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Jacoba Bolderheij

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Seatrade, Informa Group, Informa Markets, Suite N, The Octagon, 27 Middleborough, Colchester, Essex C01 1TG

Director of Commercial Content: Emma Howell

Editor: Carly Fields

Sales: Tim Hills, Christophe Cahen, Arshed Hussain, Jorge Rojas

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Demand and inflation sucker punch ports

Terminal operators face tougher times in 2023
By Eleanor Hadland



Despite port throughput growth grinding to a halt in 2022, terminal operators in the main have reported strong financial results. However, Drewry's latest analysis indicates far tougher conditions in 2023 due to weakening demand and high inflation.

It is increasingly evident from the latest port throughput and trade data that container demand is now firmly in retreat. While we expected the market to slow in 2022 on the back of consumer expenditure shifting away from goods back towards services together with inventory de-stocking, the downturn that started in the back half of 2022 accelerated in early 2023 with high inflation eroding consumers' spending power and confidence. Drewry's March 2023 forecast predicted that global port throughput would increase by just 0.4% in 2023, following on from the 0.5% growth recorded in 2022.

Drewry has long tracked the performance of the leading terminal operators, and in 2022 we introduced a new series of financial indices to monitor the revenue, cost and earning trends in the sector.

In Quarter 4, 2022, falling demand resulted in widespread easing of port congestion which reduced the average dwell time at terminals and led to a corresponding fall in storage revenues. For example, APM Terminals and Westports both reported that by the end of the year storage income had dropped back to 2020 levels. As we looked ahead to 2023, while we expected to see stevedoring revenues per unit boosted by inflation-linked tariff increases, the additional contribution that storage made to operators is expected to revert to pre-pandemic levels which would pull average revenue per container down.

In contrast, we forecast operating expenditure to rise on a per unit basis. Wages, which are the largest single cost item for a terminal operator, have risen steeply in response to high inflation. Drewry's analysis of recent pay deals underpins our expectation that

dock workers' wages will rise by between 6 and 9% in 2023 (based on announcements of a CPI-linked increase in Australia, plus negotiated increases in South Africa 6%, Germany 7.7%, Rotterdam 8.5%, Felixstowe 8.5% and Liverpool 14%-18%).

Meanwhile, fuel and energy costs should start to fall over the course of the year in line with the expected stabilisation of fuel and energy prices. However, many operators will have hedged their energy costs, so there will be a lag before these cost savings are realised.

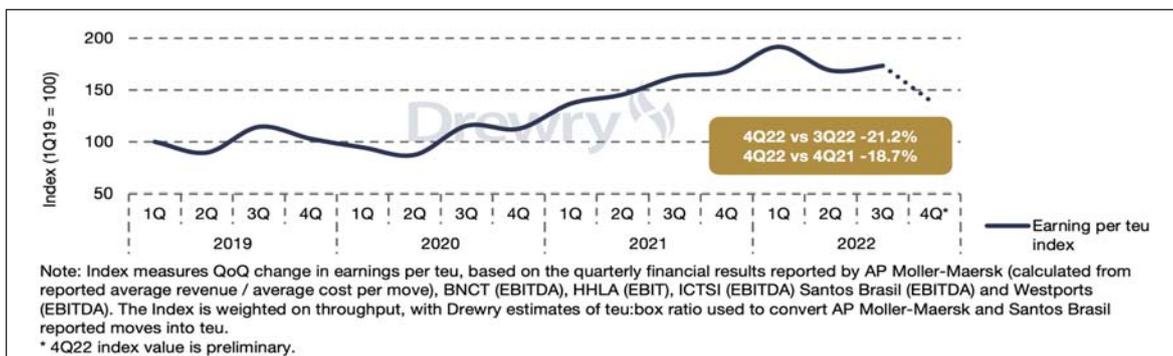
The reduction in dwell time should also result in efficiency gains for terminal operators. Falling yard utilisation levels will support improvements in quay crane productivity and gate turnaround times, as well as reducing repositioning movements in the stacks. However, efficiency gains could be reversed if terminal utilisation levels fall too low.

Margins under pressure

The Drewry Global Container Terminal Earnings Index dipped 18.7% YoY in 4Q22 as a result of falling storage revenues and rising cost per unit. While we expect growth in core stevedoring revenues on the back of annual tariff uplifts, additional storage revenues in 1H23 will be significantly below the 1H22 levels. This, combined with the impact of rising wages, is expected to pull operator margins down in 2023.

The weakening demand outlook has resulted in a downgrading of Drewry's global container port utilisation forecast. However, we are still seeing pockets of stronger growth underpinned by supply chain diversification – for example in Vietnam, India and Mexico. The easing of port congestion has also enabled terminal productivity levels to recover, which is also relieving some of the urgency behind terminal expansion programmes.

■ *Eleanor Hadland is senior analyst of ports and terminals at Drewry Shipping Consultants.*



Drewry Global Container Terminal Earning Index

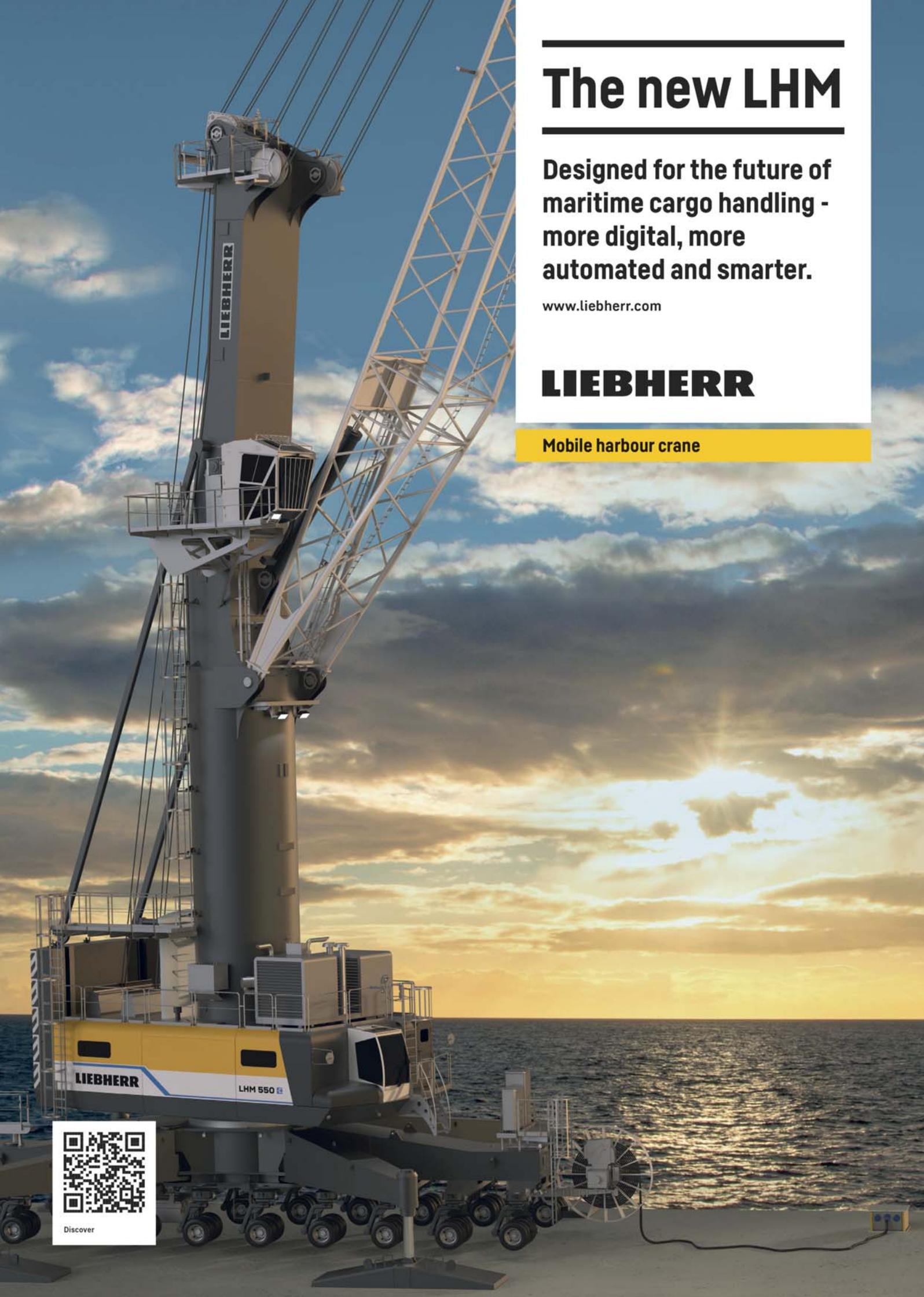
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Disrupted supply chain now the norm

Europe's ports need to be flexible to meet today's headwinds
By **Felicity Landon**



Credit: Port of Barcelona

Ports are ensuring their own electricity supplies with microgrids

Dock strikes, port congestion, Covid lockdowns, labour shortages, the impact of climate change – as 2022 drew to a close, Eleanor Hadland, Drewry's senior analyst for ports and terminals, noted that shippers' planning was now based on a disrupted supply chain as part of the reality of doing business.

Europe's ports have been through their fair share of trauma during and post-pandemic. Now they face both ongoing and new challenges, not least as the ports and shipping world pushes for decarbonisation, copes with the impact of the war in Ukraine, and rebalances operations to meet the dramatic growth in ecommerce.

Santiago Garcia Milà, sub-director general at the Port of Barcelona, said: "The logistics chain is not feeling very well. Supply and demand are not fitting as they were ten years ago. We will need to find new solutions for that. But in disruptions you can find opportunities."

Covid-19 accelerated some of the trends the port was already watching, he said, noting the increase in e-commerce and the fact that many companies have been reassessing their production and warehousing models – having discovered the vulnerability of sourcing entirely in Asia whether because of random Covid shutdowns in Chinese factories and ports, or the blockage of the Suez Canal.

Barcelona handled a record 70.9m tonnes in 2022, representing growth of 6.9%; all traffic segments saw positive results except for containers, where imports were down 29.5% (and exports grew by just 1%).

Garcia Milà insisted that the goal is to serve the economy and create value and prosperity rather than volume. "We don't want to be the biggest port in Europe – that is not our goal. We are measuring how much added value we create for the economy in a sustainable manner. That is why we spend a lot of money calculating economic impact, social impact and environmental impact.

"When I joined the port 24 years ago, I was shocked that ports were measuring by physical units only – you might move 100m tonnes, but tonnes of what? It doesn't make any sense to put together building materials, stones, caviar and electronic equipment. How can you compare?"

The bulk of Barcelona's cargo is high value, low volume and low weight, matching the surrounding industry and economy, he said: electronics equipment, pharmaceuticals, fashion, footwear.

Rollercoaster ride

Jacob Minnhagen, senior business developer at Gothenburg Port Authority agreed that the effects related to the pandemic are still here: "You have these huge ups and downs that have affected the

This is going to be a very difficult year in terms of volumes

logistics set-up and supply chain for many companies for quite some time and I don't think we have seen the end of this rollercoaster ride. You now have a situation where there are reduced volumes going to Europe. I think that when the demand increases again, and that could be at very short notice and quite significant, then of course we could be back on that rollercoaster again."

Gothenburg saw an overall increase of 7% in container volumes to 885,000 teu in 2022 but this tells two stories: a drop in demand for consumer goods being imported, a rise in empties coming in and an increase in exports. "The Swedish export industry is doing very well," Minnhagen said. "A very large amount is forest products – board, paper, pulp and sawn timber in quite massive volumes, as well as steel, chemicals, automotive parts and industrial components."

The Port of Hamburg saw container volumes down 5.1% and overall volumes down 6.8% to 119.9m tonnes in a "complex year", but this put the port in line with its competitors, said Axel Mattern, CEO at Port of Hamburg Marketing. The war in Ukraine and the related sanctions against Russia were key factors, compounded by labour disputes and high inflation.

However, he added: "All the ports are in a very good condition, being resilient to all these kind of influences from outside and still able to perform. So, although these were not the best figures you can have, we are looking back at a very successful year in 2022."

Having said that, the trend is clear, with volumes lower in 2023 so far. He is predicting a further 5% drop in container volumes – "this is going to be a very difficult year in terms of volumes", he said. "It is the world economy, the fact that everybody has filled up their stocks and sheds and there is not much ordering on the consumer side. There is still the situation in China where not everything is running perfectly smoothly."

Working with agility

Tim Morris, head of corporate communications at Associated British Ports (ABP), said that while most of the Covid effect has passed, there are "ripples" in Asian manufacturing flows and supply chains. However, the big impact on ABP's ports has come from the war in Ukraine. "There we have seen the impact in agribulks, with changing volumes, changing timing and different import/export links. We generally find existing customers are working with agility in order to change supply routes and source locations. Our perception is they have been very busy out in the marketplace finding alternative sources."

He foresees the pressure on container volumes continuing through this year, because of the dependence on discretionary consumer-facing markets. However, one surprising pick-up has been in the car handling business. "We are seeing a return of cars – and a telling turnaround is cars being moved in



Credit: Port of Gothenburg

containers, which we see in Southampton and on the Humber as well," Morris said. "That is an interesting indication of where the car market is and also the relative cost of containers versus what they were."

ABP launched its sustainability strategy in March, setting out a net zero target of 2040 at the latest. "In practice it will be well before that in most operations," Morris said. This is based on replacing fossil fuels within port operations with, predominantly, electrification, and ABP is also trialling hydrogen for some vehicles, he said.

"We are also, as you would expect, looking at more onshore power capability but we are struggling with two things. First, the standalone business case if there is no public co-funding. Second, the availability of grid capacity in our ports."

Part of the story is at least doubling the amount of onshore green energy generated by the group's ports, he said. As well as focusing on solar and onshore wind, ABP is working on hydrogen power generation.

Energy enablers

Ports are developing as energy hubs and enablers for a broad range of green infrastructure, Morris said. For ABP, which owns 21 ports around England, Wales and Scotland, examples include supporting floating offshore wind in the Celtic Sea, projects around green hydrogen and ammonia, and carbon capture and storage.

On the Humber, the Port of Hull is home to the Siemens Gamesa wind turbine blade factory and Grimsby is said to be Europe's largest O&M base for offshore wind, while at Immingham, ABP is involved in a joint project with Air Products which plans to ship low-cost green ammonia from the Middle East to be reconverted to green hydrogen at or next to the port.

Gothenburg has a reputation of being ahead of the crowd in terms of sustainability and decarbonisation – to the point, Minnhagen said, that the port is in danger of taking its achievements for granted and forgetting to talk about it. "We have situations where people ask us – don't

Stena Germanica is bunkered with methanol at the Port of Gothenburg



Jacob Minnhagen, Port of Gothenburg



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you have this? And we say yes, of course – for 20 years already, while it's something new for other ports. I would say we are in the forefront in terms of new fuels and decarbonisation. We have been working with sustainability initiatives for many years, including onshore power, and we always try to throw a carrot or two to the customers taking the next step. Of course, we are not alone because we are also pushed by some of the shippers and shipping lines, so it is also a community thing."

What has changed, he continued, is "more specific and more transparent requests" from many shippers, who are asking for more specific numbers. "Sustainability is top of the agenda for all the shippers and shipping lines we have discussions with. It is much more of a supply chain discussion – you have to have the infrastructure and conditions in place."

He also mentioned the challenges of ensuring access to enough green electricity. "From the political perspective, it is really important that we have the grid capacity. We cannot just say we have electric trucks – they need somewhere to charge, we need green electricity for them. There are so many stages in the process. We have had good discussions with the local grid supplier about how much capacity we need now and in ten years' time. All these things take time and development and building. Co-operation is much more crucial now – you have to see your customer's customer and your supplier's supplier."

Future fuel puzzle

Shipping's 'future fuel' debate continues alongside the discussions about society's decarbonisation, and ports are watching carefully. Earlier this year, Gothenburg announced the first methanol bunkering at the port, when the Stena Germanica became the first non-tanker vessel in the world to be bunkered with methanol ship-to-ship.

Sustainability is top of the agenda for all the shippers and shipping lines we have discussions with

"Nobody really knows in which direction it is going to develop," said Mattern, at the Port of Hamburg. "Everybody knows we need renewable energy and we need a lot of this. But we don't have a clear picture of how this is going to be fulfilled or received in Europe," he said.

"Ports like Hamburg are able to make a transition or development in the direction of hydrogen or ammonia or whatever, but the space is limited and you need to make decisions. We have decided to implement an ammonia import terminal. We have decided to build up the electrical production of hydrogen using renewable energy mostly from windfarms which we have on and offshore. But this is not enough.

"This is a new situation in which ports are being forced to make decisions. However, ports are flexible and resilient."

The Port of Barcelona is home to one of the biggest liquefied natural gas plants in Europe and there are plans to use the cool energy released in the regasification process to support air conditioning to warehouses and buildings. The port's energy transition plan incorporates a series of activities: maximising solar power generation onsite, including solar panels across 250 hectares of warehousing; building a biogas plant fed by organic refuse from cruise vessels; budgeting €140m to provide onshore power to all vessels in the port, which can include up to six power-hungry cruise vessels alongside at the same time; and investing in infrastructure to provide bunkering of the 'new fuels'.

Out of depth

As well as meeting the fuel needs of shipping, Europe's ports must accommodate ever-larger vessels. At Hamburg, the deepening of the Elbe was welcomed but this was not the end of the story.

The river from the city of Hamburg to the North Sea is a federal state waterway, so Berlin is responsible for dredging. "There were personnel problems with hundreds of jobs not filled; we got to a situation where they were not dredging any more and we were losing the depth of the river," Axel Mattern, CEO at Port of Hamburg Marketing, said. Thankfully, he says, the situation has now been resolved.

In Gothenburg, environmental permissions are in place for deepening and widening the fairway and

strengthening quays. Dredging is expected to start in late summer or autumn, Jacob Minnhagen, senior business developer at Gothenburg Port Authority, said. "We handle the largest container vessels today, but not fully laden. This project will have a positive effect, since the vessels have been growing bigger year by year. Also, the traditional first stop in Europe has been Rotterdam, where a lot of cargo would be discharged, and a few other ports before Gothenburg. We were never number one or the last port, but today is different. So, for more flexibility and new destinations, it is crucial we get this dredging project going – otherwise it would be very easy to end up in the second league."

In parallel with the mega container ships, hinterland connections – or bottlenecks – are also occupying minds at Europe's ports. Santiago Garcia Milà,



A Maersk vessel leaving the port of Gothenburg, in the area where the fairway is to be deepened

Credit: Port of Gothenburg

sub-director general at the Port of Barcelona, said: "We used to handle one call on a Monday with 5,000 teu, another on Tuesday, another on Wednesday. Now we have a big vessel coming in and have to move 15,000 teu at the same time. Now it is concentrated, we have to build up the logistics chain and deal with the bottlenecks. The economies of scale on the maritime side can cause problems in the hinterland."



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Ports wider infrastructure role acknowledged



North American hubs welcome rise in visibility
By **Barry Parker**

Prior to the supply chain crisis of late 2020 into mid-2022, seaports and their ancillary infrastructure were largely invisible to most of the North American population. That all changed as cargo movements backed up and the mainstream news media featured images of vessels anchored at San Pedro Bay, waiting to berth at the ports of Los Angeles and Long Beach. Though the popular attention faded as vessel queues shrank or disappeared, the 2020-2022 experience has infused North American ports with renewed desires to move cargo efficiently.

US supply chains – and the ports that serve them – are complicated, interspersed as they are with multiple layers of stakeholders from the government and commercial worlds. Chris Connor, president and chief executive officer of the American Association of Port Authorities (AAPA), explained on a podcast that US ports are “creatures of municipalities, counties, or states ... they are not Federal animals. The Federal government was only lightly involved in funding our nation’s ports – now that’s starting to change.”

In outlining the many roles of Washington, DC-based AAPA, Connor highlighted its efforts in “creating funding mechanisms to help ports build out their infrastructures, their footprints, their intermodal connectivity, and to be a more efficient part of the goods movement industry”.

Funding goes along with functionality; US ports will certainly compete, but planners and legislators are increasingly recognising that ports are part of a bigger infrastructure picture. And this picture has a digital component as well. Ongoing efforts, across a wide swathe of agencies and organisations, are looking at enhancing information flows relating to vessels, cargo flows, and landside operations.

Funding increases

Among the changes noted by Connor is the increased support from the US Department of Transportation’s Port Infrastructure Development Program (PIDP), a Federal program administered within the Department of Transportation (USDOT) by the Maritime Administration (MARAD). The PIDP is funded by traditional baseline appropriations, in concert with a hefty infusion from the Bipartisan Infrastructure Law (BIL), enacted in late 2021.

In 2022, \$703 million was awarded, and the 2023 grants – to be awarded later in the year – are set at \$662 million, with a majority (\$450 million) coming



Credit: Port Everglades

from the BIL. MARAD, in describing the 2022 awards, tied them very specifically to the disruptions of the previous two years. In a release, the agency said: “Creating a stronger and more resilient supply chain for the nation has been a key focus for the President who issued an Executive Order on Supply Chains in February 2021 and stood up a Supply Chain Disruptions Task Force, co-chaired by [USDOT] Secretary Buttigieg in July 2021.” PIDP grants supplement existing funding, which, as noted by AAPA’s Connor, comes typically from state or local sources.

A look at recent years’ PIDP awards provides visibility into the types of projects underway. The 2021 grants, totalling a more modest \$241 million (BIL funding had not yet kicked in), included \$52.3 million for extending an existing rail yard at the Port of Long Beach, which handled 9.1 million teu in 2022. This tranche is an important piece of a much larger \$1.5 billion project that will substantially expand the On-Dock Rail Support Facility at the port’s Pier B. The 2022 grants included \$36.6 million for Oakland, where an off-dock container support facility is being built.

On the US East Coast, Jacksonville received \$23.5 million to fund part of an electrification project to support deployment of hybrid power container handling equipment and charging hook-ups. In Hawaii, Honolulu’s Kapalama Container Terminal will benefit from a \$47.3 million award that will also support electrification. As box traffic moves onto barges – and off the motorways – Beaumont, Texas is developing a landside facility for docking barges, and storing containers; the port received a PIDP grant of \$26.4 million which will go towards buildout.

Port Everglades is to be deepened to 50 feet



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Supply chain efficiencies

Supply chain difficulties, along with upgrades to support increased flows and larger vessels have also driven ports' initiatives to move cargo more efficiently. The Port of Charleston, which benefitted greatly, along with other US East Coast ports, from cargo shifting from the West Coast in 2022, is initiating a chassis pool with the aim of speeding throughputs. It has also expanded its Wando Container terminal to handle multiple 14,000 teu vessels with boxes stowed 22 across.

The Port of Virginia, which operates terminals at Norfolk, Hampton Roads, and the semi-automated facility at Portsmouth, is also operating a chassis pool arrangement. A terminal at Richmond is linked to Hampton Roads by a container-on-barge service along the James River, providing an alternative to truck transport on the very crowded I-64 highway.

AAPA's Connor noted that, historically, ports were not meant to be holding cargo; "they were built for throughput". The backups and congestion during the Covid years hastened a trend which was already underway – the development of inland distribution and logistics centres; the port at Savannah is linked to the Appalachian Regional Port, located 200 miles inland, near the Tennessee border. Similarly, neighbouring port Charleston has beefed up its link to Inland Port Greer via the Norfolk Southern railway, while the Port of Virginia is tied with a rail link to inland Front Royal in the Shenandoah region, west of Washington, DC.

Supply chain difficulties, along with upgrades to support increased flows and larger vessels have also driven ports' initiatives to move cargo more efficiently

In conversation with *Seatrade Maritime*, Sean Strawbridge, CEO of the Port of Corpus Christi and also the current AAPA chairman, emphasised the ports' lynchpin roles in providing critical infrastructure. In recent years, Corpus Christi has been a leader in energy exports, much of which are handled on deep drafted very large crude carriers. He said: "I am sure that Corpus will be applying for 2023 PIDP funds, but we should look for further Federal funding, recognising the vital role of ports in the US economy." He added: "The port community needs to do a better job of explaining our importance to mainstream America."

He also emphasised the importance of continued funding for the US Army Corps of Engineers (USACE), responsible for pivotal dredging and harbour deepening projects, in addition to ongoing maintenance dredging. Strawbridge told *Seatrade*: "Our Ship Channel Improvement Project – deepening to 54 feet, completed by end 2024 – will render Corpus Christi the deepest port in the US Gulf. We are also widening to 900 feet."

With the changing energy landscape in mind, Strawbridge also pointed to an expanded role in

LNG exports, with an additional 12 million tonnes/year expected to come onstream at Cheniere Energy's liquefaction facility, in 2025. Geopolitical developments have increased the importance of US energy exports (2022 saw record levels of crude oil sent abroad), greatly benefitting ports around the US Gulf.

'Greener shade to come'

Importantly, the Inflation Reduction Act, enacted in summer 2022, provides insights into the greener shade of things to come, amplifying the existing efforts of ports. In the legislation, some \$3 billion is earmarked for port electrification projects, tied into ports' digitisation efforts over a five year period. The emphasis is on "zero emission technologies", which would encompass alternative-fuelled cargo-handling equipment, shore power systems, and electric grid infrastructure, including micro power networks providing energy resiliency on a broader scale.

Decarbonisation efforts are ubiquitous throughout the broader power generation sector, and the push towards offshore wind, with funding efforts concentrated at the state level and often tied to power purchasing agreements, is another driver of increased activity at the ports.

The Inflation Reduction Act provides investment tax credits for capital spend on equipment to be utilised in the offshore wind areas and ports will see tangible benefits from these provisions. A recent announcement saw energy giant Shell backing Gulf Wind Technology (GWT), a turbine developer to be located at the site of Avondale shipyard in New Orleans. GWT plans to serve future wind projects in the region.

On the more distant horizon will be the involvement of ports in hydrogen hubs, a new program now taking shape. With funding also coming from the Bipartisan Infrastructure Bill, the US Department of Energy (DOE) will provide seed money for regional initiatives to convert existing activity to cleaner hydrogen fuelling.

Along the US Gulf Coast, where energy industries have already laid the groundwork, New Orleans, Houston and Corpus Christi have joined regional consortia to apply for DOE funding.

Overall, the current picture for US ports is a rosy one with business returning to normal. However, funders in Washington can be fickle as political winds can change direction. The next election, in 2024, might see such shifts, which, if they were to occur, could potentially slow down the favourable tailwinds in evidence in early 2023.



Chris Connor,
AAPA

Credit: AAPA



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Latam still chasing lost pandemic volumes

Mixed bag sees recovery for some regional ports, while others languish
By Michele Labrut



The economies of Latin America slowed substantially in 2020, with only a slight recovery in 2021. There was some further improvement in 2022, but it has proven difficult to recover the ground lost due to the pandemic, which is reflected in consumption and therefore in container movements.

In 2022, the most outstanding economic expansion was in Panama, the largest transshipment hub in the region, with 10.8% GDP growth, but the volume of teu moved in Panamanian ports decreased 1.2% to 8.5m teu compared with the previous year – dropping for the first time since 2016. Panama surpassed 7.3m teu in 2019 and volumes grew in 2020 to 7.7m, and then to 8.6m teu in 2021.

“Relatively little of the box volume handled at Panamanian ports has an actual destination in Panama,” said Stephen Shaffer, president of Evergreen’s Colon Container Terminal (CCT), located on the Panama Canal Atlantic entrance. “A good amount of the imported volumes goes into freezones, the contents of which become nationalised and imported into the economy or re-exported to Central America/Caribbean markets. Most boxes handled at the ports are transshipment only.”

If we want to continue attracting shipping lines to using Panama as their logistics hub, the operation in our country must be efficient, reliable and above all, the lowest cost option

CCT posted 37.1% growth last year, with 1.44m teu. CCT is the only terminal in Panama where volumes have been increasing steadily with double-digit growth for three years in a row.

“Decline in volumes for Panama ports most certainly has to do with exogenous variables such as changes in demand by regional and extra regional markets served by Panamanian ports. As a transshipment hub, Panama serves as a hub-spoke as well as relay hub. Rising and falling fortunes in any of those spoke markets can affect us,” Shaffer said. “Added to that is the element of competition for transshipment market share by regional ports.

“To stabilise volumes for ports exposed to high level of transshipment, the approach has been to implement more warehousing/distribution-oriented



Credit: SSA International

solutions for international manufacturers to effectively convert discretionary movements to non-discretionary movements. This is something Caucedo terminal in the Dominican Republic has implemented and something CCT has been implementing. The goal is to make cargo ‘sticky’ and more difficult for volumes to shift away simply because of a difference in port costs,” he added.

Panamanian ‘fatigue’

Carlos Urriola, president of Seattle-based SSA International and president of Manzanillo International-Panama, said that “[Panama’s] model is beginning to show signs of fatigue, the first sign being decline in volumes.

“If we want to continue attracting shipping lines to using Panama as their logistics hub, the operation in our country must be efficient, reliable and above all, the lowest cost option. We must also transform Panama as a ‘green gas station’ for the international fleet so that they not only unload/load their containers, but also come to refuel with green fuel.

“The concept of being a green transshipment hub option will give the isthmus another competitive advantage,” he said. “For Panama it will be important to modify the transshipment hub concept by adding the word green.”

Last year was the year, meanwhile, that Mexico’s ports broke records for container throughput, up 5.8% on 2021, surpassing pre-pandemic levels by 16.9%.

The Mexican Ports Directorate reported total volumes of 8.31m teu moved by the country’s port system, up from 7.85m in 2021. The 2022 throughput was also higher than that reported in pre-pandemic 2019, when it totalled 7.10m teu.

“Mexico is a very fascinating market,” said Uffe

Mexico is described as a “very fascinating market”



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Record figures passed through Lazaro Cardenas' Specialised Automobile Terminal in 2022 for the second consecutive year

Credit: SSA International

Ostergraad, the new CEO of Seattle-based Carrix, holding company of SSA Marine that operates several ports in Mexico, including the container terminal of Manzanillo, Tuxpan liquid bulk, vehicle operations in Lazaro Cardenas and Vera Cruz and cruise terminals. "Overall, it was a very good year for SSA Marine in Mexico."

"SSA Mexico registered a number of milestones in 2022," added Manuel Fernandez, SSA Mexico general manager. "The acquisition of OCUPA HOLDING means we can combine the strengths and abilities of both companies, we offer a better and more flexible service to all our customers; the arrival of two new super panamax ship-to-shore cranes and five new e-rubber tyred gantry (eRTG) cranes to the Specialised Container Terminal I of Manzanillo; and an additional eRTG crane in January. We set, for the second consecutive year, record figures at Lazaro Cardenas' Specialised Automobile Terminal and we had a 300% growth in passengers at our Cozumel and Progreso International Cruise Terminals."

And 2023 looks quite promising. "The segments that have shown greater dynamism in the first two months of 2023 compared with the same period of the previous year are, firstly, the tourism sector with 135% growth in passenger reception, followed by the automotive segment, with an average growth of 22% for Lazaro Cardenas and Veracruz," Fernandez said. At Tuxpan Port Terminal the reactivation of automobile and steel operations also stands out. "We expect to handle about the same volume as last year."

Peru investment drive

In Peru, containerised cargo decreased slightly (0.6%) in Peruvian ports in 2022, to 2.84m teu down from 2.86m teu the year before. Total cargo dropped to 54.07m metric tonnes, down 3.4% from 56.0m mt in 2021. The most important container terminal, South Pier (Muelle Sur) operated by DP World in Callao, saw volumes decrease to 1.46m teu compared with 1.50m teu in 2021. APMT Callao posted 997,695 teu, up from 984,050 teu in 2021.

However, investments in port terminals supervised by Peru's Supervisory Body for Investment in Transport Infrastructure for Public Use (Ositran) exceeded \$119.2m in 2022, up 20% on 2012.

Peru's \$1.1bn-Chancay Port Terminal, built by Chinese company COSCO Shipping and promoted by the Peruvian Ministry of Transport (MTC), has an overall construction progress of 29.69%. The terminal, located in Huaral, is a mega construction that will receive large ships to meet the growth in port demand, reduce costs of the Peruvian and international market, and positively impact the economy of Peru.

The project is made up of three major components. One is the port operational area, the second is the entrance complex, and the third is the tunnel, which will be 1.8 kilometres long.

Chile slowdown

Chilean ports moved around 4.08m teu in 2021, reflecting the slowdown of the economy. No official figures were yet available for 2022.

DP World has a lot of projects in Chile, according to Matias Laso, commercial director of DP World Chile. "One is taking shape now of a warehouse in Port San Antonio, which at the end of the year will have an extra port." Work is also underway to implement a ship mooring system to counteract the effects of waves and ensure a higher degree of safety in operations, expected to be operational by May 2023.

San Antonio Terminal International (STI), a SSA Marine joint venture, moved almost 1.1m teu in 2022, maintaining its leadership in the country. "Volumes were down in line with the slowdown in the economy but balanced with a better mix of services. STI is strongly linked to Asia services, where in the second half of 2022, we had a decline mainly in imports in line with what has happened in other ports in the region and the world. We have achieved a strong increase in the cherry season, where export volume increased by 35%," said Rodrigo Gallegillos, STI general manager.

"Our \$66m investment plan is in full swing and is the most relevant injection of resources at present among the Chilean ports. It includes technology and new equipment, which will increase the terminal's capacity by 30% by 2030, adding an additional 500,000 teu," Gallegillos added.

Adapting to the post-pandemic world

Myriad opportunities and challenges in the Asian port sector
By **Thomas Timlen**



Credit: Son Vu Tran from Pixabay

Supply chain experts expect Vietnam (pictured) and India to rise as functioning container shipping hubs

Interrogating the prospects for Asian ports requires a step back to take in a vast region stretching from Turkey in the west to Indonesia in the southeast, capped by Russia to the north. As the world's largest continent, Asia has a wide diversity of geopolitical, commercial and environmental characteristics which serve to bolster sustained growth and opportunities in some areas while presenting distinct challenges in others.

"Against the backdrop of inflation and its impact on global trade, we can expect growing demand and business expansion into new markets to boost export volumes, especially in the second half of 2023," DP World's CEO and managing director for Asia Pacific and Australasia Glen Hilton said. "Effective public-private collaboration, innovation and adoption of digital technologies, as well as the rise in environmental, social and governance (ESG) considerations will remain key in ensuring that Asian ports continue to optimise capacity, drive new efficiencies to achieve sustainable growth, and future-proof operations in a rapidly evolving environment.

"As world economies adapt to a post-Covid world," Hilton continued, "we remain optimistic about intra-Asia trade growth, driven by high export markets such as China, Vietnam, and Thailand." To capitalise on that growth, Asian ports need to be flexible and

resilient, he said. Countries like Thailand and Vietnam have already benefitted from supply chain regionalisation in the face of disruption. However, this growth cannot be sustained without strategic long-term investment, a key challenge for port operators across Southeast Asia, Hilton warned. "There is opportunity for governments to step in as a catalyst to drive stronger public-private collaboration, offering better visibility for port operators who are looking to invest in long-term growth, and unlocking gateways for greater global trade flow for the region."

Digital progress

As ports in Asia facilitate two-thirds of global trade, they have the ability to deal with enormous volumes of cargo, which is enabled by adopting more efficient terminal operations. "This points to a huge, continued opportunity for digital adoption in the region, and its role in driving efficiency to help port operators better serve their customers," Hilton said.

His views on the importance of flexibility are echoed by others. "The pandemic and recent geopolitical pressures have put the spotlight on the need for supply chain flexibility and diversification," says GAC Group vice president for the Asia Pacific and Indian Subcontinent Daniel Nordberg. "We're seeing this happening at pace at ports across

Southeast Asia, with major investments in new terminals and facilities to support anticipated economic and regional growth." He noted that part of this development is a result of nearshoring with companies looking to de-risk their supply chains and diversify their operations and manufacturing bases across Southeast Asia.

Sustainable energy initiatives represent part of that development. "Offshore wind farm projects are picking up pace across Asia as countries in the region look to harness renewable energy in a bid to decarbonise," says GAC Group vice president for marine and energy Erland Ebbersten. "To support these ventures, ports are adapting their terminals and services to cater specifically to offshore energy projects, and port operators and logistics providers that use these ports must develop their services in tandem." GAC has opened new offices in Taiwan and Vietnam at ports specifically focused on the offshore market to support renewable energy projects in those regions.

"However," Ebbersten said, "offshore wind farm developments are facing global inflationary and supply chain pressures that have raised uncertainties surrounding the long-term financial viability of such projects, particularly when it comes to rising energy prices and the cost of raw materials. This should not deter investment in offshore wind and related port development projects so we anticipate that offshore projects in Asia will pick up or at least keep pace with current levels."

Sustainable energy boom

Which ports stand to benefit from sustainable energy exploitation as it moves offshore? Taiwan and Vietnam look poised to reap some rewards. But catering to wind farm development is far from the only opportunity for Asian ports. GAC's Nordberg sees

an anticipated uptick in regional trade as another driver of opportunities. "Despite the geopolitical and inflationary pressures that the supply chain is facing, intra-Asian trade is expected to pick up over the next 12 months: a big boon for ports across the continent. The potential of further intra-Asian trade is going to include an expansion of domestic shipping services and feeder services across the continent, which will keep ports incredibly busy."

Facilitating the development of sustainable offshore energy solutions is one opportunity for ports, while related developments within ports and terminals themselves have a significant impact. "We expect that ESG considerations within ports and supply chains will be increasingly prioritised as more customers align their businesses to the sustainability agenda and expect to work with partners who share the same vision," DP World's Hilton said. "Although ports in this region are gradually prioritising their sustainability focus, there are challenges which impede this progress towards decarbonisation, a situation not unique to Asia.

"For example," Hilton said, "there still needs to be more commercially available alternatives to diesel-run vehicles which are needed in ports operation. Ports also must grapple with a tight supply of electric equipment, a result of a dip in global production capabilities and transportation delays. We envision that ports across the region will have to keep navigating regulatory constraints, as well as limited availability of land (especially within the port environment) and technology as they source for and manage access to renewable energy."

Joerg Roehl
MBS Logistics



Crew change services set to reset

One area where Asian ports may realise opportunities in the short term relates to the facilitation of crew changes, as a reset to normal practices settles in. "As Covid restrictions eased across Asia, the ability for vessels and ports to access quality seafarers and skilled personnel will become much easier in 2023 and beyond," GAC's Nordberg said.

"Crew change operations at ports have eased but there are still changing national regulations and requirements to abide by, and as ship agent we cannot become complacent in adapting to new rules at short notice again in future."

While this can result in gains for some ports, others stand to lose out.

"During the pandemic, we saw a major uplift in the number of vessels calling at Manila port to conduct crew change operations for Filipino crew members due to Covid-19 restrictions in nearby countries," GAC Philippines' officer-in-charge shipping and commercial manager Ronald De Leon said. "With restrictions lifting across Southeast Asia, there has been a noticeable decrease in the number of vessels calling at ports in the Philippines for crew change and husbandry services. We foresee the decline to continue over the next year."

Ports that cater to specific sectors also stand to gain from a post-pandemic return to normal, which could exceed pre-pandemic volumes. "In Indonesia, we are expecting a huge

pick-up in tourism this year and with that comes an increase in cruise vessel calls at Indonesian ports," GAC Indonesia's managing director Melwyn Crasto noted. "Some port operators are offering discounts to fees of up to 40% until the end of 2024 in a bid to drive tourism. This could open the door to new cruise operators entering the Indonesian market." As a result, Indonesian ports are expected to be busier than ever over the next 12 months.

Easing of pandemic-related regulations is also expected to enhance the flow of goods. "Local port regulations across Indonesia are continuously changing, often at short notice. We experienced this during the pandemic as port authorities sought to protect workers and implement more stringent checks on cargo. We expect this to change and should be able to see improvements from this year onwards as business increases."



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Offshore wind farm projects are picking up pace across Asia as countries in the region look to harness renewable energy in a bid to decarbonise

Uncertainty and trade shifts

MBS Logistics, with over 900 offices in 144 countries, is also well-positioned to assess the prospects at Asian ports in comparison with other regions. MBS Logistics' CEO Joerg Roehl sees challenges as a result of uncertainty in the container sector. "It appears 2023 is shaping up to be another year of instability for Asian ports. The pendulum swing from over-capacity to under-utilisation is presenting a range of new challenges. Looking at Shanghai port, for example, we see empty containers accumulating. Container prices in many major ports across Asia, such as Ningbo, Shanghai and Singapore, have fallen sharply over the past year, indicating that the current situation may persist in the foreseeable future."

Trade patterns also appear to be shifting amid a global recession and heightened geopolitical tensions, Roehl added. "The mid-term outlook for the industry indicates a general slowdown in container trade on Asia to EU and Asia to America trade lanes. India, seemingly wary of China, is working to expand trade ties with the West."

Last year, free-trade deals between India and the United Arab Emirates as well as Australia came into force, and now negotiations with the United Kingdom, Canada and the European Union are advancing. At the same time, China's trade with Russia is surging, helping counter Western sanctions. "With the free fall in container rates, weak demand from the West and shifting trade routes, Asian ports are facing a complex situation," Roehl said. "While the shipping industry may witness a rebound in the future, the current outlook remains uncertain."

The challenges surrounding the accumulation of empty containers at Chinese ports have not gone unnoticed. Kris Kosmala, vice president at Marine Digital, sees China's rail-sea intermodal trains that have made 25,000 trips along the New International Land-Sea Trade Corridor as a practical fix.

"Six years ago," Kosmala said, "I wrote about this smart intermodal-sea project in the context of PSA Singapore's trade orchestration platform CALISTA and my still-standing argument for ports needing to provide better alternatives to the carriers' initiatives of Datalens and GSBN." Kosmala sees the pairing of ports such as Qinzhou and Singapore and exploiting under-utilised rail connections

offering several benefits, the first being the time savings. Transport of containers from Chongqing by barge to Shanghai for sea carriage to Singapore can take up to 25 days, while rail transport of containers from Chongqing to Qinzhou for further sea carriage to Singapore takes only ten days.

"Port pairs like this exist all over the world," Kosmala said. "This intermodal-plus-sea alternative to shipping China's e-commerce goods into South East Asia through the congested and expensive port of Shanghai worked well for everyone involved, and also handsomely repaid PSA in augmenting their volumes in Singapore port with the port-to-port connectivity between Qinzhou and Singapore." The number of train trips on the rail-sea intermodal service of the New International Land-Sea Trade Corridor surged from 178 in 2017 to 8,820 in 2022 and the rail-sea intermodal service has expanded from its origin in Chengdu to cover 61 cities in 17 provincial-level regions in China.

Congestion still a problem

GAC China's shipping director Frank Xia warned that container pile-ups and overcrowded ports across China will be a "consistent challenge" for 2023. "In 2021, container manufacturers produced over 7 million-teu-worth of boxes globally to meet the soaring demand for container shipping amid the pandemic. Coupled with the 2% increment in global container volume last year, the number of excess containers in the global shipping market has reached 5 million teu.

"However, current weak global demand and sluggish foreign trade means there is now an oversupply of empty containers building up at Chinese ports," he said. However, these empties stand ready to serve an anticipated uptick in China's economic and manufacturing output later this year.

New and expanded container hubs resulting from cross-border foreign direct investment (FDI) may also lead to shifts in the regional supply chain and the flow of commerce. "Looking to Vietnam, a hot topic is the possible wave of FDI inflow to the country," Roehl said. "Looking at reports, we see some supply chain experts saying they expect Vietnam and India will rise as functioning container shipping hubs as the market strives to diversify supply chain risks for geopolitical reasons. There is still substantial work to be done by the Vietnamese government to catch the FDI wave, take advantage of supply chain transformation and turn current challenges into opportunities for economic development."



Erland Ebbersten, GAC Group

Multi-modal growth drive supports volumes

Middle East port expansion continues at record pace
By Paul Bartlett



Untold energy wealth across the region has underpinned port development as demands from youthful and aspirational nations ensure that the Middle East is now a key destination in its own right. Covid-19 apart, cargo volumes continue to expand and container terminals across the region are engaged in a constant expansion drive.

There are virtually no parts of the region where seaward links are now less efficient than shoreside transport systems. Politics limits growth in some areas, but these are usually well served by regional feeder services. And it is true that some long-planned port developments remain on the drawing board or progress only slowly.

For the most part, however, port expansion continues at record pace. Earlier this year, the Saudi Land Bridge Project progressed to the financing stage, according to Minister of Transport and Logistics Saleh Al-Jasser. Said to be costing a staggering \$26bn, it will connect Jeddah Islamic Port on the Red Sea with the Saudi capital, Riyadh, via rail, and then ultimately with Dammam on the country's Gulf coast.

Quoted in the *Saudi Gazette*, Al-Jasser suggested that if sufficient private sector investment was not available, a public-private partnership would be the way to go. If the line is built, a freight train could cross the desert in around 18 hours, instead of five days by sea, and the line would also cut down substantially on truck traffic, which currently carries around a third of Saudi Arabia's freight cargo from ports to cities, according to Oxford Business Group.

The new line would involve extensive reorganisation of Saudi's logistics infrastructure. It would involve relocating Riyadh Dry Port for a start, as well as installing new logistics centres at Jubail Industrial City Logistics Centre, Dammam Logistics Dry Port, King Khalid Airport Logistics Centre in Riyadh, Jeddah Logistics Dry Port, King Abdullah Port Logistics Centre and Yanbu Industrial City Logistics Centre.

Jeddah's journey

As a passenger gateway to the holy city of Mecca, the Port of Jeddah is essential in pilgrimages made by many. A new Saudi high-speed rail line, the Haramain, opened in 2018 and links Jeddah with the holy cities of Mecca and Medina. It suggests a taste is developing in the Kingdom for bolstering infrastructure.

The country's 2022 Hajj season was a muted one, however. Less than a quarter of the devoted



Credit: DP World

travelled through Jeddah last year compared with 2019. According to Saudi Ports Authority (Mawani) data, 23,863 out of a total 899,353 pilgrims passed through Jeddah in June and July compared with 110,102 out of a total 2.5 million in 2019.

In cargo terms, Jeddah has gone from strength to strength. As of August 2022, container volumes had reached about three million teu through the year-to-date, matching its 2019 throughput. However, the port plays a pivotal role in transshipment volumes, handling around 75% of the country's total. Its importance is only growing, with 1.7m teu of transshipment cargo having passed through the port up to and including August 2022, compared with 1.4m teu for the same period in 2019.

Recognising this, Mawani announced two new contracts, worth a combined \$171m, to deepen the harbour to 16 metres, and to construct two new berths. And in February 2023, Mawani and AP Moller-Maersk broke ground on a new logistics zone.

The area is to be powered using an extraordinary 6.5 hectares of rooftop solar panels, which Maersk and Mawani say will be enough to power the entire facility. Some 70% of the 22.5-hectare facility will be given over to bonded and non-bonded warehousing and distribution, while the remainder will serve as a transshipment hub, air freight and less-than-container-load (LCL) cargo area. Altogether, the logistics park will add some 220,00 teu in capacity.

Dammam's record-busting

Soon to be a train ride away from Jeddah should the vaunted Land Bridge Project go ahead, the King Abdul Aziz Port in Dammam experienced its best

In partnership with DP World, the Saudi Ports Authority (Mawani) launched the first direct shipping line connecting UAE's Jebel Ali Port in Dubai with Egypt's Sokhna Port through Jeddah Islamic Port in 2020

Despite the normalisation of container trades throughout 2022, AD Ports' network still managed to increase throughput by 30% compared with 2021

year yet in 2022, with throughput of 2m teu – representing not only a year-on-year improvement over the 1.78m teu recorded in 2021, but also beating its pre-pandemic 2019 result of 1.82m.

But there are greater gains to come. A new upgrade and development project worth \$1.9m began in January, under a build-operate-transfer agreement between Mawani and Saudi Global Ports. On completion, the project is expected to more than double the capacity of the port, to 7.5m teu. Meanwhile, Singapore-based shipping line Bengal Tiger Line announced in March 2023 that it will connect King Abdul Aziz Port to Umm Qasr in Iraq and Mundra, India, by feeder.

The port also welcomed its first port call by a cruise vessel, *MSC World Europa*, with around 5,000 passengers on board. Unlike its counterpart on the Red Sea, neither King Abdul Aziz nor other Saudi east coast ports have been passenger ports. The development would "...open a new and important gateway connecting Saudi Arabia to the rest of the world – via the Arabian Gulf", said Lars Clasen, CEO of Cruise Saudi.

In competition with Damman for Saudi hinterland cargoes is APM Terminals Bahrain, which opened a sea-to-air hub in late 2021. This integrates customs processes at the port and the airport, lending itself to time-critical perishables, medicines, and machinery parts that cannot wait.

Meanwhile, work is at the contracting stage to build a second bridge between Bahrain and Saudi Arabia, augmenting the capacity of the existing King Fahd causeway. The work, which is expected to cost \$3.5bn, will relieve the strain on the current bridge, which is notorious for its long traffic jams during holiday season.

Dubai's ecosystem

DP World's flagship port, Jebel Ali, caught up to pre-pandemic levels in 2022, recording a throughput of 14m teu, an increase of 1.7% over the previous year, and comparable with the 14.1m handled in 2019. Most recently, the port has embarked on a project alongside Maersk to improve quayside productivity, thereby reducing the amount of bunker fuel burned alongside. Maersk is deploying its fast-tracking system, Maersk Accelerate, as well as Maersk Flex Hub, a cargo storage system, for the purpose.

"Jebel Ali's success has been built on progressive collaboration with partners such as Maersk, enabling us to combine our operational efficiencies and expertise to ensure we deliver the best end-to-end solutions to our customers," said Shahab Al Jassmi, vice president – ports and terminals at DP World UAE.

"This synergy has allowed us to develop a successful ecosystem at Jebel Ali that continues to evolve and adapt to the dynamic markets we operate in."

A pilot project at Jebel Terminal 4 might demonstrate one way in which this could be achieved. Boxbay, an automated storage-and-retrieval structure developed by DP World and Germany's SMS, allows containers to be stacked 11-high instead of six-high, improving storage footprint. It also allows any box to be quickly retrieved from anywhere in the stack. DP World's proof-of-concept is also powered by rooftop solar panels.

"It delivers more than three times the capacity of a conventional yard with enhanced performance, so the footprint of terminals can be reduced by up to 70% and enables any container to be accessed individually without moving any other," said Patrick Bol, head of port expansion and special projects at DP World.

The next facility to try out the Boxbay system will be DP World's container terminal in Pusan, South Korea. "This is not a cheap solution," Bol admitted, requiring "much more capital requirement upfront". However, he added, "the running cost is less".

Abu Dhabi's vertical journey

Abu Dhabi Ports Group, meanwhile, has been on a vertical integration drive. In 2022, it acquired a 70% stake in International Associated Cargo Carrier, the parent company of Transmar International Shipping Company, a regional container line, and Transcargo International, a terminal operator and stevedoring company.

It then went on to buy an 80% share in Global Feeder Shipping, a Dubai-based container carrier, and bought out Noatum, a logistics company dealing with cars, reefers, breakbulk and dry cargo. In total, AD Ports spent \$1.6 billion on acquisitions throughout the year. It also agreed some 390 hectares of land leases in 2022, which outstripped those agreed in the previous two years combined.

Despite the normalisation of container trades throughout 2022, AD Ports' network still managed to increase throughput by 30% compared with 2021. However, the group's chief strategy and growth officer, Ross Thompson, acknowledged that economic headwinds probably lie ahead. "Global markets are still turbulent with a high inflation environment, rising interest rates, geopolitical tensions as well as continued ramifications of the Covid-19 pandemic, including supply chain disruptions and supply shortages," he said.

Elsewhere in the UAE, the world's third largest bunkering hub Fujairah hit headlines in 2023 after prices for its tank storage shot up to \$12 per cubic metre, on the back of an influx of Russian oil. The facility recorded stockpiles of 21.9m barrels as of March 27, of which some 11.6 million were heavy distillates, and tank storage was fully leased out. Heavy distillates, such as bunker fuel, were a growing percentage, increasing by 15% since the end of 2022, eating into the share of middle distillates which had decreased by 16%.



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New dynamics to shape breakbulk terminals

Tumultuous return from 2022's high. By Johan-Paul Verschuure



The breakbulk shipping market crashed from its high in the second half of 2022, in the same sudden and fast way as it did in 2021. However breakbulk throughput volumes in ports managed to exceed the record rates of 2021 and breakbulk throughput developments were less dramatic than spot rates suggested.

In the first quarter of 2023 volumes stayed stable. New dynamics for breakbulk terminals are, however, shaping the industry for the coming year. Overflow volumes from the container sector are drying up with spot rates normalising, some breakbulk flows are being re-containerised again and port congestion is easing across the board. The big question will be if macroeconomic demand is indeed weakening and whether project cargo will offset the macroeconomic drivers.

In addition to rapid changes in total volumes, the product and service mix on breakbulk terminals is seeing rapid changes as well. These include changing energy prices and labour issues causing a preference for import of finished goods in some sectors, such as steel and ferro-alloys. At the same time, demand for construction materials remains high, while supply is struggling to keep up. With slowing steel demand, terminals are seeing storage times increase, compensating partly for the lost revenues on the volume side with softening end demand. Perhaps the rapidly growing shortsea ro-ro market may offer new opportunities in 2023 to replace the container overflow activity of last year.

Terminals need to monitor these changing geographical structures and remain attractive to new opportunities

The volume potential offered by the energy transition and large offshore wind ambitions has been widely reported and will provide opportunities to the sector in the medium term. Several European countries are planning dedicated offshore port facilities to support the wind farm developments.

While a good opportunity for the wider industry, other cargo flows require different facilities solutions. In addition to heavy duty paving and equipment, storage times are typically longer (hence require lower storage tariffs to be competitive) and assembly and production activities may need to take place at the terminal. For breakbulk terminals to benefit from the large offshore wind ambitions the



Credit: Port of Hamburg

Hamburg recorded double digit breakbulk growth in 2022

terminals need to do quite a bit of homework, especially those land constrained terminals within larger established ports. Terminals which can already handle heavy-lift cargoes are already well positioned.

Volatility requires flexibility

Last year was the third year in a row with high volatility in the breakbulk market. It seems volatility is becoming a structural characteristic of the market. Ports and terminals have to accommodate this volatility to ensure fluid operations and to be a reliable partner. Ideally, lower average capacity utilisation should be targeted to ensure future spikes in volatility can be accommodated. This volatility is, however, hard for breakbulk terminals to digest. Operating on thin margins and with relatively short-term outlooks in comparison with other sectors in the port, the risk increases that smaller operators will cease operations.

In an environment with labour shortages, where ports are struggling to fill vacancies, labour efficiency and flexibility is key to staying competitive. Locking in inflation adjustment mechanisms in contracts and concession agreements can avoid strikes and falling service levels – as witnessed in, for example, Hamburg. Also, smart staff planning, and partial automation of operations will increase in importance in the next few years to allow ports to stay competitive with rapidly changing macroeconomic and labour conditions.

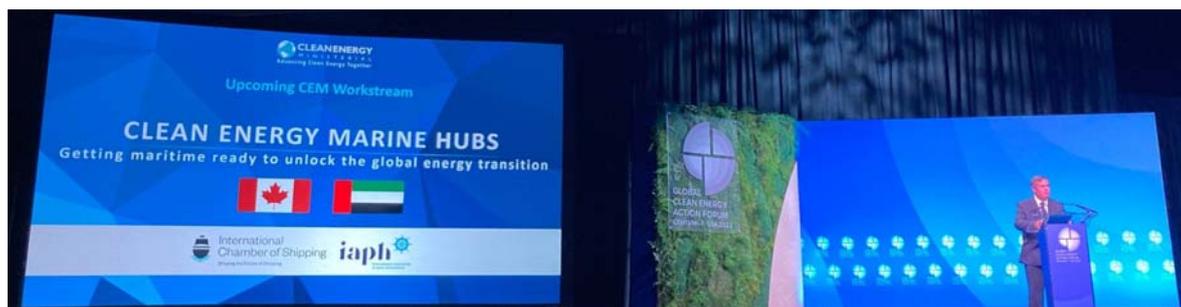
Port authorities can accommodate this by offering volume-linked concession payments, taking over part of the market risk as well as shortening contract durations with options to renegotiate. In particular, due to the importance of the breakbulk sector in the energy transition, ports should make sure that breakbulk operators can accommodate the much-needed shift away from fossil fuels.

■ **Johan-Paul Verschuure** is a senior port and transport economist and director at Rebel.

Powering up the energy transition

Global ports lay the groundwork for the green fuel era

By **Victor Shieh**



Clean Energy Marine Hubs encourage all stakeholders, including ports, to work with governments to prepare for the future fuel transition

Servicing the energy transition comes at a cost and ports are wrestling with the question of ‘who pays’ in the shared responsibility of addressing climate change.

Climate change, the impact of extreme weather on the resilience of maritime transport chains, the emergence of low and zero carbon fuels and increasing pressures placed by regulators to decarbonise the maritime industry have placed ports in a prime position as potential energy hubs. The International Association of Ports and Harbors World Ports Tracker report for Q4 2022 indicated that 31% of the 77 ports responding from eight regions confirmed increased land use planned for non-fossil energy production.

The challenge in fulfilling this potential lies in bridging the production and distribution costs. The high economic costs of production, the challenges in the funding of infrastructure and the availability of resources for supplying zero carbon fuels implies that ports aiming to become bunkering ports will have to consider becoming zero carbon energy hubs themselves.

However, not all ports will become low and zero carbon fuel bunkering hubs. Some will need to provide maintenance facilities for vessels running on dual fuel or zero carbon fuel propulsion when they make a port call. Other ports will need to have the necessary safety and operational procedures in place with trained personnel to receive vessels running on these fuels. Those that are aiming to become bunkering hubs for these new fuels also need to consider attracting energy suppliers to make ports their energy production hubs for manufacturing, land-based transportation modes, local population energy supply and/or energy reuse.

Studies estimate that the world will need an eighteen-fold increase in renewable capacities of all zero emission fuels to meet the COP26 goals and that 50% percent of that capacity could be carried by ships,

according to the ICS report *Fuelling the Fourth Propulsion Revolution* – this creates an opportunity for ports. In addition, the relative low density of zero carbon fuels means that ships will have to bunker more frequently irrespective of on-board fuel storage capacity of the most advanced vessels, creating unique opportunities for ports that are well-positioned to receive them on principal trading routes.

Regulatory gap

However, the absence of regulation and the need for funding to bridge the gap between the cost of production of zero carbon fuels and hydrocarbons increases risk for ports committing to invest in bunkering infrastructure. Ports are exposed to investment risks in long-term infrastructure investments when there is no real indicator of which fuel(s) will be adopted by shipowners to gain the necessary critical mass. There is every indication that the market will require a mix of low and zero carbon fuels in the future with no one fuel emerging as the standard.

One potential support to help break this chicken and egg situation may come through a revenue-raising market-based measure (MBM) with the potential to balance the competitiveness gap between zero carbon and hydrocarbon fuels, and which can support a just and equitable transition.

In the meantime, the speed of implementation of zero carbon fuels is also highly dependent on the speed of technological development of ships’ engines, onboard fuel storage technologies and committed investments by shipyards and shipowners. Much of the funds into research and development on combustion engines that can work efficiently on zero carbon fuels – and offer a realistic return on investment – are currently dependent on more advanced shipowner-operators and yards seeking first mover advantage. However, there is currently only limited progress at the IMO’s Marine

Ports are exposed to investment risks in long-term infrastructure investments when there is no real indicator of which fuel(s) will be adopted by shipowners to gain the necessary critical mass

Environment Protection Committee in reaching consensus between member states on a method and legislation to create a fund through MBMs.

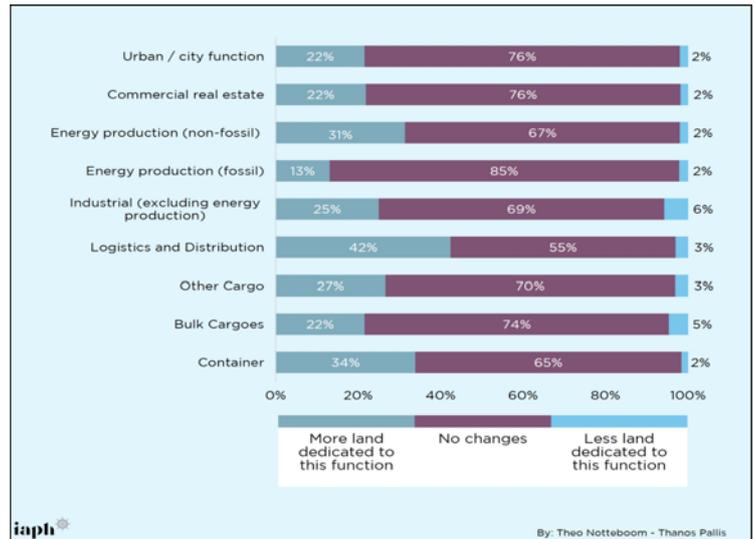
For now, speed of development is mainly dependent upon efforts conducted in the private sector. An initiative that is gaining traction is the Clean Energy Marine Fuel Hubs platform. This encourages all stakeholders in the maritime value chain, including ports, to work with governments to help them identify clean energy maritime hubs, de-risk green investments, and prepare the global supply chain to be ready for the future fuel transition. The initiative, which was founded when representatives from the energy sector, ports, and shipping joined 29 energy ministers from the world’s leading governments at the Clean Energy Ministerial in Pittsburgh last year, is being led by the International Chamber of Shipping with the support of IAPH and several government signatories, including the UAE, Canada, Uruguay, Norway and Panama.

By encouraging public fund investment to stimulate supporting private sector financing, the aim is to break through the current limited Final Investment Decisions (FIDs) being taken in designing and constructing these energy hubs in and around ports.

Power surge

Adopting onshore power offers a proven and positive short-term method of reducing vessel emissions at berth. Several advanced ports have already successfully implemented onshore power systems (OPS) with partners using renewable energy, so acquiring knowhow from these first installations is a priority.

Providing ports with practical guidance on operational, economic, organisational and technological aspects of OPS through initiatives by IAPH and other partners, along with capacity building in developing countries through IMO-Norway GreenVoyage2050, will support this adoption.



Credit: IAPH World Ports Tracker report, Q4-2022

One of the principal gaps facing ports in their efforts to decarbonise using this method is the availability of low or zero carbon sources of power. To significantly reduce emissions in and around ports, the electrification of materials handling equipment, the introduction of onshore power for vessels at berth and other measures being taken by ports need to be matched by the availability of solar, wind, geothermal, tidal and other renewable energy sources. This is especially true for developing nations in the southern hemisphere. Ports will need to source this low carbon energy, otherwise efforts to reduce emissions within the port gates will effectively be cancelled out or even worsened. The positive impact of OPS on decarbonisation is ultimately determined by the uniformity of its deployment and the use of renewable energy to power it.

Offering incentives to shipowners that can demonstrate outstanding environmental performance of their fleets using an index-based calculation system is another proven method of encouraging ship emissions reduction. By offering incentives – such as reductions in port dues to shipowners demonstrating material improvements in environmental performance by means of a neutral, well-defined index-based calculation system – ports can have a positive impact on air quality and reduce carbon and particulate emissions.

■ **Victor Shieh** is director of communications and events at the International Association of Ports and Harbors.

More ports are committing land to production of non-fossil fuel energy

Index scores emissions reduction successes

The IAPH Environmental Ship Index (ESI) manages just over 6,900 vessels with 60 incentive providers and is an index that has been in place for just over a decade.

An automated, maintainable environmental scoring system is available for registering shipowners which potentially results in lower

port dues/fees for vessels calling at ports. ESI scores vessels on their NOx and SOx emissions, rewarding reporting and improvements over time of energy efficiency. Vessels also receive bonuses for being equipped to use onshore power systems in ports.

A separate module also scores noise

emissions of vessels, directly and proportionally, and gives a fixed bonus for a noise reduction measurement report. Further plans for the Index include a new at-berth module for the evaluation of the emissions performance of a given port call, starting with cruise vessels as a pilot case.



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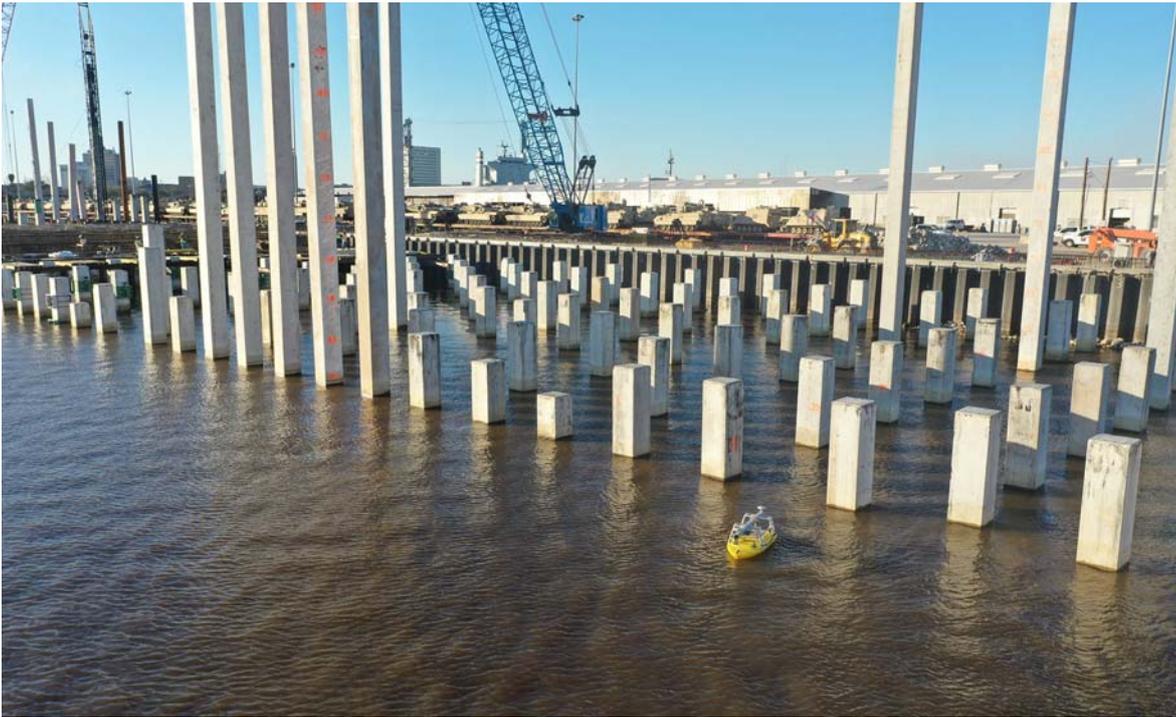
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Spend wisely on sustainable tech

Ports must avoid falling into the trap of one-off solutions that do not stand the test of time. By Carly Fields.



Credit: McCarthy

McCarthy's USV can survey obstructions without halting port operations

Ports looking to invest in new technology need to avoid falling into a common pitfall: poor sustainability. This isn't sustainability in the modern-day green sense; instead, it refers to sustainability in the traditional sense of the word: the quality of being able to continue over a period of time.

Carlos Lopez, vice president for product management at Kaleris, explained the risks to *Seatrade*: "In adopting technology, it is crucial to weigh its immediate benefits against its ability to evolve and endure in the long term, as well as the costs associated with maintaining it. While one-off solutions may be enticing due to their adaptability to a specific facility, such technologies must also be replicable and implemented at a reasonable cost to incentivise ongoing investment from technology partners over the years."

For him, the key to promoting innovation that is truly sustainable, and delivers compounded value over time, lies in striking the appropriate balance between risk, benefit, cost, and replicability.

The prospect of finding that balance can be daunting for many ports, which translates into a level of risk aversion within the industry. That risk aversion must be contextualised by the potential

consequences of failure, Lopez said. "Container terminals are critical sites that directly impact the economies and GDPs of countries and regions. Therefore, they cannot afford to fail due to the significant impact it would have on the global economy. As a result, container terminals require more robust risk mitigation strategies than other businesses."

Kaleris takes this risk to heart and strives for solutions that can be adopted incrementally, at a comfortable pace, rather than implementing drastic, all-encompassing changes that could potentially disrupt a port's operations. "Our solutions are designed to be deployed in smaller areas of the terminal, with the option for expansion as users become more familiar with the technology. Additionally, the modularity of our solutions allows for technology deployment without excessive downtime," he said. "In essence, our customers seek to innovate and disrupt the industry, but they require solutions that will not disrupt their operations in the process."

TOS evolution

Kaleris' focus on the port side is its Navis Terminal Operating System (TOS), but it is not content to sit

While productivity remains an important consideration, terminals are now more focused on improving efficiency and reducing costs

still. "As the industry landscape continues to evolve, it is imperative that our technology evolves alongside it to meet the changing needs of our customers."

Lopez noted that there are several key trends driving this evolution. Firstly, the historical measurement of productivity, moves per hour, was the primary metric by which terminals evaluated their success. "While productivity remains an important consideration, terminals are now more focused on improving efficiency and reducing costs," Lopez said.

Another key trend is the shift from building new, greenfield terminals to expanding existing, brownfield ones. "This change has significant implications for personnel, as terminals must manage increasing volumes of cargo with the same number of staff," he said. "To support this growth, the TOS must focus on enhancing the productivity of its users by leveraging data to inform decision-making."

Connectivity represents a third trend driving the evolution of TOS. "Terminals are no longer isolated nodes in the supply chain but rather must exchange information with a variety of stakeholders, partners, and other players," Lopez noted. Incorporating real-time data and insights into its processes, today's TOS becomes part of a larger ecosystem focused on optimising the end-to-end supply chain.

Service provider

From another angle, technology is supporting auxiliary services in and to ports. Sarah Johnson, senior field engineer at McCarthy Building Companies Inc, pointed to McCarthy's uncrewed survey vessel, which utilises sonar and GPS to collect hydrographic data and find obstructions without a person on board. It also has a sound velocity probe which reports the density, salinity, temperature, and conductivity of the water – all of which impacts how fast sound waves travel through water so the data it collects is more accurate. The hydrographic data collected is used to provide a detailed map of the seafloor and other subsea information.

"Being able to view this information and understand the existing conditions below the water surface helps in planning future development for ports, as well as assisting our construction crews in near real time while actively building," she said.

The uncrewed survey vessel (USV) uses the same technology as a traditional person-operated survey vessel, but on a much smaller scale and without personnel directly in the work area. The obvious benefit of removing the human from the equation is increased safety. "When planning work, you always think of risks to personnel. Anytime you can take a person out of a dangerous work environment, it's safer. Most of our work involves a lot of heavy

equipment operating in close proximity and the underwater areas we need to survey are right in the middle of all the equipment. By eliminating a person in that situation, it brings the risk of the work significantly down," Johnson said.

Another benefit of the USV is time saved. Before the development of the USV, McCarthy would have to move equipment out of the area to be surveyed and then wait on the results from the third party. "With the small size of the USV (5 feet long and 3 feet wide), it is not necessary to move equipment and stop production," Johnson said. "The USV is small enough to reach narrower and shallower spaces than a conventional survey vessel, not to mention turning around the findings much more quickly."

McCarthy has been using the USV to assist with port projects, and it has been instrumental in recent Port Freeport and Port Beaumont projects, Johnson said. At Port Freeport, the USV was used to record slope depth for toe trenches so ship propellers would not hit, while in Port Beaumont, the USV was able to locate 40-foot sections of concrete underwater obstructions in zero visibility. There, the data collected was then inputted into a GPS-enabled crane barge to allow the removal of the debris. Further, the USV also provided slope data to determine the quantities of slope protection needed.

Carlos Lopez,
Kaleris

Looking through windows

Technology is also driving trade facilitation. From January 1, 2024 it will be compulsory for ports around the world to operate Maritime Single Windows (MSW) for the electronic exchange of information required on ships' arrival at a port, their stay and their departure.

Julian Abril Garcia, head of the facilitation section at IMO, works with Member States to ratify and implement the Convention on Facilitation of International Maritime Traffic. Speaking with *Seatrade*, he said that the pandemic was an unexpected driver towards digitalisation and that the maritime sector must build on that momentum if ports across the world are to hit the MSW deadline.

"Few in the 21st century would argue that reproducing information and individually sharing it with multiple partners is an effective way to operate. Digitalising and automating procedures from a ship's arrival in port





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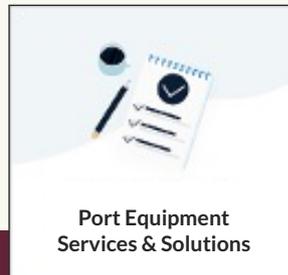
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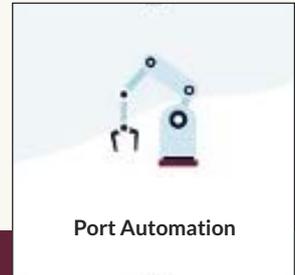
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through to its departure, and potentially including its cargo's onward land journey, not only streamlines processes for the port itself through the sharing of data just once but also supports resilience in the global supply chain of goods," he said.

Ports are a "crucial interface" between the maritime and onshore supply chain, and IMO is encouraging ports with valuable experience of operating their own MSWs to share it with those still in the earlier stages of the development process.

"The FAL Convention has put in place the regulatory structure for this push to modernise the port call process, but it's clear this digital transition is not happening at the same pace in the developed and developing worlds." IMO is committed to supporting all Member States in finding tangible solutions to enable their compliance under FAL.

An example of the sort of successful partnership-working that IMO is promoting includes the facilitation of Norway's assistance to Antigua and Barbuda. Providing technical expertise, Norway has helped Antigua and Barbuda design a Maritime Single Window system specifically with small island developing states in mind – one that can be replicated, modified and adapted as required by other ports facing similar issues.

By leveraging the strengths of both AI and humans, we can achieve greater efficiency, accuracy, and productivity

"As the January 2024 deadline draws closer, the benefits of an approach whereby collective expertise is shared to accelerate its spread across the global maritime industry are clear.

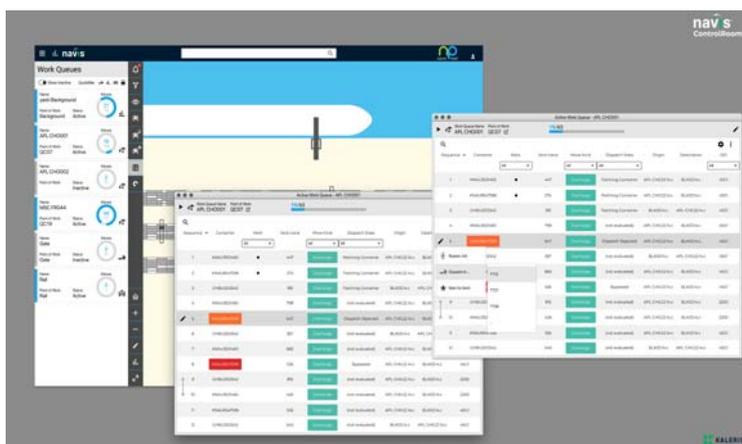
Under the FAL Convention, the number of formal declarations required is set to a maximum of thirteen. But once a ship is berthed, up to 20 parties might provide services to it, requiring the exchange of lots of information.

"Being able to easily co-ordinate those services digitally enables effective planning by those providing port call services and, in turn, around the ship's departure. This reduces the likelihood of delays and the knock-on effects those can have on an individual ship's schedule and that of others waiting to berth."

Tech of tomorrow

For Lopez, it's the tech on the horizon that is generating the most excitement. He expects artificial intelligence and large datasets to revolutionise numerous industries, including the maritime sector. "I see AI as a productivity booster rather than a replacement for existing talent; AI can augment people's capabilities in many ways." He gives the examples of:

1) Decision-making: AI can provide data-driven insights and recommendations to assist people in making better decisions. "This can lead to greater efficiency, accuracy, and a reduction in errors."



Credit: Kaleris

2) Task automation: AI can automate repetitive tasks, freeing up time for people to focus on higher-level tasks that require creativity, critical thinking, and human interaction.

3) Predictive analytics: AI can analyse vast amounts of data and identify patterns and trends that humans may overlook to help predict outcomes and inform decision-making.

"Overall, AI has the potential to enhance people's capabilities by automating routine tasks, providing insights, and enabling more personalised experiences," Lopez said. "By leveraging the strengths of both AI and humans, we can achieve greater efficiency, accuracy, and productivity."

"When applied to container terminals, AI can enable our customers to handle more business without having to double their personnel. Moreover, it can help optimise their assets and resources, leading to significant cost savings."

Ports harnessing the power of AI technology include Port of Cork, which has opted for an AI-powered port system to accelerate digitalisation. With software supplier Innovez One, Cork will fully digitise and optimise marine services for vessels arriving and departing at the port. Using algorithms powered by AI and machine learning, a planning module will manage schedules and dispatch resources – assigning pilots and tugboats to jobs in the most efficient way, and reallocating resources if a vessel's ETA changes.

"Digitalisation is an essential foundation that enables ports to tackle the most pressing challenges they face today, from persisting congestion to the need to reduce their emissions," said Grant Ingram, Innovez One UK and Europe CEO. "Smart ports will also be the ones best placed to position themselves in the greener supply chains of tomorrow and support decarbonisation in shipping and beyond."

Kaleris' TOS is continuously evolving to meet the changing needs of ports

Julian Abril Garcia, IMO



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Downward safety trend a concern

Half of maritime incidents in 2022 occurred in ports and terminals.
By **Yucel Yildiz**, RightShip



Ports and terminals are the beating heart of global trade. So, when a port's operations are interrupted, this can set in motion a chain of disruptions locally and globally.

Big charterers are aware of the risks of disruptions. They're taking a proactive approach and carrying out due diligence when they charter vessels to eliminate 'unknown' risk factors from substandard ships or shipping companies. But most ports and terminals aren't seeing the benefits of these procedures; they don't have the luxury of choosing which ships come in.

RightShip has been conducting due diligence in shipping for decades, with our goal being zero harm in the maritime industry. Every day, RightShip collects, verifies and evaluates data relating to safety, sustainability, crew welfare, and the operational performance of vessels. In 2022, we registered over 4,300 vessel incidents of varying levels of severity. These incidents resulted in 175 fatalities, 114 missing persons, and 76 serious injuries.

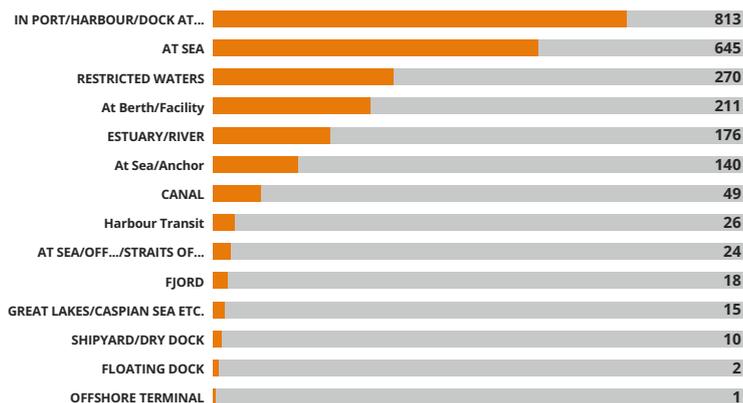
The statistics clearly show that ports and terminals are contending with increased risks due to vessel calls – but not all have adequate mechanisms or risk evaluation models to deal with them

A startling detail from these figures was that half of the incidents occurred in ports and terminals. Of the 4,300 incidents, 2,400 have location data. Half of these 2,400 incidents occurred within the port and terminal boundary, including at berth or using facilities, waiting at anchorage, or during harbour transit. And the majority of these incidents (813) happened when the ship was docked.

This statistic should worry harbour masters and terminals' operations teams. Even a low-severity incident causes harm to people and the environment and disrupts the supply chain. A high-severity incident has much more serious consequences.

Ports are in a difficult position. Every day, they are required to deal with vessels of wildly varying safety and operational standards. Therefore, many of the risk factors are out of their control. But once the vessel is within the port's boundary, the port has to deal with the incident, while trying to keep the rest of its operations working as normal.

In 2022, 1,955 vessels were detained by Port State



Control for a total of 10,445 days. Considering that Port State Control detentions are based on serious non-compliance with international regulations, this indicates that ships and shipping companies are falling behind on safety standards and best practices.

Cost of detentions

Detentions are one of the few tools that ports have to deal with incidents. However, they are costly; they entail blocking berths, rescheduling manoeuvres, delaying cargo operations, re-tasking shore personnel, and, in the worst cases, clogging transit routes for multiple berths.

The statistics clearly show that ports and terminals are contending with increased risks due to vessel calls – but not all have adequate mechanisms or risk evaluation models to deal with them. Ports need to be able to evaluate risks before accepting vessels into berth, so they can plan for potential incidents instead of simply accepting that accidents happen.

The benefits are numerous: when ports can perform a risk analysis of every vessel before encountering detention problems, and know its environmental ratings, they are in a position to create a future emissions reduction plan. From shore, ports can diagnose their problematic berths and plan sustainable layouts to reduce waiting times and cut emissions. They can improve the shore environment and plan crew welfare in tandem to provide the best ship-to-shore experiences.

All this will improve the overall efficiency of a port's operations while reducing costly and time-consuming incidents.

■ **Yucel Yildiz** is ports and terminal manager at RightShip. RightShip has established a new global task force named RightPORT that is 100% dedicated to improving safety, sustainability, and crew welfare in ports and terminals.

Number of Incidents by vessel location 2022

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Driving digitalisation, catalysing growth

Singapore pushes boundaries to capitalise on digital ambitions
By Koh Chin Yong



Credit: Maritime and Port Authority of Singapore

MPA is investing in 5G infrastructure in Singapore's anchorages

Digitalisation took an accelerated pace during the Covid-19 pandemic, in tandem with an increased reliance on connectivity. In the maritime sector, digitalisation plays a key role in areas such as supply chain efficiency, enhancing vessel performance, uplifting crew welfare, and aiding progress towards decarbonisation goals.

In 2020, the Maritime and Port Authority of Singapore (MPA) completed the rollout of a Maritime Single Window to enable a seamless port clearance application process that saved the industry an estimated 100,000 man hours annually in submission of regulatory requirements for declaration of arrival and departure of ships. This is known as Phase 1 of the digitalPORT@SG project where 'PORT' stands for Portal for One-stop Regulatory Transactions.

In 2022, MPA commenced Phase 2 trials of the digitalPORT@SG project with implementation of a just-in-time (JIT) planning and co-ordination platform. The JIT platform aims to orchestrate the scheduling of port resources required by ships, thereby facilitating optimal arrival and departure timings of ships to and from the Port of Singapore. It will enable faster ship turnarounds and reduce dwell times at anchorages. Improvements in operational efficiency will also help reduce greenhouse gas

emissions by ships in our port. Port users will also benefit from cost savings, or cost avoidance for shorter port stays.

Data initiative

To support digitalisation, in 2019 MPA launched the Singapore Maritime Data Hub (SG-MDH), a data platform for industry to promote data sharing and enable secure data exchanges between organisations. This has catalysed the development of innovative applications for industry use cases.

Recognising the need to facilitate system-to-system interoperability within the global digital ecosystem and to maximise the benefits of digitalisation, MPA launched the digitalOCEANS (Open/Common Exchange And Network Standardisation) initiative in 2020 to foster standardisation and harmonisation of data in the maritime industry. Under digitalOCEANS, harmonised datasets can be exchanged through a common set of application programming interfaces (API) between vessels, ports and supply chain stakeholders. The seamless and automated exchange of data between ports and shipping-related digital platforms can further optimise the port call process through the digital exchange of documents for port reporting requirements, and

thus improve the efficiency of port calls and lead to faster turnaround of ships.

The first set of API specifications for port clearance regulatory data was developed and launched in November 2021 with several partners including Port of Rotterdam and PSA Corporation. Today, Singapore and Guangzhou, China, can exchange 25 types of ship e-certificates for port clearance and port state control purposes via APIs, achieving greater operational efficiency and streamlining of various processes required for a vessel's entry and departure between ports.

MPA has also been collaborating with international ports to promote digitalisation and decarbonisation in the industry. In August 2022, MPA signed a Memorandum of Understanding with the Port of Rotterdam to establish the world's longest green and digital corridor to enable low and zero carbon shipping, and is working with a number of partners to enable more green and digital shipping corridors with Singapore. Under the digital corridor workstreams, the overarching goal would be to accelerate the deployment of solutions and enablers to facilitate efficient port call and flow of goods, and paperless handling through the ports of Singapore and like-minded partners.

Supporting enterprises

In Singapore, there are about 280,000 small-to-medium sized enterprises (SMEs) that account for 70% of employment. It is vital that SMEs embrace the digitalisation journey to increase their efficiency and to be in a stronger position to scale and offer greater value to consumers.

MPA has implemented several programmes to support maritime SMEs in Singapore. For instance, MPA worked with the Infocomm Media Development Authority and the Singapore Shipping Association to jointly develop the Maritime Digitalisation Playbook. The playbook provides a systematic approach to help SMEs understand the value of digital transformation, identify work areas, and processes they can transform, and provide them with the Government resources that they can tap into to embark on their digitalisation journeys.

There is also a Sea Transport Industry Digital Plan (IDP) that supports maritime SMEs to adopt digital solutions. A co-funding programme, the Sea Transport IDP, provides the companies with a step-by-step guide on the digital solutions local SMEs can adopt at each stage of their growth. Last year, we expanded the Sea Transport IDP from the sub-sectors of ship agency, harbour craft and bunkering to all sub-sectors. More than 3,000 SMEs are thus eligible to apply for funding support for their digitalisation journeys. MPA will continue to update our Maritime Digitalisation Playbook and IDP to bring onboard the latest solutions that will be useful for our maritime SMEs.

It is heartening to see the building up of momentum by various segments of the industry in digitalisation and exploitation of data and technology. However, I think we are still early in the adoption and that there must be continued efforts to promote all

Maritime industry players who do not reap the full benefits of digitalisation are likely to be left behind, and those who embrace it will thrive and grow new businesses

these initiatives, including cybersecurity, and to also support SMEs and bring them onboard. We hope that with more success stories of SMEs who have benefitted, it will inspire more to take that first step towards digitalisation and invest time and resources into embracing new opportunities.

5G initiative

Digitalisation requires good connectivity to flourish and MPA has 5G in our sights. In August 2022, MPA and our partners announced that we would roll out Maritime 5G in Singapore's anchorages, fairways, terminals, and boarding grounds by mid-2025. Twelve maritime 5G base stations will be set up, of which three will be ready by 2023 to support the development and testing of new maritime applications.

Establishing Maritime 5G in Singapore's port waters opens up new possibilities. It will serve as a test bed for maritime technological innovations and accelerate the research and deployment of new maritime applications such as remote pilotage, digital bunkering, drone delivery, and telemedicine.

One of the use cases enabled by Maritime 5G is Remote Assisted Pilotage Advisory (RAPA) or remote pilotage. At present, for vessels of 300 gross tonnage and above entering the Port of Singapore, a harbour pilot is required to board the vessel physically. The current process requires the harbour pilot to take a harbour launch, sail out to the vessel at the boarding ground, and climb up the pilot's ladder to board the vessel to conduct pilotage.

With the high bandwidth and low latency telecommunication network enabled by Maritime 5G, RAPA can potentially allow harbour pilots to guide the ship masters remotely using real-time cameras from a shore-based control centre. When fully developed, this can eliminate the need for the harbour pilot to board the vessel physically, making the entire process more efficient and reducing the risks that come with embarking and disembarking persons to/from the vessel.

We are in the era of the digital economy. Maritime industry players who do not reap the full benefits of digitalisation are likely to be left behind, and those who embrace it will thrive and grow new businesses. As the digital surface increases, we must also enhance resilience against the growing cyber risks and implement the necessary safeguards even as we improve our connectivity globally. With proper collaboration, sustained investments, and strong commitment by all, I am confident that the maritime industry can achieve a more connected, efficient, secure, and sustainable future.

■ **Koh Chin Yong** is chief information officer/director (information technology) at the Maritime and Port Authority of Singapore.

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WELCOME

Doesn't Time Fly?

It seems like yesterday we gathered here after one of the most bizarre periods in modern history and reunited as a community. The COVID years now seem like a distant nightmare. However, looking ahead there is still a strong sense of optimism resonating around this industry and we are here, as ever, to provide a platform for discussion, debate and knowledge sharing, particularly at our flagship event, TOC Europe. Personally, this is my 22nd TOC Europe. The first took 200m from here in the halls near the entrance of the AHOY all those years ago, wow time really does fly...was anyone else at TOC 2000? I wonder.

NEW Format, NEW Opportunities

Take a look at our content programme. You will see we have put a lot of effort into freshening up the format and offering our attendees a wealth of options and opportunities. We now have 4 theatres, namely TECH TOC, Business Intelligence, Sustainability and Digital. So you now have the opportunity to build out your own programme and create a bespoke experience that best suits your objectives. However, you may also notice that we have slightly less speakers than usual (please accept our apologies if you did not make the programme this time but lets talk about other ways of repurposing your content across our channels) which is a move designed to offer visitors more breathing space and time to network with exhibitors. You will also see we have minimised clashes in sessions, so that again attending sessions will not be at the expense of missing others.

GO App!

This content programme and indeed all aspects of the event, are now housed on our new App. This tech will provide you with options to book in sessions and create your own schedule. Many attendees will also now have the opportunity to reach out to other people on site and request meetings, chat on line and connect. All of our commercial supporters, speakers and VIPs have this option, for visitors; why not upgrade to an 'Executive Pass'? For a reasonable fee you too can join this online community and also access our networking & catering areas. Definitely worth asking us about ..



3 Course Meal

Remember, TOC Europe is a 3 day event. Why stop after the starters and main course? We created an excellent programme on the last day so please do have a look. And, seeing as you thankfully have invested so much in your attendance, then it make sense to get the most out of it. Plus, who would want to miss the now infamous TOC golf tournament? Treat yourself to some dessert!

Planet TOC

Across our global brand you will now see a suite of sustainable initiatives that we are deploying to make our events carbon neutral by 2025. On top of this we are working with various charities and community groups to ensure we deliver a positive impact on the places we visit with the shows. Sustainability is a hot topic across the industry for all the right reasons. So its important as the leading event in this market that we also are sustainable. To find out more please do visit us and learn how you, as our customers, can help us achieve this ambitious goal – we will need your help!

Thanks Everyone!

Finally I would like, on behalf of TOC, to thank you all for your continuing support of this brand, not just here but all over the world. Special mention to our exhibitors who have once again created an amazing market place that showcases the latest cutting edge technology solutions. We are also joined this week by some very new companies, new to TOC and the industry, so please welcome them into the community and have a look at some of their, sometimes disruptive, solutions. Also I would like to thank our sponsors - DP World, Port of Long An, Moffatt & Nichol, TT Club, Navis, ZPMC, Nokia, Visy, Avlino, Q Terminals, KUNZ and PSA, and of course our expert speakers from all over the world. We at TOC never take for granted your investment and are deeply grateful for your ongoing belief and trust in what we do.

I do hope you all get what you hope for from this event. Please do come over to our stand for assistance or just to say hello. TOCsters are pretty friendly (mostly)

Remember, time flies so lets all make the most of this opportunity to connect and also enjoy our time together.

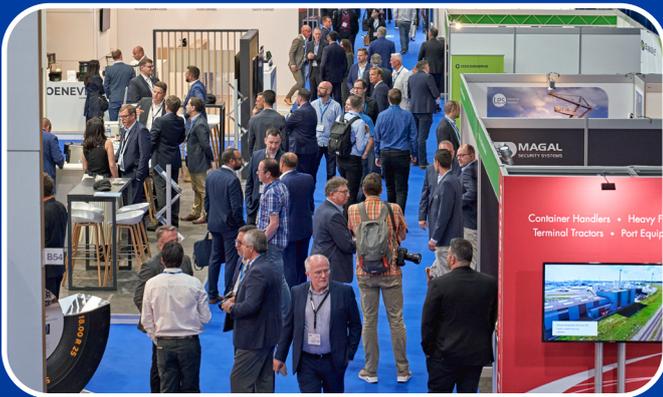
See you soon

Paul

NEW FEATURES.

Greater Opportunities

The AGM for port and cargo supply chain professionals just got a whole lot larger. Here's a taster of what you can expect:



NEW HALLS. LARGER FLOORPLAN

More space, more exhibitors, more products...



NETWORKING APP. PRE & POST-EVENT

A new way to connect with your peers and maximise your experience...



4 THEATRES. DOUBLE THE CONTENT!

Featuring Business Intelligence, Digital, Sustainability & TECH TOC...



SAFETY VILLAGE. NOW BIGGER!

More content, more networking & new exhibiting pods featuring safety...

TOC Europe is the meeting place where business comes to life. Get set to take centre-stage at the place where port visions become reality!

Minimal clashes between sessions so you don't miss out on anything!

4 NEW content theatres to build your own bitesized agenda

TOC Europe is the AGM for port and cargo supply chain professionals, with an unrivalled 40+ year heritage. With a 'Who's who' of key decision-makers, influencers, policy experts and solution-providers all underneath one roof, you'll be in good company amongst thousands of port executives looking to supercharge their strategies.

Take advantage when on-site of the event's plentiful learning and networking opportunities:



From understanding the basics of automation to enhancing safety at the terminal, this theatre will present a holistic approach to terminal operations.



From the practicalities of green legislation to the deployment of alternative fuels, this theatre will look closely at the integration of sustainability-led actions in the sector.



From new trends in port infrastructure development to forecasting the evolution of the supply chain, this theatre will provide business savvy on maritime trade.



From visibility and data collaboration to the latest digital solutions, this theatre will explore how the industry can truly capitalise on digitalisation.

Discover the World's Leading Showcase of Port & Terminal Products & Solutions

TOC Europe is the home of cutting-edge port tech and services, where product launches take place year-on-year, and this is your chance to see, touch and try out the latest solutions in-person from 200+ leading suppliers, including both well-established and more specialist names.

On the exhibition floor itself will be thousands of decision-makers and influencers strolling around to network, discover and soak up the very latest innovations and developments. Expect the unexpected across a diverse array of stands, including the 'TT Club Safety Village,' in partnership with ICHCA international.

TOC Safety Village (In association with TT Club & ICHCA) Stand E50

Are you a safety innovator? This is your place to....

- Submit your greatest safety concerns
- Hear and learn from experts in risk management
- Meet top suppliers of innovative safety solutions
- Attend workshops on the most common areas of risk for the transport and logistics industry

Let us know what's keeping you awake at night.

Safe operations are sustainable operations. If sustainability is on your radar, safety should be too.

Evening Networking Reception

Join the industry for an Evening Networking Reception on Tuesday 13 June from 6pm to 9pm at Bar Seventy One at The Ahoy Rotterdam.

You'll enjoy a light buffet and unlimited drinks! Open to Exhibitors, Speakers & Executive Visitors.

APMT Port Tour

'Executive Visitor' pass holders are eligible to register for one of our limited FREE places for the APM Terminals Maasvlakte II, taking place one day before the show starts, on the 12 June.

To find out more and to register your place, contact Tania Muñoz, Event Executive at tania.munozpaico@informa.com.

NEW TOC show app

Build your own bite-sized agenda | Message other attendees | Book meetings

Ahead of the show, download our official event app – TOC GO. Make the most of your time by tailoring your experience both before, during and after your stay in Rotterdam.

Personalise your profile so that attendees know who you are. Plan your schedule so you don't miss essential sessions, connect with fellow attendees, and much more.

Registering as a Free Visitor?

Why not upgrade your experience with an 'Executive Visitor' pass and enjoy all these benefits and more?

To get your premium pass or to upgrade your free pass, simply scan the QR code here





WORK SMARTER AT TOC EUROPE

Build your own bitesized agenda | Message other attendees | Swap contact details | Book meetings

Maximise your event experience with the official **TOC GO** App that allows you to:

ORGANISE YOUR TIME ON SITE

- With double the content on offer, build a personalised programme specific to your interests
- Schedule meetings with fellow attendees pre-event and during the show
- Incorporate your meetings around your agenda, maximising your time away from the office
- Access session recordings post show at a time that suits you

EXHIBITOR LIST

- Look at all 200+ Exhibitor profiles & "Add Your Favourites" so you know who to meet
- Access detailed information about each exhibitor
- Learn more about the exhibitor products & view press releases

FLOORPLAN

- Download the Floorplan & locate exhibitor booths easily

Q&A

- Ask Questions before & during the conference using the Q&A tool (*anonymously if you prefer*)



Search for "TOC GO" in the App Store & Google Play. For further information about TOC GO click the **QR code here**



SPEAKERS *Corner*

With **DOUBLE the content** now on offer at this year's TOC Europe, there will be no shortage of expert insights on hand to supercharge your strategies. Ahead of the show's opening, we caught up with **TWO hotly anticipated speakers** to find out their thoughts on the current state of the industry and what they are most looking forward to at this year's event.

Where does southern African sit in the global trade scenario?



An interview with Dr Darren Fraser, Transport Economist at HPC Hamburg Port Consulting, by Mateo Wiegold, Editorial Content Manager at TOC Worldwide

With about 90% of cargoes brought to Western Europe coming from the Far East (Asia), the need to reassure clients and end-users becomes ever more pressing as we navigate through a new era where global supply chains are challenged by unpredictability.

In a conversation with Dr Darren Fraser, Transport Economist at HPC Hamburg Port Consulting, he mentioned that today's world is significantly influencing the shape of present – and most likely future – supply chains and highlighted the impact of this scenario upon the African continent, particularly southern Africa.

Whether caused by Covid-related lockdowns and congestion, or the ongoing conflict in Ukraine, supply chains are in need to diversification if they are to stay resilient against another potential shock in the future. The search for resilience has, therefore, led to several manufacturers to consider reshoring as a possibility – and in some cases, the term evolves to “friendly-shoring”. While transpacific trade has dominated the scene in recent

decades, shipping lanes and supply chains connecting Europe and Asia are faced with more options, not just in terms of trade corridors but also for manufacturing, which places the African continent on the spotlight.

The traditionally low production costs in East Asia seem now less profitable compared to those in Africa, which is closer to Europe and presents a younger semi-skilled population, with a growth rate of 2.3% (2.7% for the southern African region), which is significantly higher compared to the -0.04% rate of Eastern Asia. In the views of Dr Fraser, this presents a great opportunity for African countries to capitalize on their strategic position and enlarge the share of manufacturing activities in the region. However, if the continent – and especially the southern African region – is to become an attractive production alternative for global supply chains, it needs to improve its port, inland and manufacturing infrastructure. Significant milestones have taken place in this regard, such as recent commission of 750,000 TEUs that Namports (Namibian Ports Authority) have commissioned for Walvis Bay, to which TiL Group has been appointed, the Port of Maputo in Mozambique, where DP World operates, leading to the Maputo corridor, and the recent investment in port and railway networks across the region.

In addition to infrastructure development, we are witnessing the constitution of Special Economic Zones (SEZs) adjacent to ports. While Africa has traditionally been

known for its extractive economy, where minerals and raw materials would be extracted and shipped to manufacturing countries like India or China, national governments are now looking to stimulate local production to add value. This is another significant milestone for the region as it aims to incentivize local economies, enabling African countries to own a larger portion of their supply chains.

While these milestones point the industry in the right direction, the issues of political stability, safety, security, and reliability need to be addressed. Unfortunately, there does not seem to be a median average, but the region rather presents a mixed scenario, with some countries performing better than others. This is a major barrier for the development of manufacturing centres and infrastructure in Africa. Energy is another major issue to consider; without energy there can be no industrial production, and this is another issue that requires an articulated effort to guarantee the optimal performance of the energy grid.

Despite the clear areas where there is room for improvement, the longstanding trade relations between Europe and Africa, combined with the continent's strategic geographic location and unique characteristics, places the spotlight on this region's untapped potential to play a much larger role in global supply chains.



Industry collaboration needs listening: What do shippers have to say?



An interview with James Hookham Director of the Global Shippers Forum, by Mateo Wiegold, Editorial Content Manager at TOC Worldwide

When looking at maritime trade, we observe a complex value chain that places the port as the pivotal element for cargo coming in and out. As the sector evolves, whether in search for greener supply chains to meet the goals of the Paris Agreement, or pursuing digitalisation to enhance data collaboration, there is a simple fact that remains still: There can be no maritime trade without cargo to ship. As such, the industry must bear in mind the needs of the shippers – including the cargo owners – they intend to serve.

The Global Shippers' Forum (GSF), founded in 2011, is the global trade body that speaks up for and advises both shippers in the conduct of international trade. Whether talking about manufacturers, producers, retailers, wholesalers, or traders of goods, the GSF supports in the essential role they perform in national economies, and works with them to guarantee an efficient, safe, and sustainable transport of cargo, while promoting and defending the interests of shippers in world trade.

In this regard, James Hookham, Director of the GSF since 2018, highlighted some key areas in which the GSF is currently supporting cargo owners: Sustainable Profit, Digitalisation, and Safety & security, among others. But what does this mean?

It is no secret that industries face growing pressure to decarbonise their production and operational processes. For shippers, this means understanding – and quantifying – the CO2 emissions released across each stage of their value chains, designing tangible decarbonisation strategies with concrete deadlines,

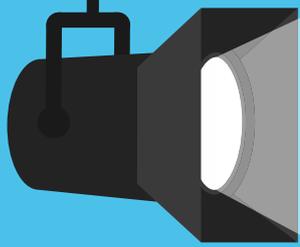
and reporting on these so that stakeholders can assess whether their pledges to achieve net-zero by 2050 are on track. This becomes particularly relevant for the shipping and aviation sectors, which are some of the hardest to decarbonise. While some of the biggest shippers are committing to invest in sustainable fuels, which could in turn allow them to credit their carbon footprint within the targets, what fuel is the right to invest in remains as a question yet to be answered. Furthermore, some industry experts do not seem to agree on one specific green fuel and instead advocate for a multifuel landscape, which in turn presents a new dilemma, addressed by Professor Lynn Loo, CEO of the Global Centre for Maritime Decarbonisation at TOC Asia in 2022: Will there be bunkering and storage infrastructure for the right type of fuel? Whether looking at ports or airports, how to reassure shippers – and others supply chain stakeholders – looking to invest in planes or vessels running on a specific green fuel of their ROI? James highlights the importance of clarity and collaboration to convince ESG boards across the sector that decarbonisation of their supply chains can – and should – be profitable.

The clarity, however, should not be limited to sustainability; it is paramount for the digital transformation of the industry. In James' opinion, digitalisation – understood as using digital technologies to alter and improve existing processes – can help shippers optimize their transactions and the management of their value chains to prevent potential peaks in demand. Whether caused by the pandemic or the present geopolitical situation, shippers are faced with levels of unpredictability like never before. James stresses the need for shippers to use digital platforms and data collaboration to become more resilient against another potential shock; nonetheless, he also acknowledges a significant barrier: Data governance. By trusting a hypothetical digital platform with

sensitive commercial information, who would be accountable for this? What cybersecurity measures would need to be undertaken to prevent a potential data breach and what would be the standards to follow? What would be the rights of shippers using such a platform and what due diligence would need to be implemented? These are only some of the questions that need answering before an articulated digital transformation can take place across the industry.

On the subject to safety and security, it is simple. No one wants any accidents happening to the people handling the cargo, or to the cargo itself. Yet, again, the issues of clarity and standards come back to the surface. From the packaging of specific types of cargo to its handling upon arrival to the port, standardized best practices need to be observed. Beyond the scope of what happens at the terminal, container handling must also factor in the risks of invasive species that may have been transported with the cargo and gone unnoticed. Hence, the GSF in tandem with ICHCA and TT Club have been working on the Cargo Integrity Group, which advocates for standardized best practices for cargo handling.

Amongst such a plethora of topics to cover, the need for shippers to engage with their supply chain partners – ideally in a less formal and more relaxed environment – holds a great deal of possibilities. As such, James will be elaborating on these and other issues at the next edition of TOC Europe, taking place in Rotterdam, the Netherlands from 13th to 15th June at the Ahoy. This will be an open conversation where shippers will make their voices heard. We keep bringing collaboration as something we need in the industry, let us start by listening. I look forward to hearing what James and other shippers will have to say. See you there.



EXHIBITOR Spotlight

At this year's TOC Europe, **over 200 sponsors and exhibitors** will gather to showcase the latest port operations equipment and technology solutions. This year we are delighted to welcome faces both new and long-established within the TOC community, and ahead of the show we caught up with just a few to find out what they'll be up to in Rotterdam



DP WORLD

Booth Number: D82

Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

As a leading provider of smart logistics solutions, our global network of ports and terminals enable goods to move seamlessly and securely around the world. We operate ports and terminals that let the world's trade flow more freely, helping businesses to streamline their operations, lower their costs and reduce their environmental impact.

In light of recent supply disruptions, we are excited to demonstrate our capabilities and innovative trade solutions at this year's event. At DP World, our ports and terminals are acting on the global business 'Our World, Our Future' strategy, focusing on day-to-day improvements in our operations towards decarbonisation and net zero. At TOC Europe, we will showcase how we are streamlining operations, developing new technologies and implementing digital solutions to be more innovative and sustainable. Our ports and terminals network spans the globe, connecting the supply chain today and innovating to create the sustainable trade infrastructure of tomorrow. We do this by improving safety and efficiency at our ports while unlocking multimodal, end-to-end transport options, bringing flexibility, agility and resilience to global trade.

Who are you hoping to meet?

We are excited to connect with our industry peers to discuss how we can work together to make the movement

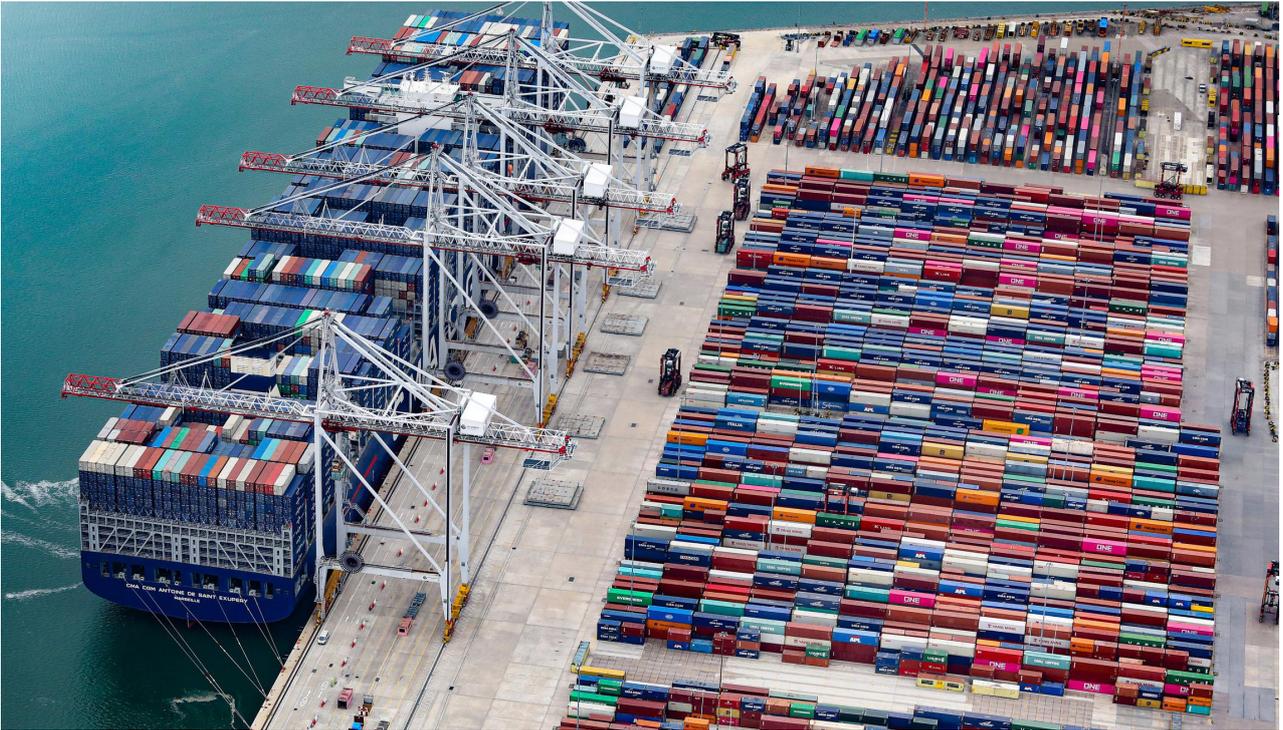
of goods through ports and terminals more sustainable and efficient, and work together to help deliver economic prosperity and opportunity to the communities we serve.

The action we take at our ports and terminals is making good progress towards our target of full electrification of ports and terminals equipment and 100% renewable electricity supply by 2050. Overall, DP World's operations in Europe reduced its absolute CO2 emissions by 20% last year compared to 2021. DP World Antwerp now runs on 100% green energy, while our Southampton port has recently become the first in Britain to reduce emissions with biodiesel, cutting net carbon emissions by 55%.

We have a clear roadmap to achieve net zero carbon emissions by 2050 across our entire operation, but we can't do this alone. We are continuing to form partnerships to accelerate efforts and bring about real change to the industry. It is only with collective sector efforts that we can truly mobilise all parties towards a net zero reality.

Why is the European market so important to you?

Europe is strategically very important for us, and we have developed trade infrastructure and services to cater for our customers' cargo needs. Our vast network across Europe starts from two UK Freeports in the north-west linking directly to the largest coastal trading hubs in mainland Europe and onward throughout an ever-expanding inland network, deep into south-east Europe to the Black and Caspian seas. We operate a strategically located network of ports, marine terminals, industrial parks, inland cargo depots and specialist facilities in Europe across 261 locations in 34 countries. Our European network of 10 ports and terminals, 11 inland terminals and one logistics park offers greater geographic range, more transport solutions and an increased number of connections to our customers.



What are your plans, goals and ambitions for the rest of 2023 and beyond?

In recent years, we have seen how inefficiencies and disruptions to global supply chains affect us all, increasing the price of goods and destabilising society. As such, the future of trade requires investment in seamless, sustainable end-to-end solutions. Our approach is forward-facing and long-term – we invest in smart technology to lead the future of world trade. At the same time, we believe in protecting our people and our planet through world-class safety and environmental standards and measures.

Our goal is to continue streamlining operations, lower costs and reduce environmental impact for businesses and their customers. We currently do this by improving safety and efficiency at our ports while unlocking multimodal, end-to-end transport options, bringing flexibility, agility and resilience to global trade. By innovating and adapting to make the movement of goods through our global network of ports and terminals constantly more efficient and sustainable, we will continue delivering economic prosperity and opportunity to the communities we serve in the future and beyond.

Why do you consider it important to be at TOC Europe?

TOC Europe is the ideal platform to engage with our peers across the maritime logistics, port and supply

chain industries and address key challenges and opportunities in the sector. As the last three years have shown - under the spotlight of the world's attention - ports and terminals must increase performance and ensure resilience to shelter our customers from disruptions, no matter where they come from. There is much talk of diversifying and digitising trade – our most recent Trade in Transition report revealed that the number of companies moving their manufacturing closer to home has doubled in the past year - and through this, ports and terminals will remain pivotal to global supply chains. As conduits for global trade patterns, advances in ports and terminals will lead to enhancements in the efficiency of an increasingly dynamic global supply chain.

What message do you have for the TOC community who will be in Rotterdam?

We are looking forward immensely to the first TOC event of the year in Rotterdam to share our perspective on current industry challenges and opportunities and showcase our industry-leading end-to-end solutions. We are looking forward to connecting with industry peers across the entire spectrum of terminal operators.



Booth Number: F54

Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

Continental Specialty Tires includes services for specialty tire trade and fleet applications, as well as digital management systems for tires in industrial applications. In the port operations business, we are offering an integrated product range of V.ply tires, radial and solid tires complemented by a digital solution package that is unique to the port segment.

At the TOC Europe 2023, we will be showcasing the digital connection of tires, as well as how this can bring out the maximum efficiency and longevity of the tires – today and for the flow of tomorrow. A Smart Port means: Better flow

Who are you hoping to meet?

We are looking forward to an in-depth exchange with our customers, the media, professionals, as well as the port business and TOC community. We understand ourselves, as a partner and solution provider for port operators, that they are able to deal with the current developments in the industry in an effective manner.

Why is the European market so important to you?

Europe is one of the regions in the world when it comes to container traffic, has multiple large to medium-sized terminals and is intermodal. European customers require solutions regarding total cost of ownership, sustainability and digital solutions. All of this fits in perfectly with our overall business approach, bringing the best flow to our customers with regard to efficiency, total cost of ownership, and safety.

What are your plans, goals and ambitions for the rest of 2023 and beyond?

Since the recent realignment of the Specialty Tires business area, Federico Jiménez has taken over the global management of the Business Field tires for port operations. He is supported by Teck Seng Chew who took over as product manager for the port operations business in March. Under the new structure, customer and market needs are the focus of Continental's developments in

order to increase efficiency, safety and sustainability in the port business.

Why do you consider it important to be at TOC Europe?

We appreciate taking part in discussions, staying closely in touch with our customers and professionals, and keeping an eye on the latest trends and an ear to the ground within the industry. The European region stands for a technically interested one, and many customers from around the world are coming to the TOC Europe to discover the latest technological developments and trends within the industry. This makes the TOC Europe one of the leading port industry fairs and network events.

What message do you have for the TOC community who will be in Rotterdam?

Ports worldwide are facing changes, not least due to the current impact on global trade routes and supplies. Fluctuations in the demand and availability of cargo as well as delayed delivery times pose challenges for port operations. This is a challenging undertaking in which tires play an important role in order to keep the operations running. Let's exchange with one another – and ride the wave with us. Visit our Continental booth at show stand No. F54





Sponsor

Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

Long An International Port is strategically located in Can Giuoc District, Long An Province, Southern Vietnam. Through the 500 million USD investment by Dong Tam Group in the world's most modern equipment, facilities and technology, Long An International Port is set to launch its full-service container handling capability in the second half of 2023 to complete its existing portfolio of bulk cargo handling and logistics solutions.

The port's ideal location in the rising star province of Long An ensures several key competitive advantages, particularly being the nearest container terminal to 12 other provinces in the Mekong Delta Region. Furthermore, Long An Province has no infrastructure surcharge and reasonable service charges benefitting cargo owners, shippers, and shipping lines alike by minimizing overall logistics costs. Coupled with the active support given by Long An's provincial government and the national government to several key infrastructure projects in this region, there is an exceptional potential for growth in and around Long An Province.

Long An International Port is the flagship project of the master development plan of Dongtam Group which spans 1,935 hectares connecting the existing 147-ha port area as well as the 239-ha Industrial Service Area, the 396-ha Industrial Park, and the 1,145-ha Urban Area. In the future, this industrial ecosystem will be working together to play a pivotal role in facilitating trade between the Mekong Delta, the other regions in the country and the rest of the world.

Who are you hoping to meet?

We are hoping to meet the major players in the port and logistics industry to not only share information about Long An International Port but most importantly, to learn about the latest developments from industry experts and leaders. We are in the early stages of our journey towards our vision of becoming a port of choice in Asia, and we are looking forward to hear from our potential customers, suppliers, consultants, and advisors on how to promote sustainability in our operations, learn about



best practices and stay up to date on upcoming market trends and demands.

Why is the European market so important to you?

Apart from being a top trade partner of Vietnam, the European market is where the headquarters of some of the biggest global shipping lines are located, making it home to market-leading industry players. The importance of the European market is further highlighted by the EU-Vietnam Trade Agreement (EVFTA) which took effect in 2020, signaling the vibrant potential of EU-Vietnam trade relations and ushering in an influx of new and increasing European foreign direct investments recently. Apart from this, many large international corporations have been shifting from China to diversify their supply chain and Long An Province offers vast potential to contribute to this value chain transformation and has shown active support in enacting business-friendly policies and major investments in infrastructure developments.

What are your plans, goals and ambitions for the rest of 2023 and beyond?

We are currently focused on the launch of our full-service container capability in the second half of 2023, with 500,000 TEU capacity, massive yard space available for both empty and laden containers, and the ability to accommodate the largest size feeder vessels, making Long An International Port the ideal container and logistics hub for the Mekong Delta Region. In the next phase of development, the port will expand to 10 berths, having a continuous berth length of 2,368m, and receive ships of up to 100,000 DWT.

Moreover, Long An International Port is part of a wider master development plan by Dong Tam Group, with major investment into a multi-purpose and modern port city complex which aims to bring added value to the whole region in the future and benefit businesses investing in and around Long An Province through reduced logistics costs, strengthened competitiveness and the promotion of sustainable development.



Why do you consider it important to be at TOC Europe?

After our initial participation at TOC Asia 2022 in Singapore as the Reception Night Sponsor, it is but natural for us to join the biggest event of TOC which is the Europe leg. Here at the Rotterdam event, we hope to connect with a wider international audience and spread the word about our upcoming full-service container capability benefitting businesses in and around Long An Province. More importantly, this event provides a rich resource for gathering the industry's best practices that we can bring home to Vietnam and implement in our container, liquid, bulk, and general cargo operations.

What message do you have for the TOC community who will be in Rotterdam?

We invite the TOC community to watch out for the upcoming launch of our full-service container capability in Long An Province and our journey towards the vision of becoming an internationally recognized port of choice in Asia. We are looking forward to welcoming you when you have the opportunity to visit Vietnam.



Booth Number: D16

Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

Kaleris is a leading provider of cloud-based supply chain execution and visibility technology solutions. Many of the world's largest brands rely on Kaleris to provide mission-critical technology for terminal operating systems, ocean carrier & vessel solutions, yard management, transportation management, and maintenance & repair operations,

We plan to showcase our Navis terminal operating system and carrier & vessel solutions at TOC Europe. We're also looking forward to presenting in the Digital Theatre on the importance of creating a connected ecosystem in the

supply chain where execution and visibility come together to accelerate operations. This type of connectivity eliminates dark spots and data gaps that cause friction and inefficiency in the global supply chain and results in better outcomes for everyone.

Who are you hoping to meet?

We're excited to see many familiar faces and meet lots of new ones. After the last few years, it's been refreshing and wonderful to connect face-to-face again. And we're also looking forward to meeting with anyone interested in solutions for automating and optimizing terminal operations, AI, execution and visibility, and optimized carrier operations. We're a partner and are here to help.

Why is the European market so important to you?

Europe is an important hub in the supply chain for both imports and exports globally. It's also experiencing significant growth, creating opportunities for ports to partner with technology companies that can help them leverage this growth

to best achieve their business goals. What are your plans, goals and ambitions for the rest of 2023 and beyond?

We're excited to share more about our new Execution & Visibility Platform, a first-of-its-kind supply chain technology solution that eliminates data gaps and dark spots within pivotal execution points in the supply chain. The platform connects operating data to workflows within the execution ecosystem, resulting in high-value outcomes for terminals, shippers, carriers, asset owners, and ultimately consumers.

Why do you consider it important to be at TOC Europe?

Because TOC Europe is so well attended, it's the perfect opportunity to connect with many colleagues, decision-makers, and experts. Many productive and important conversations happen at TOC Europe –

whether it's learning how others have successfully overcome challenges, debating ways to tackle the issues such as sustainability, or experiencing the latest tech innovations. Connecting with our industry colleagues at the event helps drive and shape the future of our sector.

What message do you have for the TOC community who will be in Rotterdam?

If you're looking to supercharge your operations, you've come to the right place. It's an action-packed three days, and we hope everyone makes the most of it! Planning your schedule can help make sure you experience all the show has to offer, including informative and educational sessions, innovations on the show floor, and lots of networking opportunities.



Booth Number: G14

Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

We go back a long time, to 1884, and are globally well known for supplying intelligent braking systems.

We deal with the world's biggest OEM's and end users in the Renewable energy market though mainly to wind turbines, but we are also big in the mining, oil&gas and crane markets.

Who are you hoping to meet?

Customers who are looking for a trusted and well established partner offering the latest developments and not least quality and service worldwide.

Why is the European market so important to you?

We already have a huge install base in Europe, and see great opportunities for growing and strengthening the partnerships with our European customers.

What are your plans, goals and ambitions for the rest of 2023 and beyond?

We have several projects in our pipeline worldwide within the Portcranes market, and in 2023 we will be introducing more intelligent braking solutions to this market. Our global footprint is bigger than ever before, being part of Regal Rexnord who has 36.000 employees worldwide. This makes our global reach beyond any others in this segment.

Why do you consider it important to be at TOC Europe?

To show our customers our new developments and present the huge range of products to the market. TOC is absolutely the right place to meet!

What message do you have for the TOC community who will be in Rotterdam?

Svendborg Brakes is the first mover in intelligent braking systems, we have been doing this for decades. Come and meet us at our booth #G14, so we can show you some impressive controlled braking tests!



Booth Number: C84



Please tell us a little about your company and what you will be showcasing at TOC Europe 2023

Avlino is a US-based Artificial Intelligence (AI) company that specializes in providing

solutions to enhance the operational efficiency of Container Terminal Operations. The company's objective is to transform the supply chain by providing terminal operators with solutions to overcome common pain points and challenges that undercut their business goals. For the past few years, Avlino has been developing AICON, a Suite of Solutions designed to dynamically resolve the challenges arising from the demand fluctuations in container terminals. By using AI/ML and Operations Research, AICON's cutting-edge approach significantly reduces manual processes, improves accuracy, and optimizes resource allocation. With AICON, container terminals gain the capacity to direct their operational strategies towards different objectives, optimally responding to the challenges arising from changing conditions, leading to greater outcomes, be they cost reduction, higher throughput, or improved customer service.

At TOC, we intend to showcase how our AI solutions are impacting Container Terminal operations. We propose to do this supported by two terminal operators that will present their experience in deploying our solutions, to achieve their objectives. One of our customers, US operator Virginia International Terminals, will speak about how they are using AICON's module YardSight to plan their housekeeping in a way that helps to keep up with service peaks and increase productivity. The other customer supporting us will be Ports America. They will speak about their experience deploying Dispatch Sight to take charge of their equipment and optimize its utilization to reduce operational costs and traffic congestion.

Who are you hoping to meet?

We are hoping to meet potential customers but also partners at TOC Europe. And of course, it is important to check out for competition!

Why is the European market so important to you?

The European market is crucial to Avlino as it represents a sizable portion of the global maritime logistics industry. Participating in TOC Europe will enable Avlino to strengthen its position in Europe and increase market traction.

What are your plans, goals, and ambitions for the rest of 2023 and beyond?

Avlino intends to focus on completing product integration for current customers, accelerating the go-to-market strategy to increase market traction, and advancing on the internal AICON development roadmap. We want to extend the AICON Solution Suite to include berth management, gate, and vessel operations and increase the scope of analytics and reports.

Why do you consider it important to be at TOC Europe?

For us, it is essential to be present at TOC Europe because, being one of the industry's flagship events, it presents the ideal opportunity to showcase what we are doing and what we are all about to a broad audience. It is the place where we can really make our stand.

What message do you have for the TOC community who will be in Rotterdam?

Our message is that there is a place for AI in container terminals, and it can play a crucial role in transforming the container supply chain into a more efficient, safe, and productive environment where demand unpredictability is not an issue. We also want to achieve recognized leadership status in innovative technology for maritime logistics!

After our initial participation at TOC Asia 2022 in Singapore as the Reception Night Sponsor, it is but natural for us to join the biggest event of TOC which is the Europe leg. Here at the Rotterdam event, we hope to connect with a wider international audience and spread the word about our upcoming full-service container capability benefitting businesses in and around Long An Province. More importantly, this event provides a rich resource for gathering the industry's best practices that we can bring home to Vietnam and implement in our container, liquid, bulk, and general cargo operations.

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Agenda at a glance



Day One: Tuesday 13 June 2023

TECH TOC THEATRE <ul style="list-style-type: none"> Understanding Automation The Future of Container Terminal Operations: Exploring the Transformative Value of Artificial Intelligence The Operational Language of Ports 	SUSTAINABILITY THEATRE <ul style="list-style-type: none"> Green Legislation Energy Transition Across the Supply Chain
BUSINESS INTELLIGENCE THEATRE <ul style="list-style-type: none"> Market Outlook Finance & Strategic Investment 	DIGITAL THEATRE <ul style="list-style-type: none"> Digitalising the Supply Network Innovative Digital Solutions

Day Two: Wednesday 14 June 2023

TECH TOC THEATRE <ul style="list-style-type: none"> Safer Port Operations Automation Trends at Intermodal Terminals 	SUSTAINABILITY THEATRE <ul style="list-style-type: none"> Alternative Fuels & Clean Tech Sustainable Profit for Maritime & Logistics
BUSINESS INTELLIGENCE THEATRE <ul style="list-style-type: none"> Forecasting the Evolution of the Supply Chain New Trends in Port Infrastructure Development 	DIGITAL THEATRE <ul style="list-style-type: none"> The Road Towards Digital Interoperability Cybersecurity Resilience

Day Three: Thursday 15 June 2023

TECH TOC THEATRE <ul style="list-style-type: none"> Port Equipment Maintenance & Damage Detection 	SUSTAINABILITY THEATRE <ul style="list-style-type: none"> Sustainability Workshop
BUSINESS INTELLIGENCE THEATRE <ul style="list-style-type: none"> Listening to Cargo Owners - A Round Table Discussion 	DIGITAL THEATRE <ul style="list-style-type: none"> A Conversation with #NEXTGEN Professionals

TOC ESSENTIALS



TOC Europe runs from **13-15 June 2023** in **Halls 2,3,4 and 5 of the Rotterdam Ahoy Centre**:

OPENING HOURS:

Tuesday - 13 June

Registration opens at 08:30
Exhibition | 09:30 - 18:00
Welcome remarks starts at 09:45

Wednesday - 14 June

Registration opens at 09:00
Exhibition | 10:00 - 18:00
First conference session starts at 10:30

Thursday - 15 June

Registration opens at 09:00
Exhibition | 10:00 - 15:00
First conference session starts at 10:30

HOW TO GET TO THE VENUE:

The venue is easily accessible by bus, metro & train. From bus and metro station Zuidplein it's ~a 5 minute walk to Ahoy.

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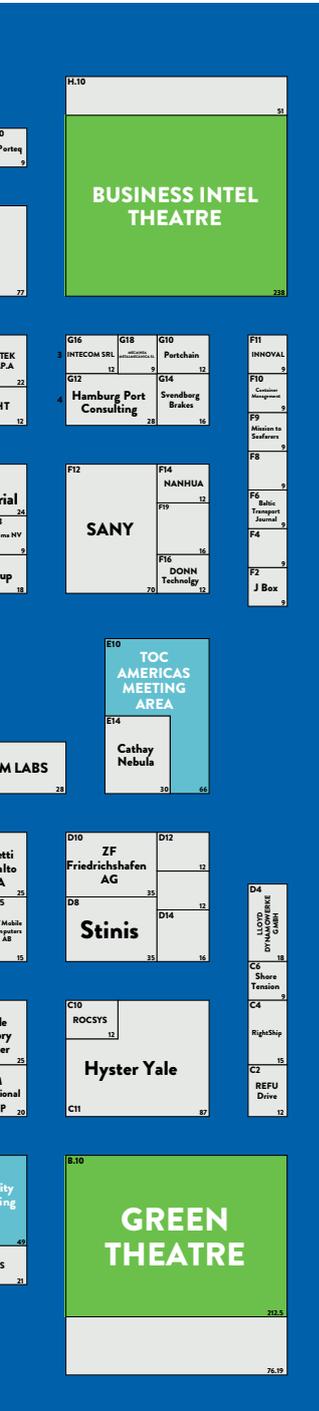


ABB	C52	EMG	D30	LLOYD DYNAMOWERKE GMBH	D4	SFPORTEQ	J50
ADE-WERK GMBH	H30	EMBOTECH AG	A22	LAGENDIJK	G56	WESTWELL LAB	B80
AECOM	J12	FANTUZZI TEAM		MAFI TRANSPORT SYSTEME GMBH	C60	WESTWELL LAB	B84
AIDRIVERS	B26	MATERIAL HANDLING SRL	D52	MAGAL SECURITY SYSTEMS	E76	ZPMC	D20
AKQUINET PORT CONSULTING GMBH	G.70	FERNRIDE	A8	MAGNA TYRES GROUP	C71	SHORETENSION	C6
ALIMAK GROUP SWEDEN AB	B22	FEYTER	E60	MALMEDIE	C40	SHT SUHLER	
ALLREAD	J6	FOGMAKER INTERNATIONAL AB	G94	CISCO SYSTEMS ITALY	H32	HEBEZEUGTECHNIK GMBH	G24
APM TERMINALS	G84	FORKLIFTCENTER	F50	MECAINSA		SIBRE SIGERLAND BREMSEN GMBH	D30
ARCK SENSOR	G82	FRIGORTEC GMBH	H70	METALMECÁNICA SL	G18	SICK AG	G32
ARISTONCAVI	C64	GANTREX SPRL	F68	MECCANICA CENTER SRL	H36	SIEMENS	C38
ATAI	A6	GANTRAIL	E32	METAGRO BEHEER B.V	C40	SNDC	G60
ATLANTIC TRACK	G92	GLOBALSIM	E58	MEVEA SIMULATION SOLUTIONS	C36	SPOHN & BURKHARDT GMBH	G46
AUCOS-SYSTEMS GMBH	G20	GOETTING KG	G28	MISSION TO SEAFARERS	F09	STABIRAIL	J40
AUMA DRIVES	A24	GULLSEYE	H58	MOFFATT & NICHOL	H82	STEMMANN TECHNIK	F46
AUXEMA STEMMANN	G76	HARVEST RAIL	J48	MOL CY NV	J38	STINIS	D8
AVLINO	C84	ROYAL HASKONING DHV	G29	PACECO MOMENTUM	D24	SVENDBORG BRAKES	G14
BALTIC TRANSPORT JOURNAL	F6	HATCH	H76	MUSCO LIGHTING	B24	SYMEO GMBH	G26
BECKER & HÜSER GMBH	E38	HAUK & SASKO	J10	NAVIS LLC	D16	TANTRI TRAILERS	A34
BEMO RAIL - VERSTEGEN GRIJPERS B.V	G44	HEMPPEL	J4	NEDCRANES	H34	TBA GROUP	B48
BOXBAY SMS	F66	HEYPORT	A10	NOKIA SOLUTIONS AND NETWORKS OY	D48	TEC CONTAINER	F48
BREVETTI STENDALTO SPA	D21	HOUCON CARGO SYSTEMS	G66	NOVATECH APS - NT LIFTEC	B82	TELESTACK	E34
BRIEDA CABINS	G30	HOVE A S	D60	OPS FACTOR B.V	B66	TERBERG BENSCHOP	B62
BROSA GMBH	G50	HPC HAMBURG PORT CONSULTING GMBH	G12	OUSTER	G42	TES INDUSTRIAL SYSTEMS	F24
BTG SPECIAL PRODUCTS BV	C40	HYSTER YALE	C11	VAHLE	C20	TGI MARITIME SOFTWARE	D58
BUSICAR CARGO SYSTEMS	F49	ICT GROUP	F22	PEMA	F70	TT CLUB SAFETY VILLAGE	E50
CABLE FACTORY BITNER	C18	IDENET SOLUTIONS	E74	PHOENIX TERMINAL SOLUTIONS	G78	TIDEWORKS	C54
CAMCO TECHNOLOGIES	C62	IFM ELECTRONIC GMBH	D18	PORT STRATEGY	J42	TIMARS	J74
KALMAR	D40	IGO SOLUTIONS	D50	PORTCHAIN	G10	TIC 4.0	H31
BROMMA	D46	IGUS GMBH	F34	PORTUNUS	E82	TMEIC	B30
CASCADE DRIVES AB	C82	INAMER FLEXI FLIPPER	D56	PROSTACK -TEREX GB LTD.	G54	TOC SALES STAND	C86
CATHAY NEBULA	E14	INFORM GMBH	G90	PRYSMIAN GROUP	C22	TOTAL SOFT BANK	E78
CAVOTEC INTERNATIONAL	C76	ING. BONFIGLIOLI S.R.L.	J8	Q TERMINALS	F42	TRANSAID	J44
CERTUS PORT AUTOMATION	E72	INNOVAL SRL	F11	HHMC	B72	TRATOS	F88
CM LABS	E36	INTECOM SRL	G16	RAJANT CORPORATION	J2	TRENT PORT SERVICES	C40
CONDUCTIX WAMPLER	B44	INTER CONTROL HERMANN KOHLER GMBH	A20	RAM SPREADERS	H84	TSUBAKI KABELSCHLEPP	F47
CONTAINER MANAGEMENT	F10	IT PARTNER B.V.	D64	RBS	G62	TVH PARTS	C78
CONTINENTAL TIRES	F54	ITALGRU SRL	D54	REFU DRIVE GMBH	C2	UEBEX GMBH	H74
COOPER SPECIALISED HANDLING	E34	JACOBS	C40	REMPREX	G72	IFS ULTIMO	J16
CUMMINS EUROPE	G52	JBOX	F2	RIGHTSHIP	C4	UNTEL KABLO	B34
DAFO VEHICLE FIRE PROTECTION AB	A26	GENMA SOLUTIONS	F82	RM INTERNATIONAL GROUP	C14	UTV CAVI	G74
DATA AND SYSTEM PLANNING	B64	JLT MOBILE COMPUTERS AB	D15	ROCSYS	C10	VDL CONTAINERSYSTEMEN	B74
DELLNER BUBENZER	C16	JOHANNES HUBNER GIESSEN	C40	ROEMER FOERDERTECHNIK GMBH (RFT)	D42	VEM MOTORS GMBH	F20
DMS LOGISTICS	A12	KLAUS FABER AG	E38	RUGGON CORPORATION	B32	VISY OY	G80
DMT ECHOTECH GMBH	C74	KLUBER LUBRICATION	G22	SAMSON MATERIALS HANDLING	J86	VOLVO PENTA EUROPE	D66
DONN TECHNOLOGY	F8	KONECRANES	B50	SANY	F12	WIRECO GERMANY GMBH	G96
DP WORLD	D82	KONECRANES	A28	S CUBE SRL	H78	WOLFER MOTORS GMBHAA	F64
MINATO	J46	KROTT ELECTRONIC GMBH	E38	SDC VERIFIER	F44	WOLK ENERGY	J80
EASYMILE	A14	KUNZ GMBH	F40	SEACOM AG	F80	WORLD CARGO NEWS	H60
EBEMA NV	F18	LASE INDUSTRIELLE LASERTECHNIK GMBH	F32	SEW-EURODRIVE B.V.	B46	YARDEYE GMBH	F72
ELETTROTEK KABEL	G25	LEEWEILL INTELLIGENCE	F14	SFILIGOI SRL	D62	ZF FRIEDRICHSHAFEN AG	D10
ELMA TECHNOLOGY	G40	LEINE & LINDE AB	B76			ZIMM GMBH	B70
ELME SPREADER AB	H62	JARI ELECTRONICS	C72				
		LIEBHERR MARITIME CRANES	F52				

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“We provide a global platform for the industry to share sustainability best practices – It is therefore our duty to provide the industry with sustainable events”

Paul Holloway Event Director, TOC Events Worldwide.



At TOC Worldwide, we know sustainability is increasingly important to our attendees and exhibitors, as well as to our market as a whole. This is why as a company we pledge to create more ecologically, environmentally and socially sustainable events. We plan to do this in a number of ways including delivering greener content in our conferences, promoting our better stands initiative reducing waste by 80%, eliminating onsite waste by 95% by reducing food waste and replacing printed event guides with digital versions and reusing and recycling badges and lanyards.

At TOC Europe this year we are connecting the disconnected by offering free passes and content to maritime students. We have created a #NextGen student session on day 3 which will give maritime students the opportunity to hear from key speakers about their career journeys and ask questions. We will be recording key sessions at the event over 3 days and adding them to our website for those that cannot attend TOC Europe in person.

We are very mindful at TOC of our events carbon footprint, which is why we try to work with venues and suppliers who are able to offset some of the energy used. The Ahoy Rotterdam, where our event is held, is fitted with energy-efficient LED lighting, has solar panels attached to the roof and uses wind energy which means the total energy supply is 100% sustainable. It also has a climate control system using circular process to recover heat and warm the venue and a moss sedum roof which has a CO2-reducing effect and increases the insulation value of the convention centre so less energy is needed for heating and cooling. They also collect, retain, and purify rainwater underground which can be used for washing windows and floors.

Our pledge in 2022 was to deliver greener content at our events and we are pleased to announce at TOC Europe we have a whole theatre dedicated to sustainability; covering a range of topics such as green legislation and energy

transition across the supply chain. We are also encouraging our exhibitors to build stands which are reusable or recyclable. We have created a 'Better Stands' guideline to inform our exhibitors on how and why its important to be mindful when creating stands and to reduce event waste as much as possible.

We have digitalised our conference documents and event guides online and on our event app. We do also have a pocket map which has the floorplan and the agenda outlined; but this is printed on FSC approved paper and we do not over order. Any that are leftover will be recycled along with our badge paper. Our lanyards this year, sponsored by Kuenz will also be reused and their will be bins on exit of the event for attendees to leave them. We also have printed tote bags which are sponsored this year by Q Terminals which have been made by 'Bags of Ethics', a company that promotes the people and planet behind reusable products. 90% of their workforce are women who are pillars of their community in India and are the main breadwinners for their families. To read more about this company please see their website: <https://bagsofethics.org/>



We are always conscious of improving our TOC Communities wellbeing at our events. At TOC expect vegan and vegetarian offerings at the onsite restaurant, a prayer room and water available in all conference rooms. We also have a code of conduct which we have visible around our events as well as on the event website. This is something we at TOC take very seriously to ensure everyone that attends our events have a great experience. This year TOC is supported by two amazing charities, Mission to Seafarers and Transaid. They will both have exhibitor booths at TOC Europe, so please make sure you stop by and hear all about their work. You can find out more about these charities on our website.

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Automation journey only just beginning

Ports have many barriers to overcome before automated operations become the norm. By **Carly Fields**



Credit: Warsash Maritime School

Port of Rotterdam shown from the bridge of the Warsash simulator

Global ports are “on their automation journey” but trust issues and a lack of standardisation are hampering wider take-up of automation.

According to Tomi Tuulkari, director of product management at Kalmar, terminal automation is “definitely here to stay”, inspired by the proven power of automation in factories and warehouse logistics. However, while early adopters have selected automation, the majority of ports still opt for fully manual equipment.

Real restrictions – terminal dimensions and shape, equipment type, operational model and existing IT systems – are deterring automation, as is the lack of standardisation, which “can scare a number of terminal operators as the introduction of automation is foreseen to be complicated and requiring a high skill set from personnel”, Tuulkari said.

Capt Zakirul Bhuiyan, associate professor, maritime simulation at Warsash Maritime School, Solent University, noted that ports can be slow to embrace change. “While some terminals within ports have successfully engaged with and implemented high levels of automation, most have not, or have only introduced low levels of automation.”

Compared with other high risk critical sectors such as warehousing and mining, uptake of automation within ports has been poor with the exception of terminals specialising in oil and gas, added Nickie Butt, course leader, maritime business and management at Warsash Maritime School, Solent University. Other terminals that have adopted automation to some level include container and bulk terminals.



Automation take-up

According to Bhuiyan, quoting OECD figures, approximately 4% of all global container terminal capacity handled today is through fully automated or semi-automated systems across 53 terminals. Of these, 32% are in Asia, 28% in Europe, 13% in Oceania and 11% in the US. “Full automation exists within less than 1% of these terminals, the majority just utilising automation within the stacking yards where the largest benefits are gained through better area utilisation as a result of increased accuracy of movements and placement of containers.”

Bulk terminals have embraced automation to allow a single person to operate and control all of the stackers, reclaimers and conveyors within the terminal. China has several fully automated bulk terminals including Luojing Automated Bulk Terminal, Huangye Port Coal Terminal, and Tianjin Port Nanjiang Bulk Cargo Terminal, Bhuiyan noted.

There’s a long list of positives to be gained from the introduction of automation. Many are strongly focused on safety, while operational costs and losses are also reduced through more efficient port operations that utilise data-driven operation planning. Automation promises fewer incidences of damage to equipment and cargo due to a reduction in human error, plus there’s the reduction in down time due to fewer stoppages for repairs or staff absence. Efficiency gains within a port also include better utilisation of land, while environmental benefits focus on reduced use of fuels as a result of more efficient movements of equipment and cargo around the port.

Nickie Butt, Warsash Maritime School, Solent University



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Better planning can also lead to reduced congestion in ports and anchorages and subsequent reduction in emission loads to atmosphere.

“Some or all of the above are demonstrated in smart ports across the world which implement automation and technology such as AI, big data, IoT and blockchain to enhance and improve operations and to place the port firmly as a digital node across the supply chain,” Bhuiyan said.

Barriers remain

But despite the clear benefits, take up is still slow. Butt attributes this to the simple fact of a lack of need: “For countries where cargo volumes are relatively low and labour is cheap the high initial costs of introducing automation makes no sense. On top of this you would also have the costs of upskilling the labour force.

“Additionally, social acceptance to change with the loss of traditional jobs does not align with corporate social responsibility, which sits firmly within the UN Sustainable Development Goals and features heavily in most large companies’ sustainability goals – who most likely would be the source of funding for a major infrastructure development such as an automated terminal in a port. Bureaucratic and legislative delays are additional serious detriments to external investments in ports, particularly for state owned ports.”

While some terminals within ports have successfully engaged with and implemented high levels of automation, most have not, or have only introduced low levels of automation

Ports need to focus on the benefits of automation and find ways to overcome barriers. Butt suggested homing in on the two key sectors that would benefit from attention: local stakeholders and government. “The use of outreach and education programmes delivered to communities and local government could develop awareness of the benefit of automation and address public and government concerns. A strong message could be developed through demonstrating the way in which automation aligns with the UN Sustainable Development Goals.”

While there are already terminals where yard operations are fully automated end to end – from quay crane backreach to truck lanes and vice versa – automation for quay cranes themselves is “definitely tricky to achieve”, Tuulkari said. Partly this is down to the movement of the vessels while being loaded and unloaded, and the labour needed to manage coning and lashing. “So, it should be carefully considered where automation and autonomy are beneficial and where driver assisting features would make a way greater impact.”

Powered by data and AI

For ports to be fully automated they will need to be powered by artificial intelligence and rely on



Credit: Kalmar

extensive, accurate data and advanced analytics that are integrated across the whole supply chain – end to end, Butt said.

Bhuiyan sees progress, but at a slow rate. For him, smart technology and digitalisation of cargo related data and documentation with integrated systems across the supply chain are the areas likely to see the most rapid development as these are driven by large businesses that are profit driven and which can generally operate with minimal government interference.

Ports themselves are of great importance to local and national governments as major economic multipliers and therefore subject to high levels of scrutiny, bureaucracy and regulation. So, “other than for fully privatised ports or forward-thinking municipal ventures, the challenges of introducing high levels of automation that will essentially lead to loss of employment is a much harder sell. While full automation may be possible in a specific terminal it is highly unlikely that this will extend across a whole port.”

Brownfield wins

Looking to the future, Kalmar’s Tuulkari is excited about the development of products that will make automation easier to adapt for existing, brownfield terminals. “This is not only considering delivery of automation, but also to help end users to live with automation that comes to system upgrades and maintaining automated equipment,” he said.

Warsash Maritime School’s Butt has a weather eye on the knock-on benefits for the whole supply chain, supercharged by automation in ports. She expects to see smoother operations as a result of greater digitalisation in ports and the use of tools such as blockchain, enhanced efficiency and safety through the utilisation of autonomous drones for logistics and surveys, and enhanced autonomous port security. On the marine side, the introduction of autonomous vessels to undertake hydrographic surveys of port waters, autonomous tugs and remote pilotage are all on the near horizon, she added, and “have the potential to enhance efficiency and safety in port operations”.

Kalmar’s AutoStrads in operation at Patrick’s Brisbane terminal



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Prepare for a broad spectrum of autonomy

Gradual transition to autonomous shipping calls for dual-capability ports. By Capt Marko Rahikainen, One Sea



Credit: One Sea

Catering to autonomous ships will require a range of capabilities

As an international association that has supported the implementation of autonomous ship technology since 2016, One Sea is at the heart of discussions surrounding the emergence of Maritime Autonomous Surface Ships (MASS). Responses to the topic of MASS, whether positive or negative, tend to be strong, and it can be easy to overlook the length of the journey ahead before the autonomous maritime transport system becomes reality.

While it is prudent for industry stakeholders to begin laying foundations for a new era of shipping characterised by high levels of automation and autonomy, any preparatory work should consider that MASS will not appear out of the blue to replace crewed vessels. For the foreseeable future, ships of varying degrees of autonomy will coexist, and ports therefore need the capacity to receive both highly advanced, self-navigating vessels and conventional ships that rely more heavily on human attendance.

Here, the port can be considered as two entities, each with its own duty. The asset owner is responsible for establishing the basic infrastructure needed to support higher levels of automation, such as adequate electricity supply, reliable internet connectivity and the appropriate means of cargo forwarding. The role of the port operator, meanwhile, is to deliver services that reflect ship-side developments in automation, ensuring that investment on either side is not made in vain.

Broad spectrum

Providing the infrastructure and services to support a broad spectrum of autonomy is undoubtedly a challenge. However, ports equipped only to receive traditionally operated vessels will miss out on the economic and environmental benefits of automation and ultimately fall behind, while those that fully

commit to automation too soon will limit themselves to serving a market segment that remains in its infancy. For now, becoming a 'dual-capability' port, eg, providing automated docking capabilities alongside traditional means of mooring for less advanced vessels, is the most pragmatic course of action.

Several ports worldwide are already working towards this target, with Norway in particular emerging as a hub for developments in autonomous vessel technology and the corresponding port capabilities.

Providing the infrastructure and services to support a broad spectrum of autonomy is undoubtedly a challenge

As with any port, the primary concern for a dual-capability facility is safety. Regardless of the degree of autonomy, all vessels should follow the same collision regulations. Where remote pilotage services are offered, the establishment of a digital or intelligent fairway, in conjunction with effective situational awareness tools and robust connectivity, can help to ensure safe arrival and departure. For fully autonomous vessels, it is essential that ports can communicate and share information with the ship in a situation where a course alteration or delayed approach may be necessary to avoid a collision.

Ultimately, by providing the dual capability to support conventionally operated as well as unmanned ships, ports can ensure they are ready to reap the rewards of autonomous vessels and automation when the technology becomes more prevalent – without limiting their market share in the meantime.

■ **Captain Marko Rahikainen** is director of regulatory affairs at One Sea.

Rich seam of data boosts visibility



Analysing performance data in ports provides insight into broad range of activities. By Victor Shieh

Perhaps the strongest headwind ever faced by ports in a generation came in March 2020. This was when the first lockdowns were being announced progressively westwards as the Covid-19 pandemic took hold and, one by one, terminals and operations had to be shut down due to infections or insufficient dockers or staff workers. Crew were not allowed off ships during port calls, with some sick seafarers also being unable to disembark depending on the local emergency legislation in place.

IAPH decided to team up with the World Bank and maritime economists and invited senior experts from some of the world's major member ports to meet on a weekly basis to gather information from each other on what was happening on the ground at ports and beyond.

The agenda soon adopted a more structured format, with a regular tour de table of approximately eight to ten ports from all IAPH regions, followed by the establishment of a set of guidelines available to the global ports community on shared best practices from member ports. These included a methodology and a range of good practices for potential use regarding 1) immediate measures addressing port operations, governance and communication, 2) measures to protect the business and financial returns, and 3) measures to support customers and supply chain stakeholders.

What also soon became part of the WSPSP-IAPH COVID19 Taskforce was a regular, survey-based, port economic impact report published at the height of the first waves by professors Theo Notteboom and Thanos Pallis. This report took in a global survey of between seventy and one hundred responding ports from around the world.

The ports answered the same questions to obtain consistent trends and analysis of the impact of the pandemic and tracking how ports were responding to changes in their environment. A dashboard was set up for ports and other stakeholders to obtain an immediate insight into vessel call volumes, extra restrictions, port call procedure changes, overall trends in hinterland connectivity, warehouse and storage capacity, and availability of port workers. There were also comment fields to allow for anonymous, pertinent comments to support the data, with additional intelligence on how ports were coping with the situation and what actions were being taken.

WSPSP-IAPH COVID-19 Dashboard

	Week 15 April 6	Week 16 April 13	Week 17 April 20	
Ports with decline in vessel calls (last week compared to normal conditions, %)	Container vessels	41%	41%	53%
	Other cargo vessels	41%	39%	47%
	Passenger vessels	77%	77%	76%
Ports with extra restrictions on vessels (last week, %)	Container vessels	49%	22%	33%
	Other cargo vessels	47%	23%	34%
	Passenger vessels	51%	38%	31%
Port call delays due to extra procedures (last week, %)	Container vessels	42%	35%	33%
	Other cargo vessels	35%	28%	32%
	Passenger vessels	53%	40%	49%
Hinterland transport delays (last week compared to normal conditions, %)	Inland barges	27%	21%	19%
	Trucks (cross-border)	43%	41%	35%
	Trucks (in/out port)	37%	33%	35%
	Rail services	28%	21%	32%
Ports facing high capacity utilisation of warehousing and storage facilities (last week, %)	Inland barge services	41%	23%	40%
	Foodstuff & medical supplies	35%	34%	33%
	Consumer products	27%	28%	25%
	Liquid bulk	21%	22%	20%
Ports facing shortages in port-related workers (last week, %)	Dry bulk	16%	17%	13%
	Dock workers	16%	16%	16%
	Technical-nautical services	7%	9%	4%
	Harbour master services	4%	8%	7%
	Port authority	28%	22%	22%
	Truck drivers	no data	no data	21%

Results based on surveys of ports worldwide, three weeks to April 20, 2020

Tracker report

In the post-pandemic period, IAPH's Risk and Resilience committee decided to establish a successor to the barometer. This was to maintain the status quo on the high level of engaged reporting by ports on their operational status, and to supplement this with complimentary analytical data specifically for the container segment as well as with additional, pertinent data for dry bulk, liquid bulk, and general cargo sectors, as well as separate, detailed reporting for ferry and cruise passengers. The broader remit of the tracker also includes analytical breakdowns by regions for each of the sectors, which allows for a granular, detailed view of trends.

This successor to the barometer is a four-tiered set of dashboards, covering both historical and forecast-based data, either from the S&P global port container terminal performance data set or the survey answers.

A change in data collecting trends for ports highlights the additional interest in hinterland connectivity from ports by trucks, rail and barge, as

The dashboard formed part of the WSPSP-IAPH Covid-19 Port Economic impact report

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well as inland warehousing storage and capacity. This reflects the focus of shippers, governments and other stakeholders on the dramatic changes which took place during the pandemic to the end-to-end supply chain concept from just-in-time to just-in-case and provides concrete data evidence to back up any changes taking place in the various maritime and land-based cogs that make up that supply chain. As an example, the data published for Q4 2022 showed that the supply chain crunch had, by and large, ended, with inland connectivity and storage capacity generally returned to a new normal.

Investment insight

The tracker also posts additional, annual questions related to investments, plans for expansion and/or new/renewed land use. To give an indication of how such data is currently helping ports, respondents stated that for 2023, 42% and 50% of investments in infrastructure and sustainability are being executed as planned respectively with 39% and 37% of both remaining investment projects only incurring minor delays in both categories. What is also significant is that only 8% and 7% of all ports responding do not have investment plans in infrastructure and sustainability.

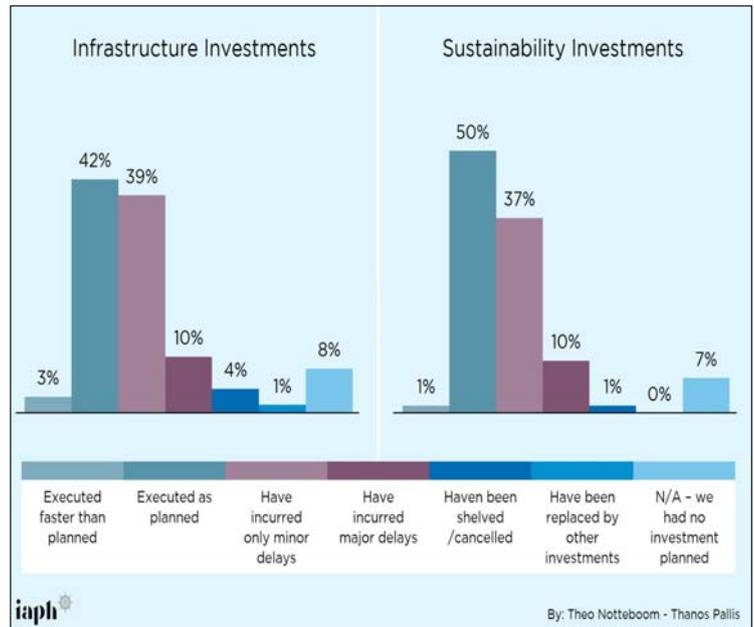
Data published for Q4 2022 showed that the supply chain crunch had, by and large, ended, with inland connectivity and storage capacity generally returned to a new normal

The noticeable upgrades being delivered by terminals in 2023 is a clear affirmation of the positive investment sentiment ports communicated during the Covid-19 pandemic, with the IAPH-WPSP port economic barometer reports containing a periodic question related to this subject.

In the Q4 2022 report, ports cited investment activity in automation, digitalised infrastructure and pre-delivery inspection sites for electric vehicles, as well as sustainability-related investments in onshore power and the electrification of port materials handling equipment, including vehicles.

In addition, one in three of the global container ports who responded confirmed major terminal capacity expansions or upgrades becoming operational in 2023. Similar upgrades will be operational in 23% of the bulk ports who replied; 15% of ports with cruise tourism activities and 8% with passenger activities will get upgrades this year and 11% of liquid bulk terminals will be expanded.

With respect to future land use, 42% of the responding ports stated that they intend to devote more land to logistics and distribution service activities. A quarter will commit to expanding industrial activities. Another interesting outcome is that 31% of ports plan on using land for non-fossil energy production, with 13% expanding existing energy production facilities.



Structured data on sustainability

The increased regulatory focus on financial institutions, multinational corporations and public entities to report on environmental, social and governance parameters, and how these organisations integrate the UN Sustainable Development Goals (SDGs) into their business, is also now impacting the way ports report. Some of the world’s largest ports have made significant inroads in this area and either produce a detailed annual report or integrate a sustainability section into their annual report. The definitions around sustainability are often mistaken for those around energy transition, climate change and environmental care, whereas in fact the UN SDGs cover a far wider range of areas of interest.

Since 2018 when it was launched, IAPH’s World Ports Sustainability Program online database has collated 237 projects by 109 ports in 47 countries, and preliminary analysis of how ports focus on UN SDGs makes for interesting reading. Community outreach and environmental care attain the greatest interest from ports. However, infrastructure – both physical and digital – is a growing area of focus which led to IAPH splitting these into two categories in 2022.

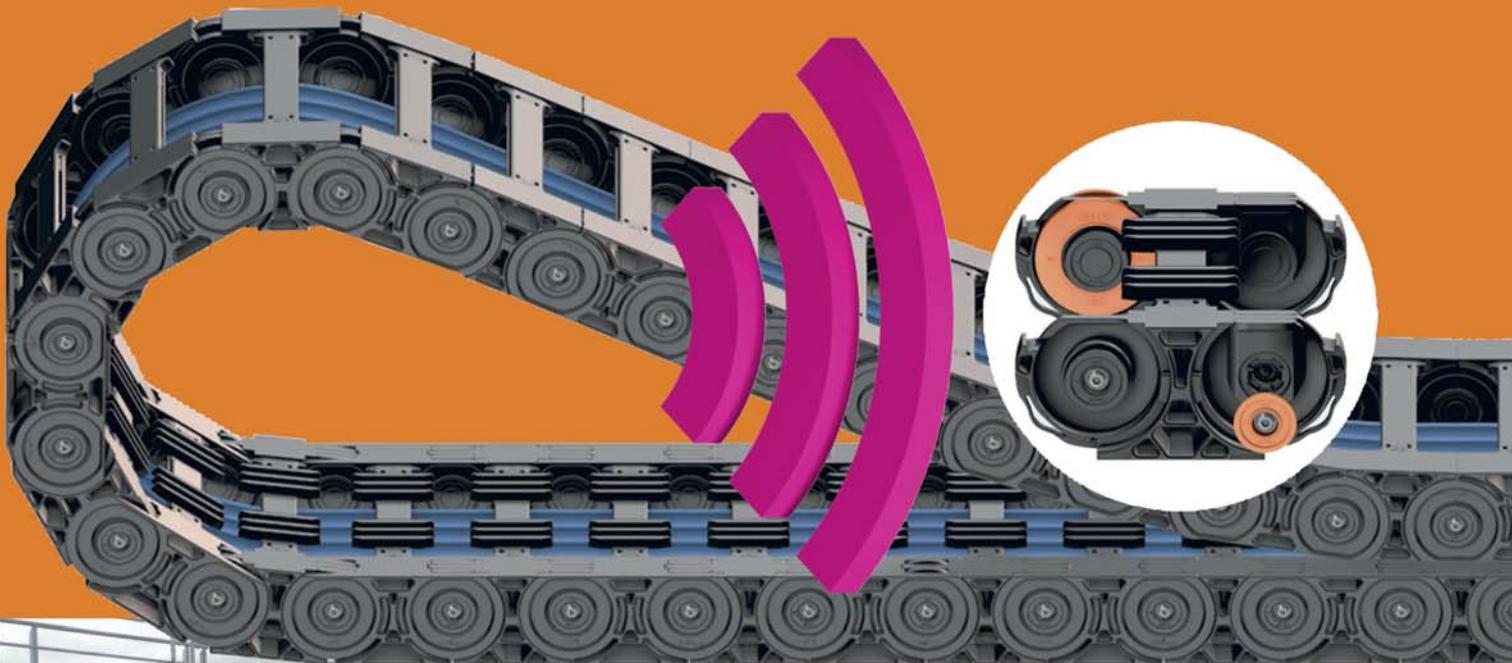
Ports are also increasingly looking to introduce more data analysis into the emissions visiting vessels produce before, during or after a port call. For ten years, up to 60 incentive providers have been offering advantages to good performing vessel owners who continuously improve the emissions efficiencies (primarily NOx and SOx, but also particulate and CO2 emissions) of their vessels using IAPH’s Environmental Ship Index. There are over 6,900 vessels registered on the index with the majority of the container fleet included. An expert group is now busy creating an at-berth module for the index, and pilots will commence with cruise ship lines in the near future.

■ **Victor Shieh** is director of communications and events at the International Association of Port and Harbors.

Port investments reported to IAPH

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Fighting for female representation

Priority reset needed to achieve global port gender balance.
By Carly Fields



Improving gender equality has been a low priority for too many global ports and while a few stand out for exceptional progress in diversity, the majority have a long road to travel.

Speaking to *Seatrade*, Barbara Buczek, executive director of Cruise Saudi, is encouraged by how the issue is being raised and the approach that the ports' industry is taking to ensure a stronger emphasis on diversity and inclusion, albeit that there is much more that can be done. "It's important to keep this conversation going and to maintain the progress that we've seen over the past decade," she said.

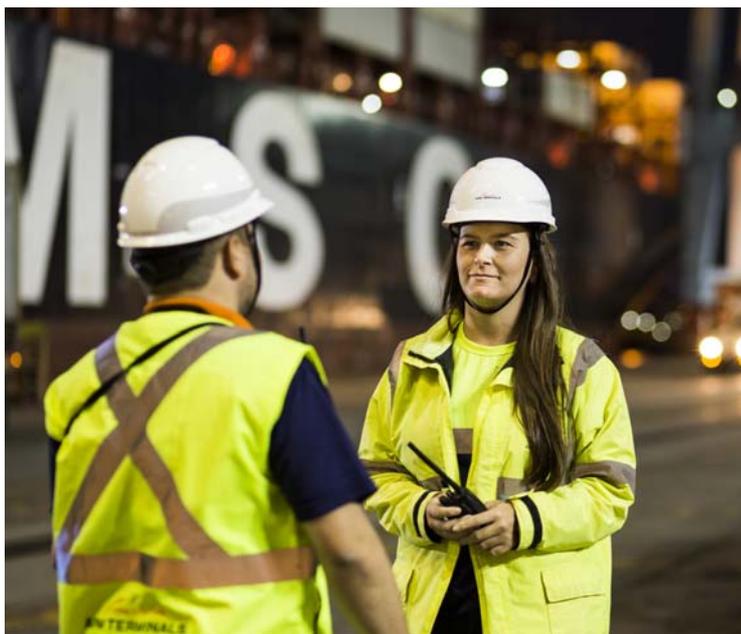
Isabel Moura Ramos, executive board member of Port of Lisbon, is hopeful that the UN Sustainable Development Agenda 2030 will propel diversity in ports: to be sustainable a port must make progress in social, environment and economic areas. "The more ports act for a sustainable agenda, the more equal in gender they will be," she said.

Speaking with *Seatrade*, other female executives involved in ports around the world offered their suggestions of how to encourage greater diversity in ports.

APM Terminals CCO Birna Ósk Einarsdóttir urged greater inclusion of women in frontline roles. "That is where misperception and stereotypes kick in most strongly. A female executive in an office is a no-brainer, but a woman operating a key crane or driving a terminal truck? Absolutely yes, and luckily, we are seeing more and more such examples across APM Terminals.

"Only by ensuring female participation at every career step can we have a strong pipeline of skilled female candidates for all types of roles."

Malin Collin, deputy CEO and vice president for strategy and innovation at Port of Gothenburg, encouraged ports to make it easy to make the right choices, pay attention to inequalities, and create awareness on all levels. This could be through improved education and awareness, rethought recruitment practices, better training and development, setting relevant policies and practices,



empowering leadership, and encouraging accountability. "Promoting diversity and inclusion in the ports sector requires a multifaceted approach. By taking steps to encourage diversity, ports can create a more inclusive and innovative workplace that benefits employees, customers, and the wider community."

Sarah Haidar, port consultant and former terminal manager at BCTC Container Terminal in the Port of Beirut, added that ports need to include the subject of gender diversity in their objectives and in values. Then, ports need to promote both and work hard to achieve those objectives.

Lastly, Jacoba Bolderheij, Port of Den Helder CEO, advised the industry to work on improving the visual image of the sector. "I believe that spotlighting female role models at all levels and disciplines could be very helpful. In Europe at least, the image of the sector is, I believe, still holding back women from choosing the maritime sector."

APM
Terminals
employees at
work

From left to
right: Barbara
Buczek,
Birna Ósk
Einarsdóttir,
Malin Collin,
Sarah Haidar,
Isabel Ramos
and Jacoba
Bolderheij



Fully charged port handling risk

Lithium battery handling and storage an increasing safety concern
By **Mike Yarwood**



Credit: Portuguese Navy

Speculation was rife that the fire that led to *Felicity Ace*'s sinking was related to the lithium-ion batteries used in the electric vehicles in its cargo

Lithium batteries are today used to power a variety of products, including handheld devices such as phones or cameras, through to larger items such as power tools and electric vehicles of all types. The market has expanded rapidly over the last two decades due to developments in electronics and now broader energy transition globally. Understanding the risks in transporting them is crucial.

Lithium-ion batteries have become a preferred energy source given their high-power density and light weight, as well as their ability to recharge and, in the case of vehicles, their apparent environmental credentials over fossil fuels. Depending on the frequency of use and recharging, a lithium battery may be expected to last several years.

Inevitably, lithium-ion batteries are moved by all modes of transport and therefore through ports and freight terminals. However, following serious incidents, regulatory restrictions regarding the carriage of lithium batteries by air have been implemented, resulting in greater use of surface modes. Coupled with a further number of recently recorded incidents, safety concerns around the transporting of lithium-ion batteries and their handling at ports rightly continue to grow among the maritime community.

The focus of concern relates to rechargeable batteries, rather than lithium metal or alloy batteries that are primarily disposable. While the precise chemical composition of lithium-ion batteries continues to be developed, experience of those

commonly used demonstrates certain instabilities and sensitivities to thermal degradation.

The hazard that a given lithium-ion battery presents is primarily related to the amount of contained reactive substances, including lithium and other reactive material. The sharp rise in demand has been accompanied by supply of cheaper, poorer quality and untested batteries, including refurbished and even homemade power banks. E-commerce platforms have facilitated a global trade in these potentially lethal batteries, often circumventing global standards and regulations.

As with many successful technologies, market demand has outpaced the development of safety regulations. Since the mid-1980s lithium batteries have been classified under dangerous goods regulations for transport based on the weight of lithium contained in the cells or battery. As the technology has advanced, the amount of energy derived from the active material has increased by up to 50%, while the weight of cells has reduced greatly.

Transport considerations

The rigours of transport, handling and interim storage should be understood and carefully considered. Shock and impact damage may result in thermal stability issues, including short circuit. Defective lithium-ion batteries have the potential to release all their stored energy instantly, resulting in thermal runaway and flammable gases. Proximity to external heat sources can also present challenges.

Given their nature and use, newly manufactured

lithium-ion batteries can be transported by themselves as individual items, packaged with products (i.e. replaceable) or within products (not intended to be removed). However, consideration should be given to reverse logistics, including used, damaged and faulty products being returned, batteries being shipped as waste and those being shipped to be recycled. In all instances, the state of charge of any battery is a relevant factor; less stored energy generally equates to less risk.

The risks presented through the intermodal supply chain primarily exist where newly manufactured lithium-ion batteries are poorly manufactured, untested or are defective. These batteries have a higher propensity to malfunction. It is also recognised that risks are higher during any period that the batteries are being charged. The supply chain risk – at any point of handling, storage and transport – is compounded by used, fully or partially charged batteries, and those destined for recycling or waste. Furthermore, some incidents have revealed the use of inadequate packaging, fundamentally compromising safety.

As with many cargo types, the majority of shippers will take all practicable steps to ensure that their cargo meets specifications, achieves certification and is classified, packaged, packed, labelled/marked and declared correctly for transport. The small – frankly criminal – minority are motivated to avoid compliance, entering cargo into the supply chain that presents great risk to all.

Maritime in the spotlight

History illustrates that the most catastrophic losses associated with the carriage of lithium-ion batteries have unfortunately occurred so far in the air mode. All surface modes are, however, exposed to these risks. There may be fewer reported incidents, but a number of container fires are suspected to have involved lithium-ion batteries. Furthermore, the technological advances, modal shift away from air and societal appetite for electric vehicles all point to an emerging risk.



Credit: Jacksonville Fire and Rescue Department

Safety concerns around the transporting of lithium-ion batteries and their handling at ports rightly continue to grow among the maritime community

Lithium fuelled fires are very difficult to extinguish, prone to thermal runaway and potentially exploding. Due to the heat generated, re-ignition once a fire has been extinguished is an additional risk, together with the impact on adjacent cargo or equipment. Furthermore, hard lessons learned by land-based fire responders, particularly relating to electric vehicles, need to be assimilated to the unforgiving maritime environment, where the crew capability to fight fire is already woefully strained.

Fire is an unwelcome hazard at any point during transport, storage or handling. TT will maintain efforts to increase awareness of the challenges faced on board containerships and within port or terminal areas; during air transport the consequences are unthinkable.

■ **Mike Yarwood** is TT Club's managing director of loss prevention.

In an incident report, the US National Transportation and Safety Board found that failure to properly disconnect and secure vehicle batteries led to a fire aboard the vehicle carrier *Høegh Xiamen*

Help to unravel regulation confusion

The various complex states in which lithium-ion batteries are shipped leads to different handling advice within UN regulations and the IMDG Code.

At the end of last year, the situation led to TT collaborating with UK P&I Club and Brookes Bell to undertake a more in depth study in order to advise the industry. The result is a whitepaper, downloadable free of charge at www.ttclub.com/news-and-resources/publications/lithium-batteries-whitepaper/.

More recently, as recognition of the dangers gained momentum, a further publication entitled CINS Lithium-ion Batteries in Containers Guidelines has been launched. Once more a group of concerned organisations are involved – the Cargo Incident Notification System (CINS), made up of leading container carriers, the International Cargo Handling Coordination Association (ICHCA), representing ports and terminals, IG P&I, the International Group of Protection and Indemnity Insurers, and TT Club.

Intended as the first of an on-going series of publications to be updated as circumstances require, these Guidelines (C-SAR 101.A) provide a general overview of lithium-ion transportation and will be followed by three further documents – regulatory compliance checklists, risk assessment and emergency response, and training and educational awareness. It is available in its full forty-six pages at www.ttclub.com/news-and-resources/publications/cins-lithium-ion-batteries-in-containers-guidelines.

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Embrace ESG to encourage finance innovation

Ports can open up funding options with aligned initiatives.
 By **Florian Kutzbach, Sarah Ellington and Christina Howard**



In the current climate in which ports and terminals are competing for customer volume, continued investment in the infrastructure, superstructures and equipment for a terminal is increasingly important. Those seeking financing for any such investment need to take into account the ever-intensifying focus on the environmental, social and governance (ESG) credentials of the wider shipping industry, and in particular the push for decarbonisation.

The ownership, acquisition and development of ports and terminals require significant financial investment which will inevitably require external financing from commercial lenders, development finance institutions/multilaterals or the capital markets. ESG has attracted increasing focus and potential funders often wish to understand the long-term viability of an investment, including:

- the ability to source and deliver alternative fuels;
- climate risk mitigation – protecting operations from the effects of climate change (including rising sea levels and more severe weather events); and
- the ability to gather and report data on environmental and human rights issues throughout the supply chain.

Port owners may need to be able to demonstrate adaptability to assuage concerns. For example, re-enabling access to infrastructure for the provision of a wider range of alternative fuels. This may also raise further issues, from needing to engage with affected local communities to funding of biodiversity credits or offsets from other projects.

Green port financing

Since the shipping industry established the Poseidon Principles in 2019, 30 financial institutions, representing over 70% of the global ship finance portfolio, have signed up.

The growth of green financing in the wider shipping sector reflects this trend. Green financing typically links the cost of financing with specific ESG objectives which are set out in the financing documentation, with independent monitoring to ensure compliance by the borrower. An owner/operator needs to ensure it has the correct structure and policies/practices in place to attract financing and ensure a bankable and sustainable transaction.

Particularly in the context of green financing, a

lender will generally require an analysis of the local environmental laws and regulations (and whether the port has 'green port' credentials) and potential liabilities for the owner of the development and whether this could adversely impact the ability of the borrower to service the loan.

As more states consider enacting regulation which will require large companies using ports to monitor the environmental and human rights records of the entities they do business with and exert (sometimes collective) leverage to mitigate risks, port owners and operators in all jurisdictions will be incentivised to improve ESG performance above that required under national law. This is also likely to provide a push towards more innovative financing structures such as ESG linked bonds and loans.

Where port owners have an appetite for pursuing green/ESG objectives, further possibilities for funding may open up. For example:

- blue bonds (aligned with SDG 14);
- impact funds – on commitments to improve ESG criteria as a condition of securing renewed investment (for example, improving health and safety records); and
- social impact bonds – paying out on the achievement of defined social goals – for example, increasing employment in local communities or re-stocking nearby fishing grounds.

Port owners may also choose to blend finance from different sources for different parts of their project.

When assessing any port/terminal financing proposal, a lender will undertake a detailed risk and bankability analysis, based on thorough local due diligence, to identify the key risks.

ESG and climate change issues carry risks and can be seen as challenging, but embracing these issues also opens up opportunities for more innovative structures to be used, potentially also helping to grow the wider value of port projects to local communities and the environment.

With advice at an early stage from experienced advisors, appropriate risk allocation and mitigation as well as relevant structures can be explored for the benefit of the successful financing and completion of the relevant project.

■ **Florian Kutzbach, Sarah Ellington and Christina Howard** are partners at *Watson Farley & Williams LLP*.

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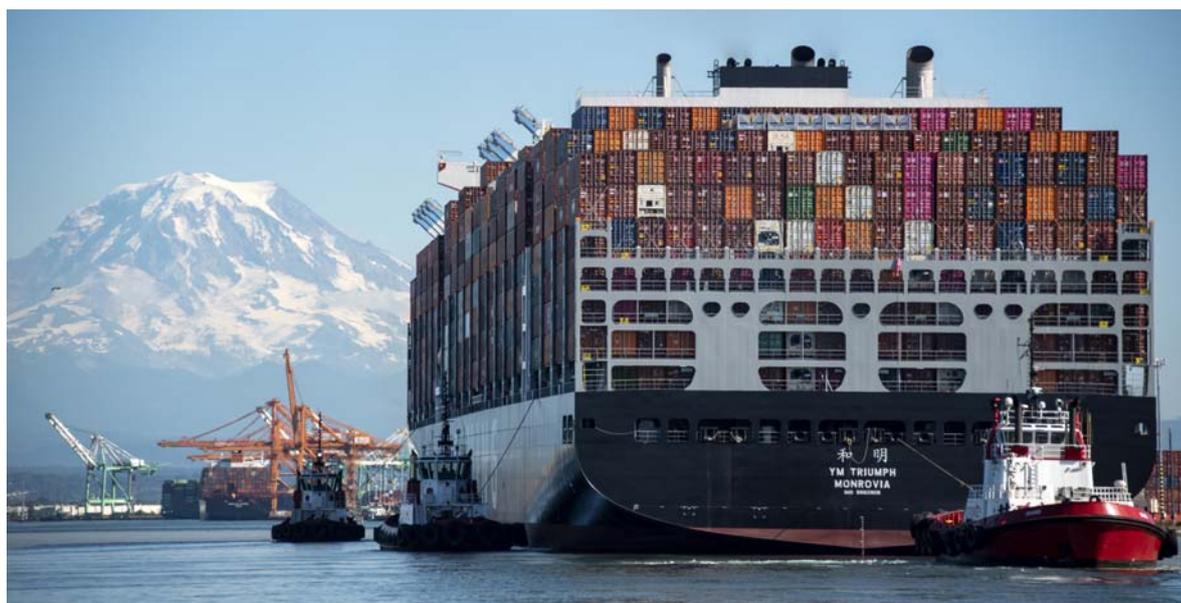
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Turn down the volume of shipping

Ports should brace for underwater regulation on noise generation.
By **Jepp Skovbakke Juhl**



Credit: Port of Seattle

Seattle's Underwater Noise Mitigation and Management Plan commits to leveraging its influence to reduce noise through leadership, investment, collaboration, and advocacy

Underwater noise pollution from ships is a growing environmental concern. The International Maritime Organization (IMO) has acknowledged concerns that a significant portion of underwater noise is generated by commercial shipping. Consequently, the subject is high on various agendas these days.

Sound in the oceans originates from many sources. The natural ones are from fish and mammals, storms, earthquakes, and even clouds of bubbles released from the seabed. However, the anthropogenic sources, like commercial shipping, port operations, marine construction, and oil and gas exploration contribute to a substantial part of the noise as well. It is also well known that sound can travel far better in water than in air, and thus the anthropogenic noise may interfere with marine life, causing disruption to their communication, navigation, and feeding habits. It is estimated that the noise generated by commercial ships has increased threefold over the last 50 years and is projected to increase even further in the coming decades.

Currently, there is no mandatory international regulation on ocean noise in place. This, however, is about to change.

New regulation ahead

The recently revised voluntary IMO guidelines on the reduction of underwater radiated noise (URN) from commercial shipping (MSC.1/Circ.833) may become

mandatory in the not-so-distant future. Furthermore, other regulations aiming to minimise adverse impacts on marine life are about to come into place from the EU, US and Canada in the years to come.

The former version of the guidelines (from 2014) focused on primary sources of underwater noise such as propellers, hull form, and onboard machinery, and included various operational and maintenance recommendations such as hull cleaning. Owing to the complexity of the issue, the IMO 2014 guidelines did not set future targets for underwater sound levels as more research was needed on URN measurements.

However, due to increased focus, the IMO agreed in 2021 to review the existing 2014 Guidelines to encourage uptake of the Guidelines and awareness of URN, and to ascertain the efficacy of various mitigation solutions.

The aim has been to provide updated recommendations based on the latest developments in ship design and technology and to address potential hurdles that could prevent general implementation of the recommendations set out in the Guidelines.

The newly updated Guidelines, although still subject to approval by IMO's Marine Environment Protection Committee in June 2023, may be applied to any ship, taking into account its design and construction, and modifications, as well as its operation. The Guidelines generally intended to assist relevant stakeholders in establishing mechanisms through which noise reduction efforts can be realised.

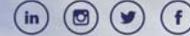
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The maxim is: "If you can't measure it, you can't manage it."

Given the complexities associated with ship design and construction, the new non-mandatory Guidelines advise that shipowners and designers should undertake URN management planning at the earliest design stages. Similarly, URN management planning may be carried out for existing ships to reasonable and practicable extents.

Although monitoring the URN from shipping, e.g. by use of the URN management planning tool, is non-mandatory, maritime authorities, financial and insurance institutions and others seem keen to establish various incentive schemes to support the implementation of underwater radiated noise monitoring programmes, where considered appropriate.

The obvious incentives are to apply certain criteria to the ships. For instance, to design according to relevant URN ship class notations issued by classification societies, development of a URN Management Plan, or other voluntary sustainability certifications. Also, benchmarking by means of key performance indicators could be commercially attractive to the industry as design and operational options can be used to reduce noise levels and also to improve energy efficiency. The port fees charged will then depend on the ship's underwater noise performance; the more noise the higher the port fee.

Port roles

Port or littoral states could consider implementing real-time measuring of ship noise whenever ships are in its territorial waters. Ports may be hesitant to consider such new requirements, as the level of investment in acoustic monitoring equipment could be substantial. Furthermore, a port environment is not the easiest in which to measure noise levels using underwater probes or sensors. Apart from anthropogenic noise sources, the shallowness of the area and the presence of hard structures may cause a permanent noise level through reflection and reverberation on the bottom and structures that is absent further offshore.

Ports may be hesitant to consider such new requirements, as the level of investment in acoustic monitoring equipment could be substantial

Littoral states may issue incentive programs providing priority in the allocation of berth slots for ships generating less underwater noise en route, or reduced ship waiting times at ports through collaboration along the entire logistical maritime chain – for example, through the just-in-time concept. Both types of programmes may require the ship to slow down, with the specific goal of reducing underwater noise emissions. The ship will already have considered this aspect in its time charter, and thus have to find a balance and trade-off between



Credit: Vancouver Fraser Port Authority

the noise level emitted and the degree of operational efficiency, also taking into account synergies with climate policies. The safety aspect of slowing down also needs to be considered, as lower speeds may hinder a ship's manoeuvrability in given sea and wind conditions.

The rebate by the individual ports may be marginal. Hence, the only economically meaningful solution for ships will be if a larger number of ports join a specific initiative scheme. As such, co-ordination between ports in setting priorities, as well as the harmonisation of indices and their widespread use by ports, will favour the adoption of the requested changes by the shipping sector.

The future

The impacts of ship noise on marine mammals continue to be of great concern. The growing awareness, improved technology, and increased availability of data streams, as well as the analytical advancements have started to provide much-needed context for impact assessments for the industry.

Ship noise is a loss in energy, and vibrating propellers, appendages, and cavities are a structural risk; therefore, there is a natural incentive for the shipping industry to maintain its ships and thus reduce noise.

However, a number of questions still remain: will future measures be provided by shipyards on delivery of the ship as part of the sea trials process, or as an out-of-water maintenance option after dry docking? Should the noise level be monitored continuously and become part of the 'noon-data' reporting? Should ports invest in real-time listening sensors outside of their entrance?

One thing is certain, however: the underwater radiated noise levels from commercial shipping are currently in focus and the newly revised IMO Guidelines are a positive element ensuring that relevant parties have the best available information to inform URN reduction efforts and to take account of linkages with energy efficiency compliance measures. Ports will in the not-too-distant future have an important role to play in mitigating URN from ships that call at their facilities.

■ **Jepp Skovbakke Juhl** is manager of maritime safety and security at BIMCO.

Vancouver Fraser Port Authority launched an underwater noise management plan in 2020

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Finding the right role in green corridors

Embrace the role of initiator, but recognise that ports can't go it alone. By Carly Fields



Credit: Port of Gothenburg

Gothenburg has agreed to pioneer a green corridor with Rotterdam

First put forward as an initial conceptualisation in *The Next Wave: Green Corridors* report produced for the Getting to Zero Coalition in 2021, with analytical support from McKinsey, Maritime Green Corridors are gaining traction. Done well, green corridors – specific trade routes between major port hubs where zero-emission solutions are supported and demonstrated – can propel shipping on its decarbonisation journey, employing cross border collaboration to better co-ordinate green fuel infrastructure and vessels.

The Global Maritime Forum sees green corridors establishing favourable conditions for decarbonisation, allowing policy makers to create an enabling ecosystem with targeted regulatory measures, financial incentives, and safety regulations. Policy makers could also consider regulations and incentives to lower the cost of green fuel production, which could in turn help to mobilise demand for green shipping.

And secondary effects are also anticipated with an indirect reduction in shipping emissions on other routes. The *Next Wave* report foresees corridors that would ideally be large enough to include all relevant value chain actors: fuel producers, cargo owners, regulatory authorities, and, of course, ports.

Here, Jesse Fahnstock, Global Maritime Forum's project director for decarbonisation and recognised as the architect of the green corridors project, speaks with *Seatrade* about ports' role within the green corridors concept.

Setting the stage, Fahnstock clarifies the position of ports in the green corridor concept. "Many green corridor initiatives have been taken by ports for understandable reasons, but thinking of green

corridors as a connection between ports is probably not always helpful. Ports should be involved in the context of routes – ports can be wonderful facilitators, and the fact that they are taking a leadership role is really great and encouraging – but a green corridor is really about powering the transportation of cargo with zero emission fuels. It's important to keep that in context."

Defining objectives

Once the stakeholders have been defined, it is important to have a shared objective and vision and to understand the corridor in the same way. Which slice of traffic are you targeting? What fuel pathway are you talking about? What is your shared objective in terms of the transition elements?

However, getting hung up on definitions more narrowly, or setting specific targets at an early stage is potentially quite problematic and counterproductive, Fahnstock said. "In our experience where we are either a partner or where we provide some advice, we have seen some stumbling in the early days around these issues. They need to be ironed out before we can go anywhere."

He prefers to see green corridors as an "arena for innovation", embracing 'learning by doing'. "Setting something up that allows you to feel your way out within the context of a shared objective and vision is a better way to go in my opinion. Then you can actually figure out your targets and definitions."

There should be agreement on some fundamental things and some shared understandings from the off; however, target settings should follow some other decisions about, for example, the fuel pathway and relevant timelines.

The message to ports is don't go it alone and don't focus early. Ports really need to evaluate the alternatives before they get too far

"Many people look at the challenge, sit down and say, 'Okay, what can we measure? What kind of results can we show quickly?' And they start thinking about marginal emissions reductions, how they'll measure their emissions reductions – and that will be the standard by which they define success," Fahnestock said.

"The whole purpose of a green corridor is not to reduce a huge amount of emissions, it's to push forward the co-ordinated development of new infrastructure."

He adds that it should be very complicated to deploy, so the metric in the end should be related to the deployment of new technology and infrastructure. That could end up being expressed as the number of vessels that use the route, the technology, or the amount of new fuel.

"It has to be something that reflects the hard part, which is getting these new investments in place. If you define it in terms of emissions reductions, you risk taking the focus off. Your efforts will be to grab the emissions reductions that are possible rather than to do the hard thing which is to set up future emissions reductions – which will be much larger if we get these corridors to act as testing and development grounds," he said.

In fact, he does not see any reason why ports or other stakeholders would need to establish a green

corridor to reduce emissions marginally as there are many other ways to approach that. "If you wanted to just use lower emission drop-in fuels, you could just provide some incentives for the use of those drop-in fuels and people will start using them – you don't need a huge co-ordinated programme."

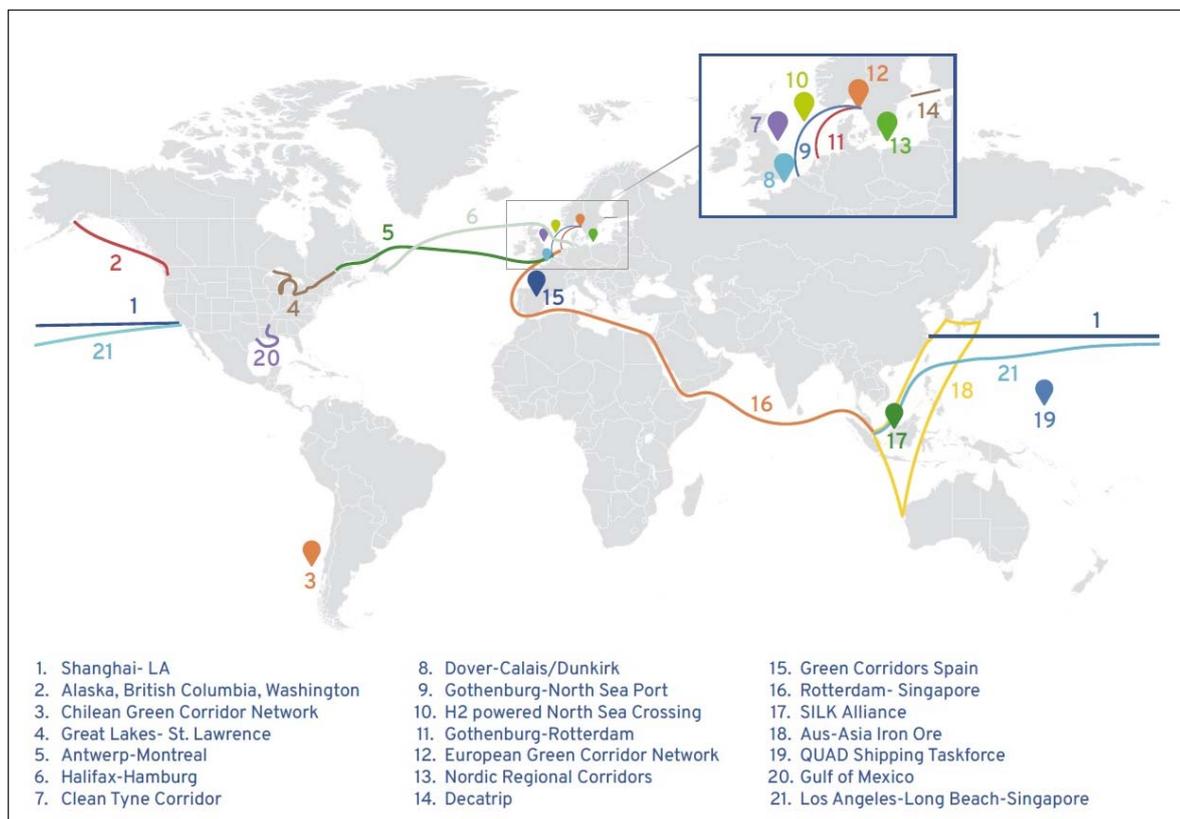
Fahnestock adds that he worries that people are getting distracted by the low hanging fruit: "I think they're super important and they should be done, but that's not what green corridors are."

Key role as initiators

Ports have a key role to play as initiators and facilitators in the green corridor concept. Indeed, some of the most advanced green corridor thinking is in the 'Rotterdams and Singapores' of the world, Fahnestock said. "They are super far along compared with the rest of the value chain."

But he stresses that ports cannot go it alone with green corridors. "It's important to realise that the most expensive and most difficult decisions have to be co-ordinated with those on the fuel and cargo side. Also, you have to approach the design of the programme in a way that puts those two issues at the centre – so, are we looking at a specific cargo on a regular route that can bear some of this cost, and do we have an idea of what fuel we're going to be able to provide and which one we're going to focus on?"

If ports do not take that approach, the end result will not be very impactful, he warns. "The message to ports is don't go it alone. Ports really need to evaluate the alternatives before they get too far. This is going to be about specific traffic on a particular route and it's going to be a specific fuel type. It needs to be really narrowed down to a segment and to a



Over 20 green corridor initiatives had been reported by the end of 2022

Credit: Annual Progress Report on Green Shipping Corridors 2022, Getting to Zero Coalition Global Maritime Forum

fuel to allow them to figure it out. These are the basic economics; these are the basic incentives that these players should be looking for.”

If Green Corridor initiatives try to address all segments and all fuels the picture will soon get very muddled, which will reduce available investment options. “Trying to do everything at once is the global challenge. We don’t need to replicate that. For a green corridor you need to design a simpler challenge – that’s the whole idea,” Fahnestock said.

Also, this does not have to be a question of size. Fahnestock celebrates the small ports starting initiatives, particularly on ferry and regional routes. “Who knows where the breakthroughs will happen? Kudos to them for taking the risk. I don’t think that the small actors will be left behind with green corridors. I think that the more appropriate logic is that the small actors will benefit from the risk taken by the big actors.”

Government position

To date, progress has been necessarily slow as each corridor finds its feet. But once milestones have been reached, sharing learnings between each corridor will be beneficial. Here, there is an important role for governments to play, according to Fahnestock. “Costings, efficiencies, performance and so on are commercially sensitive and sharing that will be challenging. This is where national governments need to be more involved. National governments can provide an innovation framework with some support. They can also require data sharing and that will unlock progress.”

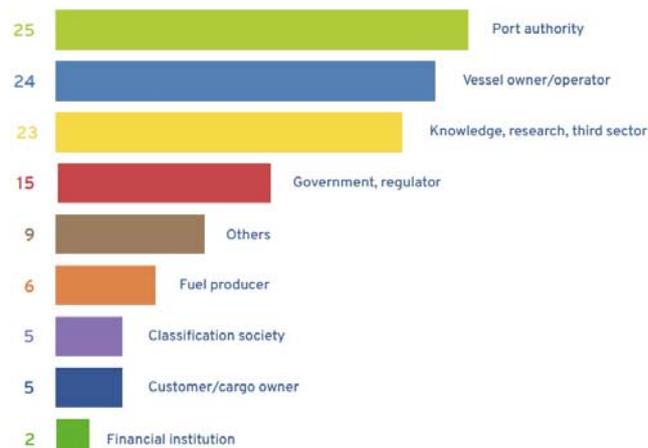
The whole purpose of a green corridor is not to reduce a huge amount of emissions, it's to push forward the co-ordinated development of new infrastructure

“To set up a green corridor, stakeholders need visibility on, for example, the cargo owner’s position on what the end customer wants. They might have a very specific view about what fuel they want to be in the ships that they’re helping to finance. However, as soon as you start to bring in consumers or end customers into the conversation it becomes a commercial space. It then becomes difficult to have open conversations as people feel like they are undermining their future business. Again, the biggest solution – and because it has been lacking, the biggest obstacle – is government involvement.”

Fahnestock highlights the UK green corridor programme, where funding has been committed to feasibility studies. “This is exactly the kind of stuff that governments should do,” he says. In conversation with other governments, he is confident that there are others exploring their options and likely to do similar things. He notes that the Singapore government is looking at impactful, long-term collaboration, and that Australia and Japan are expected to be “strong performers” when

Stakeholders

The green corridor movement has attracted 113 stakeholders covering all major parts of the value chain.



they get into the space. “There’s good hope for programmatic government responses, it just hasn’t happened yet. There’s a mindset hurdle to get over both for governments who say, ‘this is something we’re allowed to do even though it’s an international industry’, and for industry to believe that the government will provide policy levers that can support them as they take the initiative.”

Help at hand

In terms of guidance, the Global Maritime Forum has some publicly available suggestions on aspects that need to be considered when establishing a green corridor, and those are broadly replicable from corridor to corridor. These include how to engage with stakeholders in the value chain, how to undertake a feasibility study, and how to design a roadmap. There are also framing questions that are important no matter who’s participating or what the segment is.

At a more specific level there will be much more variation depending on who took the initiative, whether there are government actors involved, and whether it’s full value chain or focused on some narrower set of actors. This level could include setting the blueprint for the governance model of the corridor, the blueprint for guiding investments, or the blueprint for developing an implementation plan.

While there are no green corridors in true operation today – and there won’t be for at least another year – there are around 20 initiatives in place around the world.

Some, as Fahnestock notes, are quite small and therefore would not contribute much, but they could always have spill over effects. And some may make it easier for others to use the tools and/or make a technology choice, delivering a positive impact.

“Some of them will obviously fizzle,” Fahnestock concluded, “but it’s important that we accept that some of this stuff isn’t going to work, otherwise, there’s no point to it. If we don’t have any failures mixed in there, we’re not doing a very good job.”

Ports have an important role to play in the 20+ green corridors announced

Credit: Annual Progress Report on Green Shipping Corridors 2022, Getting to Zero Coalition Global Maritime Forum

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SCAN ME

A power shock to a port's heart

Coping with the pain of meeting the anticipated electricity demand of future ships. By Carly Fields



Pressure is mounting for ports to better manage the carbon footprint of vessels calling at their berths. While most operational efficiencies to tackle emissions apply to the ships themselves – beyond the reach of ports – shore-based power supply can score highly on the emission busting scale, if ports can embrace their new role as green energy generator and supplier.

Jürgen Zabel, general manager for shore connection systems at Wärtsilä, sees ship shore power as a “proven technology”, which is available today and can provide an immediate decarbonisation impact. “It can reduce local air pollution from ships at berth to zero while also reducing greenhouse gas emissions by connecting ships to electricity grids when docked at port, which in turn reduces fuel consumption.”

For a prime example of high-performing shore power in action look no further than California's ports, which have implemented stringent regulation on reducing at-berth emissions. “This has been a key driver behind the greater implementation of shore power systems at the port, as operators must comply with the berth regulation at all California ports,” Zabel said. To date, Wärtsilä has carried out more than 150 installations of its container shore power solution for cold ironing to connect cargo ships to local power sources at California's ports.

China is also throwing its weight behind shore power solutions as a driver to reduce emissions in its ports and cities. From 2019, China mandated that new domestic vessels should be equipped for shore power. Zabel expects Europe to tighten its port regulations concerning emissions soon, accelerating the universal adoption of shore connection systems.

'Transformational' take-up

Peter Selway, port solutions lead at Schneider Electric, told *Seatrade* that shore power has taken off significantly over the last 12 months: “It has been transformational,” he said. He agreed with Zabel that the geographic spread has been uneven, though. “In my view, this is one of the areas where the EU and Europe is lagging. Look at America and China where there really has been real progress. Really, Europe has been a bit of a laggard in this respect.”

He urged ports to “get on the shore power journey as early as possible”, as this is “the direction of travel”.

For those ports still deliberating, Selway said it's important to remember that shore power isn't new. Navies around the world have been using shore



Credit: Wärtsilä

power for decades. But he conceded that they have had a huge advantage: they control the port, the infrastructure, and the vessels – “so it is a lot easier for them because they can just co-ordinate and decide how they're going to make it work”.

However, this is a lesson for ports today, he said. “This is an amazing opportunity for ports and vessel owners and operators to work closely together. It's the basic things, like the location of the point where you plug in on the vessel, that can cause huge problems if different organisations don't work together to plan how to make things like that happen.”

Ultimately, it's about dialogue, he said.

Zabel agreed that if the industry is to achieve its collective goals on shore power, it must embrace collaboration. “Investment from owners and operators must be guided with expertise and a new level of collaboration. Having trusted partners to navigate an uncertain future is essential, for predictability and progress, but also controlling costs,” he said. “Through collaboration, we can support each other to overcome these challenges by applying standards for the whole industry. Costs can be reduced when having standardisation in place, which ultimately will make it easier to install shore power systems.”

Standard setting important

Standardisation will ensure a level playing field for all players and encourages the sharing of knowledge, Zabel added. For OEMs such as Wärtsilä this is critical when it comes to designing and installing systems. Standardisation in turn can reduce production and maintenance costs.

Wärtsilä sees ship shore power as proven technology offering an immediate decarbonisation impact

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If you needed 100 megawatts of power, you're paying to have that power available all the time – those costs are absolutely huge

“The rise of shore power mandates reinforces the need of applying regulatory standards in the industry globally, which in turn supports owners, operators and ports in operating more sustainably, efficiently and profitably,” Zabel said.

Shore power does not have to be particularly complicated, Selway added. “The standards are in place, and they’ve existed for many years.” Standards IEC 80005-1, -2, and -3 cover the “real nitty-gritty aspects” in terms of frequency and voltages, and communication protocols, he said.

Zabel highlighted 80005-1[5] – which refers to the high voltage shore connection systems, onboard the ship and on shore, to supply the ship with electrical power from shore – as “the bible for engineers and ports to build out shore power systems”. It provides a standard for all to follow, including what the cable stream will look like and what needs to be fulfilled.

What the standards do not do, however, is specify things like location of shore power points, but, said Selway, this is not “insurmountable”.

A fair and practical regulatory framework is also important, both locally and nationally. “If history tells us anything, it’s that the shipping industry reacts to mandatory legislation, so it will be important to apply pressure from a regulatory standpoint to ensure the infrastructure and solutions are in place to unlock the opportunities with shore power,” Zabel said. That regulatory framework will mould the business case for ship shore power installations.

He gave the Port of Hamburg as an example in Europe. They were among the first movers in the continent to install shore power. Zabel described a mandatory framework as “the greatest driver to ensure emissions reductions are achieved using this solution.”

Power surge

That said, the biggest challenges are getting the power into the port in the first place and managing the varying loads.

“Ports are traditionally car parks for ships – that has been their model,” Selway said. “The obvious analogy is the transition of cars to electric, but the difference with electric vehicles is that load/charge is spread across the country, whereas the power requirement each port is going to need for these vessels is astronomical.”

Schneider Electric is seeing reports of a 1,000%-plus increase in energy consumption for ports. “That is a massive challenge, and it is not a port’s core business or something that they’ve got a great deal of expertise with,” Selway said.

Then there is the management of the load. “When the ship’s in, there’s a big load; when the ship disappears again, there’s a really small load,” Selway said. To guarantee that a port can meet the



Credit: Schneider Electric

maximum load needed they would have to pay an availability charge. “So, if you needed 100 megawatts of power, you’re paying to have that power available all the time – those costs are absolutely huge.”

One answer is to establish a microgrid within the port, installing renewables on site coupled with energy storage to manage the peaks and troughs. “This is just at a time where microgrids are really becoming a much more mature technology,” Selway said. Also, if a port has access to renewables on site – for example, solar panels or tidal power – they can guarantee the price of electricity.

“If you’ve got your own renewable sources of generation in the port, you know what the price of electricity is, and you can guarantee that for the next 20 years or for the life of the solar panels or the wind turbine, or whatever. It makes the investment decision a lot easier,” he said.

But with the whole world seemingly switching to electric, demand for grid-generated power is increasing exponentially. Therefore, ports need to start their microgrid journey sooner rather than later.

“Say you are the Port of Dover and there is plenty of local power availability, which you plan to use. Then someone decides to build a factory ten miles away using huge amounts of power. Overnight, that power could disappear and then you’d be left high and dry. There’s no warning of that. If someone gets there before you, you’ve lost that power and you are back to square one.”

There is also the march towards hybrid and all-electric vessels to consider – both will substantially increase a port’s electricity demand.

Ports need to become adept at managing electricity loads

Jürgen Zabel,
Wärtsilä



Taking on the power challenge

*Improving environmental conditions through alternative maritime power. By **Dimitris Tsoulos***



The road to decarbonisation is challenging but ports have both an opportunity and a responsibility to help the transport industry move in the right direction.

Ports are a hive of activity; but while they play a crucial role in global and domestic trades as economic and commercial hubs, they are also a major source of air pollution.

While berthed in port and running their diesel-fuelled auxiliary engines to power the auxiliary equipment and accommodation load, vessels emit a harmful combination of pollutants including carbon dioxide, nitrogen oxides, sulphur oxides and particulate matter. These contribute to poor air quality in nearby towns and in surrounding waters, which can have a significant impact on health in local communities and environments.

The global regulatory landscape surrounding the use of shore power is quickly taking shape and shipowners are increasingly acknowledging shore power as a crucial capability

To protect people and ecosystems, regulators worldwide have introduced measures targeting cleaner ship operations in ports. A common theme throughout has been the requirement for vessels and ports to have the capacity for shore connections – otherwise known as alternative maritime power (AMP) or cold ironing.

For ship owners, AMP is an investment with positive return on investment that increases the commercial value of the vessel. When an AMP system is used, it contributes efficiently to reduce the greenhouse gas (GHG) intensity of energy consumed by the vessel and minimises any risks associated with the non-compliant port calls. Additionally, it promotes savings to ship operators due to reduced operating costs by reducing the burden on the auxiliary engines, extending their lifecycle and optimising the frequency and cost of maintenance.

Calculating risks

Typically, AMP solutions incorporate safety measures exclusively for high-voltage installations since the risks at low voltage are deemed less severe. However, low-voltage installations are not immune

As regulations become increasingly stringent and widespread, calls for shore power technologies that maximise flexibility to support sustainable ship and port operations are expected to get louder

to faults. To safeguard the onboard electrical grid and the system itself, ERMA FIRST conducted a risk assessment of its low-voltage solution, and based on the results, implemented measures including self-diagnostics so operators can identify the cause of any miscommunication or power loss. To increase availability, ERMA FIRST's BLUE CONNECT AMP incorporates redundant control and auxiliary power supply equipment as well as remote control and monitoring functions. It is configured to be integrated with IoT services, data logging and the vessel's PMS platform.

To support the adoption and implementation of shore connections, the global regulatory landscape surrounding the use of shore power is quickly taking shape and shipowners are increasingly acknowledging shore power as a crucial capability.

For example, the European Union's 'Fit for 55' legislative package promotes shore power, and its Alternative Fuels Infrastructure Regulation requires ports to have AMP infrastructure in place by January 1, 2030. Earlier in 2023, shipping was also among the industries selected for the EU's Emissions Trading System (ETS), which is expected to come into force in 2024. Under the new proposals, 100% of emissions on voyages and port calls within the EU and European Economic Area (EEA), and 50% of emissions on voyages into or out of the EU/EEA from other parts of the world, will be subject to the ETS.

As regulations become increasingly stringent and widespread, calls for shore power technologies that maximise flexibility to support sustainable ship and port operations are expected to get louder. Shoreside facilities considering their options are also becoming aware that, with shoreside AMP technology fully developed to meet a fast-changing regulatory landscape, it may be up to ports themselves to make sure they are ready to take up their responsibilities.

■ **Dimitris Tsoulos** is director of sales for BLUE CONNECT, ERMA FIRST's alternate maritime power solution.

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