments are being conducted in various parts of the world. Simultaneously, automatic vessel operations and the development of automatic mooring systems are also advancing rapidly."

"In the light of these technological development trends, port authorities need to take a long-term perspective and look for economic and environmentally friendly sustainable systems to ensure their future." **PH**



On the rebound

With a diverse network of ports that serve the coal and iron industries, Essar Ports tries to climb back up after the COVID-19 slump, *Shirish Nadkarni* reports

or most sectors of the shipping and ports industry, 2020 has been a comprehensive write-off. Thanks to lockdowns at a global level, trade is down, shipping volumes are abysmally low, and the bottom line of most companies is awash in red ink. Some sectors, such as cruise, have been pummelled mercilessly into the ground and will find it difficult to return to normal operations, let alone achieve profitability.

Essar Ports Limited (EPL) has managed to buck this depressing trend and shown exemplary resilience in pulling itself up by its bootstraps. The company is part of the widely diversified Essar Group – the name encompasses the initials of the first names of Shashi and Ravi Ruia, the brothers who founded the group way back in 1969. The ports operator specialises in the development and operation of ports and terminals for handling dry bulk, breakbulk, liquid, and general cargoes. It is one of the largest private sector port operators in India in terms of capacity and throughput, boasting four operational terminals – two sites on both sides of the country. EPL operates a terminal in Hazira and Salaya ports each on the west coast, and in Visakhapatnam and Paradip respectively on the east coast. The current aggregate operating capacity of the terminals is 110 million tonnes per annum (mtpa).

Despite divesting its Vadinar Oil Terminal in 2017, EPL's operational capacity in India shot up to 95 mtpa in fiscal year (FY) 2018–19, and touched 110 mtpa by the end of FY 2019–20.

EPL's cargo-handling volume during the April-June quarter this year was double compared with the volume it handled last year SAM PANTHAKY/AFP via Getty Images 5163629

REGIONAL FOCUS

Hazira

The largest port operation in the EPL portfolio is at Hazira, in Gujarat, on India's west coast. The 50 mtpa all-weather, deepdraught terminal operates under the Magdalla port, which is run by the Gujarat Maritime Board. Hazira is one of the closest ports to the landlocked northern and central Indian regions.

The terminal operates six deep-draught berths and is connected with a 7.2 km long navigation channel. It also provides lighterage facilities, allowing the customer to bring in Super-Cape and Capesize vessels. It is fully mechanised, with four ship unloaders and a conveyor system for discharging bulk cargo such as iron ore, coal, coke, and limestone.

"The terminal is integrated with the largest steel plant on India's west coast, and also serves a rich industrial cluster on this coast," Agarwal explained.



Salaya

EPL has set-up a marine infrastructure project at Salaya, which is also in Gujarat, with a state-of-the-art material-handling facility. The deep-draught terminal is capable of handling 20 mtpa of dry bulk cargo. Salaya also provides marine services such as tugs and pilotage.

The facility is capable of handling Capesize ships and is integrated to feed the coal supply to two power plants in the region. The terminal can handle commodities such as coal and fertilizer, and has the flexibility to import and export cargo. It has sufficient stockyard capacity with eco-friendly dust suppression and extraction systems.

"There is sufficient land available for expansion and customising the storage area for different commodities and customers," Agarwal pointed out.

Vizag

EPL won the bid for the mechanisation and modernisation of the iron ore berths at Visakhapatnam port (better known as Vizag), and in May 2015, it took over the 24 mtpa ore-handling complex (outer harbor berths) from Visakhapatnam Port Trust. The upgrading cost came up to INR8.30 billion (USD120 million at the time).

Now, the all-weather, deep-draught terminal has become India's largest ore-handling complex. "The terminal has the wherewithal to serve the rapidly growing markets of Southeast Asia, including China, Japan, and Korea," said Agarwal.

He elaborated, "It can accommodate Super-Capesize vessels and has dedicated rail connectivity with Bacheli and Kirandal mining sources, by which the facility has an advantage to serve the western sector of India."

Paradip

Paradip Port, in the eastern state of Odisha, is strategically located in the Bay of Bengal and is close to China, Japan, and the Southeast Asian region. EPL has set-up a 16 mtpa dry bulkhandling facility here, with a 9.2 km long conveyor to connect the berthing facility to a pellet plant, and thus facilitate exports.

The terminal can handle vessels up to 105,000 dwt and exports dry bulk cargo through a mechanised-handling system. The terminal has the highest loading rate among all the iron orehandling terminals at Paradip, more than 100,000 tonnes per day, for which it has also received appreciation from the port authority.

"Our Paradip dry bulk terminal won the prestigious Project Management Institute India award for Project Excellence a few years back," said Agarwal.



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We see involving community leaders as our key to success

Rajiv Agarwal

Managing director and CEO, Essar Ports

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The overseas assets of Essar Ports include one terminal in the United Kingdom, and another at developmental stage in Beria port, Mozambique. The UK port terminal is integrated with the Essar Oil UK refinery in Stanlow, Manchester, while the coal terminal in Beria port will work as a joint venture with the Mozambique government.

"Between March and May this year, we went through the longest-ever lockdown of the world to check the spread of COVID-19," said Rajiv Agarwal, managing director and CEO of EPL. "Business operations came to a halt and all industries across the spectrum were affected. It was no different in India, and everything was at a standstill.

"In the first quarter of the FY2020–21, however, businesses have been on the move to optimise, reinvent, and remain relevant so they could return to old performance levels. In comparison with cargo handling of 54.42 million tonnes recorded for the entire FY2019–20, the period from April 2019 to March 2020, we have recorded 11.23 million tonnes for the April–June quarter of 2020.

"Our terminals across the western and eastern coasts are already performing at pre-COVID-19 levels, and we have reached almost 95% of our normal volumes in this first quarter of FY2020–21. And what is most encouraging is the fact that third-party cargo volumes increased by more than 127% last year, and the share of third-party cargo in our overall cargo volumes went up to 27%, thus reducing our dependence on the captive cargo of the group."

All these are noteworthy achievements since EPL's facilities had had to remain locked down right through April and May. The company, however, handled an appreciable increase of cargo volume at its ports after that initial dip. All its terminals remained operational from June onwards, with stringent measures of safety, security, and compliance, to ensure its customers' supply chains remained running smoothly.

"The dip in cargo handling during April this year was also on account of dwindling production of our key customers, mainly the power and steel sectors," Agarwal said. "The recovery over the months of June and July, and going into August, has been quick owing to increased demand from the power, steel, mining, and oil sectors. Our facilities have adjusted to the new normal admirably, taking full operational and safety precautions while maintaining a smooth supply chain."

Cleaner workplace

EPL claims to have been a pioneer in investing in technologies and developing environmentally friendly and efficient handling systems. Some of these include integrated mechanised systems comprising of wagon tipplers, stackers and reclaimers, shiploaders and unloaders, thereby eliminating nonmechanised handling.

"We have also been responsible for deeper draughts, leading to economies of scale and bigger parcels, reducing the carbon footprint of shipping," he said. "We have gone in for covered and closed conveyors to avoid dust pollution. The cold-fog system that we have adopted is an advanced technology, which uses ruby-orifice nozzles that create extremely fine water particle droplets i.e. of 1–15 microns, unlike in typical water sprinkling seen with droplet size of 100–250 microns."

The company has also employed dust separation and water sprinkling systems in transport corridors and stockyards, invested in systems to eliminate spillages along conveyor corridors, and promoted the idea of minimal human intervention, thus enhancing the safety and security of the facility.

Additionally, it has adopted variable-frequency drive technology, reducing power consumption for movement of cargo through conveyors.

The port operator also wants to ensure a safe living environment for its port communities. "Community initiatives aim to enhance livelihoods through programmes focussed on entrepreneurship, education, empowering women, infrastructure, environment, and health. We see involving community leaders as our key to success," Agarwal explained.

"We have transformed the neighbouring areas of our operations by planting thousands of trees and laying water pipelines. Essar generates direct and indirect employment for thousands of people in the region it operates. EPL adheres to stringent health, safety, and environment standards wherever we operate."

EPL has plans to optimise its operations and undertake modular expansions at its existing facilities, which will cater to the growing needs of customers and the hinterland where it operates. All its terminals are equipped with advanced cargo-handling infrastructure and are well-positioned to grow in times to come.

"We are working in tandem with the government of India to meet its ambitious target of becoming [a] USD5-billion-economy," said Agarwal. "With strategically located state-of-the-art terminals across India, Essar Ports is poised for rapid growth in the coming years." PH



Russia reduces Baltic port calls

Russia is enhancing efforts to withdraw transit from the Baltic Sea ports in Estonia, Latvia, and Lithuania. *Vladislav Vorotnikov* reports

istorically, since the time of the Russian Empire, the ports in the Baltic countries have been connecting Russia to the Baltic Sea. In terms of transit supplies, Russia remained highly dependent on the Baltic ports, but this reliance is winding off.

"Russian seaports have a strategic task to compete with the ports of Baltic countries for cargo flows," said Nikolay Mamenko, representative for the Russian seaport authority Rosmorport in its Kaliningrad branch. "The plan is to expand the transhipment capacity of the Russian seaports on the Baltic basin by 50 million tonnes by 2025. The cargo turnover is slated to reach 415 million tonnes by that time," he added.

Russian politicians and government analysts make no secret that the efforts to cut the volume of transit flows going through ports of the Baltic Sea have a political background.

"We have had a dead-end situation when the Baltic states were adhering to the aggressive policy in regard to Russia, but were making money on handling our cargoes," commented Igor Yuskov, senior analyst of the Russian National Energy Security Fund. "Russia took a stance that it should not help the countries that were throwing mud at it to gain profit from handling cargoes," he added.

Numerous never-ending disputes are burdening

the relationships between Russia and the Baltic countries. Russia insists that the Baltic states discriminate the ethnic Russians in those states, banning them from having citizenship status and education in the Russian language, while Baltic states struggle to recover damage compensation from Russia for the period of Soviet occupation.

The Baltic countries were forcibly incorporated into the Soviet Union in 1940, remaining under Moscow's rule until independence in 1991.

However, Russia has repeatedly rejected all calls by Estonia, Latvia, and Lithuania for damage compensation for Soviet rule. During the past few years, the cargo turnover in the Baltic basin's Russian seaports has been steadily growing. In 2019, it climbed to 256.4 million tonnes compared with 246.3 million tonnes in 2018 and 247.4 million tonnes in 2017, the Russian state statistical service Rosstat said.

The cargo turnover has tripled from 2003, driven by the new capacities in all six Russian seaports in the region – Kaliningrad, Primorsk, St Petersburg, , Ust-Luga, Visotsk, and Vyborg.

The cargo turnover of the five seaports in the Baltic states peaked at 144.5 million tonnes in 2011 and has been gradually shrinking ever since. In 2019, the combined turnover amounted to 129.8 million tonnes



Ust-Luga port is pulling cargoes from Europe compared with 133.3 million tonnes in 2018. Almost all seaports experienced a reduction in cargo turnover in 2019.

For instance, Klaipėda seaport handled 46.2 million tonnes compared with 46.6 million tonnes in 2019; Riga – 32.8 million tonnes against 36.8 million tonnes in 2018; Tallin – 19.9 million tonnes against 20.6 million tonnes; and Butinge – 9.5 million tonnes against 9.4 million tonnes.

Ventspils managed to increase cargo turnover from 20 million tonnes to 20.5 million tonnes in 2019. However, it is still far below the 30.5 million tonnes turnover that was handled in 2014.

Latvia is bracing for the worst scenario as the transit of hydrocarbons from Russia could stop completely, Talis Linkaits, Latvian transport minister, said in early 2020. According to Linkaits, Russia has been increasing its ports capacities and reducing tariffs.

In November 2019, it is reported that Russian port operator Ust-Luga had 12 terminals to tranship over 100 million tonnes of cargo per year. By 2023, the completion of the first stage of a new terminal will be able to accommodate Russian export cargoes. A research conducted by the Latvian think-tank Certus predicted Latvian ports could experience a decline of high-value-added transit through 2030.

The main reason is the Russian cargo diversion, which began 20 years ago and is yet to be over. There are several other reasons, such as a growing European reliance on alternative sources of power generation, which hampers Russian coal export in this direction.

New projects in the pipeline

There are several projects currently under implementation to redirect some cargo flows from the European ports to Russian Baltic ports in the near future. These projects are estimated to be almost USD4 billion.

For example, EuroChem plans to build a bulk terminal for the shipment of mineral fertilisers in Ust-Luga port



in the Leningrad region by 2023. Upon completion of the three stages of construction, the terminal's capacity will reach 6.025 million tonnes per year, and the cargo turnover will reach 5.55 million tonnes per year. Currently, EuroChem, Europe's biggest fertiliser producer, is still shipping some goods through the EU ports on the Baltic Sea.

Aside from this, Ust-Luga also announced a few projects aimed at increasing the transhipment capacity of bulky cargoes by 7 million tonnes per year.

A real game changer in the region is expected to be the Primorsk loading centre. The project involves constructing a complex for handling a broad range of cargoes in the port of Primorsk.

The port will be able to accommodate 200 dwt vessels with a draught of 16 m. Its estimated annual capacity will be 25 million tonnes of coal, 7 million tonnes of mineral fertilisers, 3 million teu of containers, 2 million tonnes of general cargo, and 6 million tonnes of grain. The investment cost of that project is RUB90.6 billion (USD1.4 billion). "For Leningrad Oblast, this is an essential project – a new point of growth, which will allow us to develop nearby territories and redirect Russian export supplies from the Baltic Sea ports," said Alexander Drozdenko, governor of the Leningrad Oblast.

China is not allowed to be a replacement

During the past few years, some politicians in the Baltic states were expressing hopes that Chinese goods could effectively replace Russian goods in the course in the next decade. Indeed, China reportedly wanted to include local ports in its Belt and Road Initiative, but has recently encountered political issues on its way.

Lithuanian President Gitanas Nausėda said in July 2019 that Chinese investments into Klaipėda's deepwater port construction presented national security risks. Some officials also raised concerns over the growing Chinese influence.

According to Lithuanian Defence Minister Raimundas Karoblis, Lithuania has had to fight off China's attempts to gain a foothold in the country's only seaport in Klaipėda, a hub for NATO in the Baltic states. Karoblis said any possible investment from China into the port "poses a risk to NATO". The Chinese investors reportedly were unwilling to invest in the project without obtaining a controlling stake in the seaport. This is the second time the Chinese government wants to get a stake in the Port of Klaipėda. The first time was in 2013, and the agreement was nearly inked. However, Lithuanian former President Dalia Grybauskaitė met with the Tibetan spiritual leader Dalai Lama and caused economic ties to freeze between two countries.

Nevertheless, the port of Klaipėda secured a USD400 million fund to upgrade its port infrastructure and dredging operations from the European Regional Development Fund. This project will run from 2020 to 2023 and aims to make the port safer. **PH**

REGIONAL FOCUS







Board makes organisational changes

IAPH board members met online on 21 July 2020 to continue discussions on the implementation of the organisation's new course in terms of the focus areas for the coming years and the allocation of resources.

The board identified three focus areas: climate and energy, data collaboration, and risk and resilience. These will form the basis for the work of the technical committees.

The board further agreed to structure the organisation's human and other resources in two complementary operational units: a Policy and Strategy Unit and a Finance and Administration Unit. The former will be led by the managing director; the latter, by



Eranda Kotelawala, who has been with IAPH from 1983 to 2006, and then from 2019 to present

the secretary general. The board also made good progress in defining future arrangements for the Environmental Ship Index (see



Shinsuke Itoh, who has been with IAPH from 1985 to present

below for latest tally on the number of ships). Finally, the board appointed two members of the Finance and Audit Committee, following the adoption of the committee's terms of reference in June.

The IAPH board confirmed the appointments of Eranda Kotelawala, CEO of Solomon Islands Ports Authority, and Shinsuke Itoh, president of the Yokohama Port Corporation, as new members at the meeting. We welcome Eranda and Shinsuke on board and wish them every success.

The board will fine-tune the details of the organisational changes at its next meeting, which will be held in early September this year.

The next *Ports & Harbors* issue will include details on the changes and highlight how members will be able to benefit from them.



ESI tally updated

As of 1 July 2020, 8,166 ships are registered with the Environmental Ship Index (ESI). This initiative evaluates the environmental footprint of merchant ships, with ports serving

as incentive providers to reward low-emission vessels. Vessels are assessed through a formula-based calculation for their nitrogen oxide, sulphur oxide, and carbon dioxide $(NO_X, SO_X, and CO_2)$ emissions.

Recently, the index has recorded its first decline after a period of growth over the past three years. This is due to the introduction of the low-sulphur cap earlier this year, which impacts the calculation of the index.

Overall, compared with the beginning of 2017, close to 3,000 ships have been added to the list.

The evaluation is split into two categories: vessels that scored below 20 points based on their NO_X , SO_X , and CO_2 emissions, and vessels that scored above 20.

The infographic shows the growth rate of ships that have scored more than 20 points. This group is split into: 2,520 vessels with 20–30 points, followed by 1,784 vessels with 30–40 points, 651 ships with 40–50 points, and a select 388 managed to secure more than 50 points.



Emperor Naruhito honours IAPH Foundation chairman

Emperor Naruhito of Japan conferred the Order of the Sacred Treasure, Gold Rays with Neck Ribbon award, upon Narikuni Nakao, chairman of the Japanese Foundation for IAPH.

He received the honour in recognition of his long-standing public service.

Since its establishment in 1973, the Japanese Foundation has supported IAPH in cash and in-kind contributions, whenever IAPH needed assistance to execute its required missions. Congratulations, Narikuni!



Narikuni Nakao, chairman of the Japanese Foundation for IAPH

Membership notes

We are pleased to announce new members of the association:

Associate members

Wabtec		
Address:	3475 Piedmont Road, NE #200,	
	Atlanta GA 30305, United States	
C Telephone:	+1 630 338 9517	
Email:	iim.dietz@wabtec.com	
Website	http://wabtec.com	
Representative:	lim Dietz senior director Port Solutions	
Tepresentative.	sim Bietz, semer director, i ort solutions	
Department of Marit	ime Business Administration of Texas	
A&M University		
Address:	200 Seawolf Parkway, Bldg 3007,	
	Suite 221, Galveston, TX 77553 United States	
C Telephone:	+1 409 740 4451	
Email:	cassiabgalvao@gmail.com	
Website:	http://www.tamug.edu/mara	
Representative:	Patrick Louchouarn, CEO	
Digital Container Shipping Association		
🔲 Address:	Weteringschans 165 C, Amsterdam,	
	AM 1017XD. The Netherlands	

Email:Website:

🚨 Representative:

eteringschans 165 C, Amsterdam, AM 1017XD, The Netherlands marcel.vandepol@dcsa.org http://dcsa.org Thomas Bagge, CEO

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2022

Dates for your diary

The first three IHS Markit-IAPH webinars can be viewed on the World Ports Conference website. Link and new dates for webinars are listed below.

www.worldportsconference.com/coronaviruswebinars

September

08–10:	Moved to 10–12 November 2020 Caspian Ports and Shipping 2020 Aktau, Kazakhstan http://www.transportevents.com/ ForthcomingEventsdetails.aspx?EventID=EVE170
16:	IAPH webinar Ports as community builders https://www.worldportsconference.com/webinars
29:	IAPH webinar IAPH WPSP webinar for ports in the Southeast Asia and Oceania region Hosted by Port Klang Authority and supported by IAPH and ASEAN Ports Association Malaysia, 2 pm Malaysia time
Octo	ber
05–09:	Moved to 22–26 March 2021 International Association of Dredging Companies (IADC) Seminar on Dredging and Reclamation Singapore https://www.iadc-dredging.com/seminars-courses/ seminar-dredging-reclamation-singapore/
06–08:	Delivered digitally 21st Singapore International Bunkering Conference and Exhibition (SIBCON) https://www.sibconsingapore.gov.sg/
06–08:	Moved to 15–17 December 2020 Baltic Ports and Shipping 2020 Lubeck, Germany http://www.transportevents.com/ ForthcomingEventsdetails.aspx?EventID=EVE169
21:	IAPH webinar Sustainable partnerships between cargo interests and ports https://www.worldportsconference.com/webinars
This informa	tion is correct as of 24 August 2020. You are recommended to check the latest by visiting the relevant website as changes might take place due to COVID-19

IMO sets remote meeting plans

The International Maritime Organization (IMO) has issued the calendar of meetings for September–December 2020, setting dates for remote sessions of the IMO Council and committees.

The first scheduled meeting is set to be simultaneous, remote extraordinary sessions of all committees, expected to be held on 16–18 September, to address procedural matters. This follows decisions of the IMO Council's 32nd extraordinary session, which adopted interim guidance to facilitate remote sessions of the IMO Council during the COVID-19 pandemic and invited the committees to consider utilising the same guidance.

Following the extraordinary sessions, the calendar sets the 44th session of the Facilitation Committee for 28 September–2 October; the council's 124th



The IMO will continue its 2020 meeting schedules online

session from 12 to 14 October; and the seventh meeting of the Intersessional Working Group on Reduction of GHG Emissions from Ships from 19 to 23 October. The 102nd session of the

Maritime Safety Committee will take place on 4–11 November;

the 75th session of the Marine Environment Protection Committee is scheduled for 16–20 November; the 107th session of the Legal Committee for 27 November and 30 November–1 December; and a meeting of the IOPC Funds Assembly between 2 and 4 December.

The 70th session of the Technical Co-operation Committee is scheduled for 7–11 December, and the London Convention/London Protocol meeting will take place between 14 and 15 December. The International Mobile Satellite Organization Assembly will meet from 16 to 18 December.

The IMO Council's 32nd extraordinary session completed its work on 3 August. The council adopted a statement recognising the importance of keeping trade flowing during the pandemic, recognising the role of seafarers, and emphasising the urgent need for action on crew change. The council also endorsed the World Maritime theme for 2021, "Seafarers: at the core of shipping's future", see below.

The 2021 World Maritime theme spotlights on seafarers

The International Maritime Organization (IMO) has selected "Seafarers: at the core of shipping's future" as the World Maritime theme for 2021, reflecting a clear need to raise awareness of seafarers' vital role in world trade and increase their visibility.

The focus on seafarers comes as the COVID-19 pandemic has placed heavy and extraordinary demands on seafarers. Hundreds of thousands faced and are still facing extended sea times, going months at sea without seeing families and loved ones. The crew change crisis in 2020 has highlighted seafarers' exceptional contribution as key and essential workers, on the front line of delivering world trade through a pandemic and in ordinary times.

The theme will provide flexibility to the IMO secretariat, member states, and NGOs in consultative status to focus on seafarers as the people at the heart of shipping, while also allowing for activities to delve into specific topics relevant to the role of the seafarer and the future of seafaring against a backdrop of increased digitalisation and automation. Specific topics these bodies will focus on includes crew's role in safety, maritime security, and environmental protection, and seafarers' wellbeing. IMO secretary-general Kitack Lim said that the COVID-19 pandemic has illustrated, more than ever, that it is crucially important to ensure the functioning of the global supply chains and the facilitation of the safe and efficient operation of maritime transport. "Through these difficult times, the international community has seen how the ability for seafarers to deliver vital goods has been central to this pandemic," Lim said.

Notable numbers

16-18

September, the first digital IMO meeting will take place. **riti 10**

IMO meetings are planned to take place online until the end of 2020.



Arrival of container ships in ports needs to be better co-ordinated to reduce emissions

IMO recommends container sector implements JIT first

The International Maritime Organization (IMO) has just released a new just-in-time (JIT) arrival guide, which provides port and shipping sectors with practical guidance on how to facilitate JIT arrivals.

The Just In Time Arrival Guide: Barriers and Potential Solutions guide was developed by the Global Industry Alliance to Support Low Carbon Shipping, based on research and discussion among its membership and the findings of a series of industry roundtables. Nearly 50 companies and organisations - including the IAPH - who are key stakeholders in the port call process contributed towards the roundtable talks.

While the guide is aimed for all shipping segments, it suggests its JIT arrival approach could be implemented for the container segment first, as there are fewer contractual barriers and container ships often run on more predictable schedules with shorter port-to-port distances. The guide then provides next steps on how efforts can be scaled up, replicated, and adapted to implement JIT arrivals across other sectors.

The JIT arrival concept is based on the ship maintaining an

optimal operating speed and arriving at the pilot boarding place when the availability of three key amenities is assured of: berth, fairway, and nautical services such pilots, tugs, and linesmen. Since JIT arrivals reduces waiting time at anchorage, it therefore cuts congestion in the port area. It is estimated that ships spend up to 9% of their time waiting at anchorage, which could be reduced through the implementation of JIT arrivals.

The guide provides a holistic approach to JIT arrivals, considering contractual aspects to its implementation as well as operational. The guide is intended to be a useful toolkit for many stakeholders, including shipowners, ship operators, charterers, ship agents, shipbrokers, port authorities, terminals, and nautical and vessel service providers. All these actors ultimately play a key role in making the necessary changes and facilitating the exchange of communication required to realise JIT arrivals.

The guide considers how the exchange of key information and data that is required for JIT arrivals can be improved upon within the overall port call business process. It highlights the need for harmonised standards, acceptable to the IMO, and their implementation by all stakeholders involved in the port call process. The work is aligned with recent developments achieved by the IMO's Expert Group on Data Harmonisation, which agreed to include new operational data elements relating to JIT arrival concepts in the IMO Reference Data Model. The additional dataset is expected to be approved by the IMO's Facilitation Committee. This is seen as an important step towards facilitating the implementation of the JIT concept and will allow for digital data sharing between the port and ship. Such exchange is in line with resolution MEPC.323(74). which invites member states to encourage co-operation between the shipping and port sectors to contribute to reducing greenhouse gas emissions. Download the guide here:

bit.ly/3gVA2Kr



of their time ships spend waiting at anchorage to unload.



companies supported the IMO with its JIT arrival quide



Preparing for future impact

With COVID-19 stalling port business for half a year, ports share advice in the IAPH *WPSP COVID-19 Guidance Document for Ports* on how to plan for the coming months



at anchorage, safety concerns need to be addressed. These include higher probability of exposure to extreme weather conditions and associated grounding and collision risks.

In response, ports need to formulate and proactively communicate their policies on the use of anchorage areas in line with meteorological conditions. Ports should also ensure that cargo is being stored adequately on board.

In order to protect the business, ports need to model scenarios that could impact operations again in the future. The first step is to ensure that only business-critical investments are being made.

On the other hand, ports should also make sure to have contingency plans in place to support customers. Ports should look at if they can allow payments to be deferred. Foremost, crew changes need to be made possible.

Last, the return to work for employees needs to be planned. Consider requesting employees to fill out triage forms, following local legislative guidelines, to be able to track employees in the case of infection.

Also, ports need reporting protocols with clear instructions for employees who have returned to the office, but who then start suffering from COVID-19 symptoms. Those measures are in addition to the common social distancing and hygiene protocols.

Overall, the document advises ports, where possible, to digitise their processes.





Workers unload imported paper pulp off a ship at the Port of Qingdao, mainland China, in early June 2020

The operation of ports is of vital importance to face the COVID-19 crisis. Ports have ensured that the world's medical supplies, food, fuel and raw materials, as well as manufactured goods and components vital to the preservation of employment in ports, continue to reach their intended destinations.

In the spirit of international collaboration that drives the World Ports Sustainability Program (WPSP), the COVID-19 Task Force has issued guidance meant to help ports worldwide, by providing a menu of options based on best practices.

The goal is to provide support for immediate and future plans of port terminals and other maritime trade players. Hopefully, those actions could foster open collaboration to mitigate the pandemic.

The WPSP COVID-19 Guidance Document for Ports advisory is updated based on contributions from ports worldwide. The current edition is structured along a fourlayered approach to present a methodology and a range of good practices regarding immediate measures for port operations, governance, and communication; measures to protect the business and financial returns; measures to support customers, stakeholders, and community; and measures for getting back to work.

Regarding immediate measures, ports should make sure to

establish a secondary port office if they have not already done so. This includes relocating a small number of their employees to it, which minimises disruption in case of a potential quarantine imposed on the main office due to confirmed COVID-19 cases. If such cases emerge, the secondary office will take over all major business roles.

Other things to consider are additional warehouse and berth spaces. Ports should, therefore, reconsider their planning in order to optimise the use of the existing anchorage areas, and actively look at options for extra, temporary anchorage space to accommodate the increased demand. With ships staying longer



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