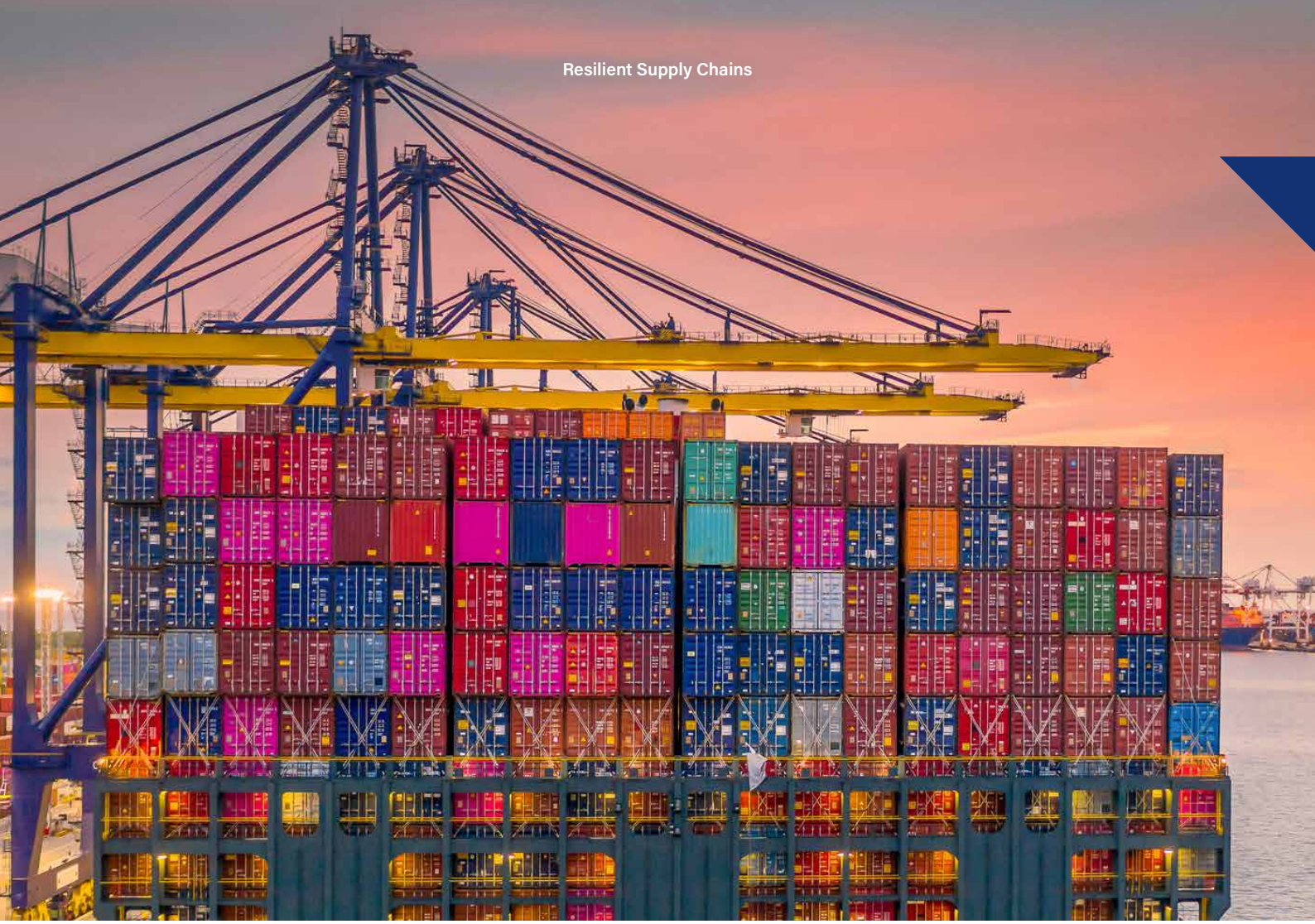
PORT TECHNOLOGY

EDITION 130 - 2023

THE E-JOURNAL OF PORTS AND TERMINALS

RESILIENT SUPPLY CHAINS



Margherita Bruno,
Editor

FOREWORD

Welcome aboard our ports and terminals e-journal - the ultimate destination for all things shipping, logistics, and resiliency in the face of turbulent times!

In this day and age, where the world is more connected than ever before, the need for resilient supply chains has never been greater. From port congestion and labour shortages to natural disasters and global pandemics, there are countless challenges that can disrupt the flow of goods across the world.

But fear not, for our e-journal is here to help navigate the choppy waters of modern-day logistics.

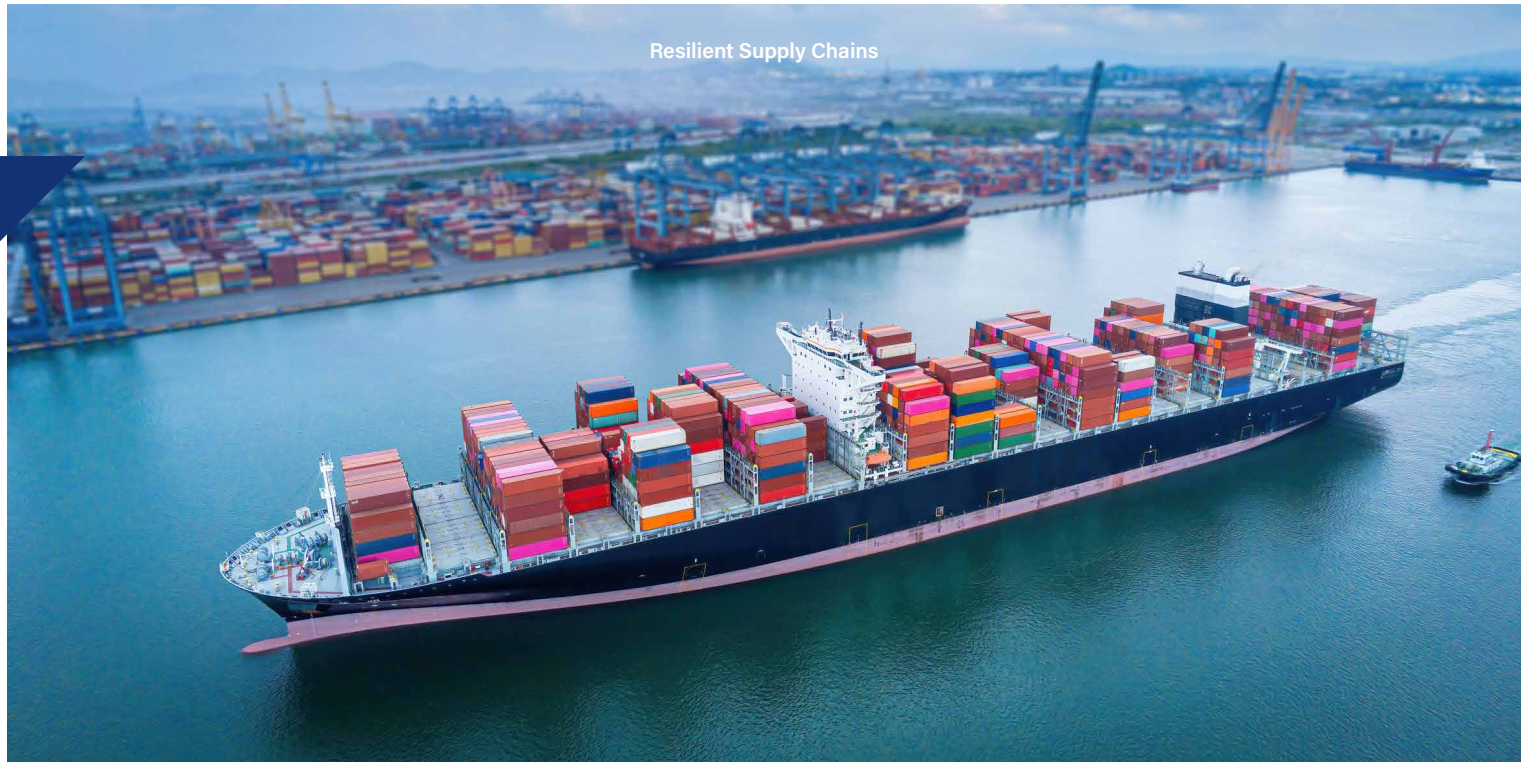
Our expert contributors will guide you through the latest trends and innovations in port and terminal operations, share their experiences and insights, and provide you with actionable tips to build a more resilient supply chain.

In this first spring edition, we feature discussions on how to enable smoother logistics, green initiatives, and cutting-edge digitalisation.

With insights from global carrier MSC, our partners at PTI's GreenTech 2023, and more, this edition showcases ongoing efforts to improve efficiency and security in the shipping and port industries.

We hope you enjoy the ride and come out the other end with a renewed sense of optimism and determination to tackle any challenge that comes your way.

Bon voyage!



CONTENTS

info@porttechnology.org
@PortTechnology
www.porttechnology.org
linkd.in/porttech

SDP

SMART DIGITAL PORTS OF THE FUTURE

SMART, EFFICIENT & CONNECTED

POWERED BY PORT TECHNOLOGY INTERNATIONAL

16 - 17 MAY 2023

ROTTERDAM, THE NETHERLANDS

EARLY BIRD TICKETS NOW AVAILABLE!

Join the Smart Digital Ports of the Future conference for a range of networking opportunities and expert led discussions on standardisation and data sharing, technical case studies from the most advanced ports, emerging AI technologies, Digital Twin, IoT applications and many more.

- 300+ ATTENDEES
- 40+ SPEAKERS
- 85+ PORTS & TERMINALS
- 12+ SESSIONS

REGISTER FOR JUST €1,399 | SDP.PTIEVENTS.COM

Ports & Terminals can attend for FREE!

Gold Sponsors: verizon business

Silver Sponsors: esri THE SCIENCE OF WHERE

Bronze Sponsors: allread, awake.ai, GISGRO, innovez-one, PORTCHAIN, Portxchange

Exhibitors: heyport

EASIER CONTAINER FLOW FOR RIO GRANDE

"OVER THE COMING MONTHS, ABB WILL PROJECT MANAGE INSTALLATION, SOFTWARE IMPLEMENTATION AND COMMISSIONING OF A NEW HANDLING SOLUTION WHICH BOTH THE SUPPLIER AND TECON RIO GRANDE VIEW AS MORE THAN AN EXTENSION OF CRANE OCR."

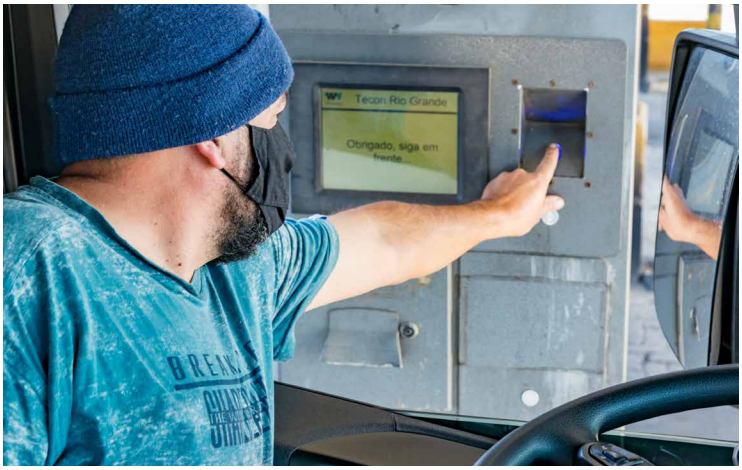
Richard Micheli,
Product Line Manager, OCR,
ABB Ports

Located in Brazil's southernmost seaport, Rio Grande Container Terminal has repeatedly demonstrated a forward looking approach to technology since opening its gates in 1997. Known as Tecon Rio Grande, the operation has earned a reputation as a high-productivity facility connected by water, road and rail, with a capacity of 1.42 million TEU.

The first terminal in Brazil to invest in both a state-of-the-art operations management system (from Navis, in 1999) and a B2B portal for the port community stakeholders (in 2000), Tecon Rio Grande was also an early mover in deploying gate automation using advanced Optical Character Recognition (OCR) for gatehouse operations (from ABB, in 2013).

Tecon Rio Grande Operations Director, Giovanni Phonlor, described the facility as "the most automated terminal in the country", adding that its willingness to innovate is wholly consistent with the ethos of parent company Wilson Sons – Brazil's largest integrated port and maritime logistics operator. Wilson Sons sponsors the Cubo Itaú innovation hub and is an investor in notable start-ups, including DockTech (a developer of seabed scanner for ports) Argonáutica (a dynamic draft tool for ship berthing/loading) and AIDrivers (adapting conventional vehicles to autonomous operations).

In early 2024, Tecon Rio Grande will sustain its 'first to market' reputation, after choosing ABB ahead of five competitors to become an early adopter of OCR for quay crane operations and to become the first in the country to integrate QuayPro digitalised container stowage confirmation into its operations.



RIGHT
Kiosks featuring biometric recognition for drivers increase security and improve efficiency at gate entry.

Phonlor stressed that return on investment has been the key driver for innovation throughout Tecon Rio Grande's 26-year history. "We operate in a tough market here and we don't have the luxury of the container numbers that the biggest container terminals work with to secure straightforward scale economies: we need to capture every available efficiency gain that new technology can bring us," he said.

DATA CAPTURE

Accuracy in data capture and exchange has proved an especially fertile area for ROI. For example, the initial impetus to introduce OCR at the gatehouse in 2013 came from mandatory customs requirements, Phonlor explained, but Tecon Rio Grande took the opportunity to invest in ABB's state-of-the-art OCR to secure efficiency gains as well as compliance. By 2014, it had put in place a gate automation solution that featured biometric recognition for drivers, automatic weighing, and automated slot allocation via ticket printing.

"Our starting point was that each truck entering the port took roughly three minutes to deal with on a manual basis," said Phonlor. "Using OCR and the other gate automation technologies, the entire process can be accomplished in 15-20 seconds, on average."

Further upgrades to operations have included implementation of NAVIS N4 terminal software (2017) and an update to gatehouse hardware and software from ABB (2022). The latter consolidated a relationship which has led on to the upcoming adoption of Crane OCR and QuayPro, which both ABB and Tecon Rio Grande expect will bring a step change for productivity.

"We are a long-established user of ABB gate automation technology, and the system has proved highly accurate and very intuitive, with ABB also providing best in class support services in my opinion," said Phonlor. "In considering Crane OCR, we surveyed what was available in the market and concluded that ABB had the solution that best meets our needs."

RIGHT
The Rio Grande Container Terminal is located in Brazil's southernmost seaport and has a capacity of 1.42 million TEU.

KPIS AND QUAYPRO

Installed across five ship-to-shore cranes, ABB Crane OCR automates data capture as containers are exchanged at the quay crane. Using ABB's advanced AI imaging technology, the system captures container numbers, ISO codes, door orientation, bolt seal presence and hazardous material labels, as well as recording images for damage in-spection purposes. The solution includes ABB MatchMaker™ which identifies the terminal trucks and enables automated handoff between cranes and terminal vehicles.

Crane OCR minimises the risk for human error in the handling operation. "Multiply the potential for keying errors, misunderstandings, inattention or even fatigue by thousands of containers a day, and the time and accurcy saved can add up to a significant efficiency gain," said Phonlor. Web-based exception management software (XClerk) also means terminal staff can correct or adjust transactions in real time from a safe remote location.

However, 'game-changing' efficiency wins will come about as a result of ABB's QuayPro module, Phonlor added, which extends the reach of the gains available to accurate data over the quayside and into the hold of the vessel itself. Where Crane OCR captures container data automatically, the QuayPro module automatically confirms that the load is being stowed in the right bay on the ship, with 'CabView' modules providing visual and audio job instructions to crane drivers.

REAL-TIME STOWAGE PLANNING

In addition, QuayPro can also adapt on-the-fly to events which change the loading sequence. Instead of requiring human intervention - and a chain of inquiries and instructions - QuayPro uses business logic to assess the impact of the change on the stowage plan and automatically generates the new loading instruction for safe stowage. In the same way, for discharge, the combination of QuayPro and Crane OCR confirms the accuracy of the inbound stow positions as reported to the terminal via BAPLIE EDI and highlights any deviations from the bay plan in near real-time so that yard equipment logistics can adjust.

The first solution of its kind to go live in the industry, ABB's QuayPro application made its market debut in 2022 at the Exolgan Container Terminal, at the Port of Buenos Aires.

"Together, ABB Crane OCR and QuayPro will allow us to streamline the stowage process automatically, and we expect this to be a productivity differentiator," said Phonlor. The ability to adapt to changing loading and discharge needs on-the-fly, will also have the effect of reducing terminal vehicle dwell time and related emissions, he observed.

Over the coming months, ABB will project manage installation, software implementation and commissioning of a new handling solution which both the supplier and Tecon Rio Grande view as more than an extension of Crane OCR. Phonlor expects that, drawing on Tecon Rio Grande's own breadth of expertise in IT, the combination of QuayPro and Crane OCR will seamlessly change the way container terminals operate.

"We can see that Crane OCR is going to have an immediate effect on crane operations at the quayside that will echo what we achieved with Gate OCR, but QuayPro's ability to adjust on-the-fly is a next level development," he said. "We also look forward to using this dynamic software to analyse our operations in new ways and to applying logic swaps with our TOS (terminal operations software) that will help us improve vessel planning."

ABOUT THE AUTHOR:
Richard Micheli is Head of the OCR product line in ABB Ports. Richard has extensive experience on OCR and container terminal automation through prior positions in ABB and APS Technology Group as director of Service and Operations, and in project management. Richard Micheli has a Bachelor's degree in Electronics Engineering from ITT Technical Institute, San Diego.

ABOUT THE ORGANISATIONS:
Wilson Sons is the largest integrated port-shipping logistics operator in Brazil, with over 185 years of experience. The company operates across Brazil and offers complete solutions to more than 5,000 clients, including shipowners, importers and exporters, offshore energy industry, renewable energy projects, agribusiness corporations, and other players in different businesses.
Learn more at:
www.wilsonsons.com.br/en/

ABB Ports develops and delivers intelligent terminal automation solutions and services for container and bulk cargo handling. The offering includes automation and remote operation for all types of container handling cranes, as well as complete OCR and electrical systems. ABB's systems help to optimise container handling from ship to gate.
Learn more at:
www.abb.com/ports

MAIN
Hybrid ro-ro vessel
at the Port of Bilbao

GREENTECH 2023: IN DISCUSSION WITH BILBAO PORT

"THIS IS RIGHT NOW THE OPPORTUNITY THAT WE'VE GOT TO CREATE A TERMINAL, NOT FOR RIGHT NOW AND CURRENT NECESSITIES ALONE, BUT ALSO FOR FUTURE ONES."

Ekaitz López Amurrio, Financial Director, Port of Bilbao Authority, and **Andima Ormaetxe Bengoa**, Operations, Commercial & Logistics Director, Port of Bilbao Authority

RIGHT
Container Terminal at Bilbao Port

"WE WANT TO GIVE VISIBILITY TO THE PORT OF BILBAO IN ALL OUR GREEN INITIATIVES AND TO POSITION THE PORT OF BILBAO INSIDE OF THE GREEN CORRIDORS."

On 22 February 2023, Port Technology International – PTI hosted its inaugural GreenTech event in Hamburg bringing together C-level executives to cooperate and exchange knowledge with the goal of empowering Ports & Terminals in their decarbonisation and net-zero efforts.

During the event, **Margherita Bruno**, Editor, Port Technology International, held a discussion sat down with **Ekaitz López Amurrio**, Financial Director, Port of Bilbao Authority, and **Andima Ormaetxe Bengoa**, Operations, Commercial & Logistics Director, Port of Bilbao Authority, to delve into the port's sustainability agenda and future projects.

Why did Bilbao Port find it important to partner with PTI's GreenTech 2023?

EL: For Bilbao Port it's very important to work our projects with a network effective view, which means that we want to work together with other European ports, ship operators and private terminals, because when we talk about adapting and investing in our infrastructures for the energy transition, we have to do it with the origin port, destination port and all the stakeholders involved. So we have to achieve this network effect and GreenTech is an opportunity to share best practices and to work together with other European ports and the ship operators.

AO: Yes, exactly. And we want to give visibility to the port of Bilbao in all our green initiatives and to position the port of Bilbao inside of the green corridors.

What does it mean to Bilbao Port to be sustainable, and how is the port working sustainably?

EL: I think what changed during the last years is that we have an environmental division at the Port Authority, but now sustainability is strategic for the port. So it's about investments, it's about the future and maybe the pricing model of the Port Authority will go in that direction in the short and middle run. It involves all the divisions of the company and the whole approach. So sustainability is now a key element in our strategy.

AO: Port of Bilbao is the pioneer in environmental management the Spanish ports. We find that the environment strategy is a way to develop the business and also to make a more efficient and effective port into a smart port. And this is why we are so relevant in the strategy of environment issues.

What does Bilbao Port want to improve on for 2023? Any new markets, cargo sectors to focus on?

AO: We are a very diversified port, we are receiving all kind of traffics, so we cannot put the X in a single one. We definitely want to

reduce the emissions and spread the traffic. We want to create the perfect ecosystem to attract customers and to further develop any single traffic that we've got.

Is Bilbao Port factoring in digitalisation to reduce emissions at its port?

AO: We've got a single window, which is a community system platform. We put everyone in contact from clients, to the authorities and to the organisations that are working together with the port. And we also want to be this platform a productive one in order to reduce the cost of the operations, and again to be more effective and efficient. So for us, digitalisation is another very important tool to create a more efficient environment in the port.

EL: As part of our proactive port initiative, we are thinking of 5G as well to work on use cases to for the future, which is a challenge. Also, now we are adapting the infrastructure for onshore power supply. But in the future we think that digitalisation will be needed as well, not just the physical infrastructure, but a digital twin or something similar that manages all the electrification of the port and the renewable energies.

Can you tell us the very latest on the new container terminal at Bilbao Port on the Central Quay?

AO: We believe that Bilbao Port has the gate for the Atlantic traffic, and not the North European only, but North American, Central and South America as well. We believe that we will have more opportunities in the future, but the track transport and the rail will not absorb all the growth of the transport and this is the opportunity for us to create a second terminal in order to respond to future challenges. It's now or never, because we are very limited in space. So this is right now the opportunity that we've got to create a terminal, not for right now and current necessities alone, but also for future ones.

Does the Northern Spain supply chain pose any challenges to Bilbao? If so, how are you overcoming these challenges?

AO: Yes, for example, we are facing a lack of truck drivers. We see that more and more of the truck transport is being reduced. So that's why our clients, our industries in the Basque Country – which are very intense industries – and in the surrounded areas they are claiming more rural transport. And we are trying to bring these traffic and these services to the Port of Bilbao in order to respond to the industry.

ABOVE
General view of the Port of Bilbao

ABOUT THE AUTHORS

Andima Ormaetxe Bengoa is the Operations, Commercial, Logistics and Strategy Director of the Port of Bilbao Authority (BPA) since 2018. He is member of the Board of Directors of several Dry Ports and Intermodal Platforms, such as Azuqueca de Henares (Guadalajara), Coslada (Madrid), Villafria (Burgos), CSP Iberian Zaragoza Terminal and Sibport. He is also member of the Board of Directors of Depósito Franco de Bilbao as well as member of the Shipping Council Port of Bilbao.

Ekaitz López Amurrio is the Chief Financial Officer of BPA since 2014. Ekaitz supports the BilbaoPORTLAB project to build an open innovation ecosystem at the Port of Bilbao. He is responsible of the BPA investment project economic analysis and coordinator of the grant agreements between BPA and the European Commission. He is strongly focused on supporting energy transition projects to deploy onshore power supply (BilbOPS CEF transport project) and renewable energies at the port of Bilbao.

ABOUT THE ORGANISATION

The Port of Bilbao is one of the most important transport and logistics centres in the European Atlantic Arc, and the leading the leading Spanish port in terms of traffic with the United Kingdom. The port boasts more than 700 years of history, offering modern and functional installations for all types of goods – including docks with draughts of up to 32 metres, land and railway connections and a huge offer of maritime commercial services for all markets.

The Port of Bilbao is interested in developing green maritime corridors and the last intiative is the BilbOPS Project, the electrification of the docks, that requires an investment of €50 million ($54 million) with the new facilities scheduled to be commissioned in 2025.

WHY RESILIENT SUPPLY CHAINS NEED AN ELECTRONIC BILL OF LADING

"AN EBL CIRCUMVENTS THE NEED TO ENTER DATA MANUALLY INTO, FOR EXAMPLE, CUSTOMS SYSTEMS. THAT STANDS TO IMPROVE DATA QUALITY AND TIMELINESS, AN IMPORTANT GAIN IN THE FIGHT AGAINST CRIME."

Niels Nuyens,
Digital Trade Program Director,
Digital Container Shipping
Association (DCSA)

Nine of the top 10 ocean carriers' recent commitment to a fully standardised, electronic bill of lading (eBL) by 2030 is a significant step towards fully digitalising container shipping processes. Digitalisation is important for many reasons, not least because it builds resilience into global trade's complex supply chains. It enables more accurate and timely information to be rapidly and seamlessly exchanged so that all stakeholders can have true visibility into the whereabouts of goods as they make their way across supply chains. This is of benefit to all stakeholders, from shippers to financers and carriers, and the many other involved organisations.

TRANSITIONING FROM B/L TO EBL

The bill of lading (B/L) has a long history. It has enabled trade over time by functioning as an agreement, a receipt, a document of title and a record of terms and conditions. To transport goods, it must be exchanged at the right times during the process. However, despite technology advances, B/Ls have remained mostly paper-based which creates a number of challenges and a missed opportunity.

Paper B/Ls aren't environmentally sustainable. They are expensive to produce and move and, of particular pertinence to supply chain resilience, they can hold up the progress of goods. If an original B/L or title document isn't where it needs to be, or hasn't been processed in time, cargo can get stuck in ports.

Supply chain stakeholders recognise the challenges of legacy processes. Indeed, the COVID-19 pandemic highlighted the limitations of paper, heightening the call for electronic documentation.

DIGITALISATION TO CUT COSTS, IMPROVE THE EXPERIENCE AND INCREASE RESILIENCE

Pre- and post-pandemic, other industries have digitalised to increase automation, reduce costs, improve customer experiences and be more sustainable. Container shipping can gain these benefits by digitising too, along with the ability to scale to support growth as trade volumes increase.

An eBL circumvents the need to enter data manually into, for example, customs systems. That stands to improve data quality and timeliness, an important gain in the fight against crime.

Despite the many benefits of digitalisation, there have been obstacles to change. A significant one is that parties exchanging eBLs need to connect to the same platform. Proprietary platforms, leveraging unstandardised data, can only support discrete segments of complex and interconnected global supply chains.

The industry needs interoperability to make progress towards a digital-first approach, starting with the eBL, and for that, it needs standards. Standards establish common processes, data definitions and communication protocols. As such, all technology platforms leveraging the standards can exchange data smoothly.

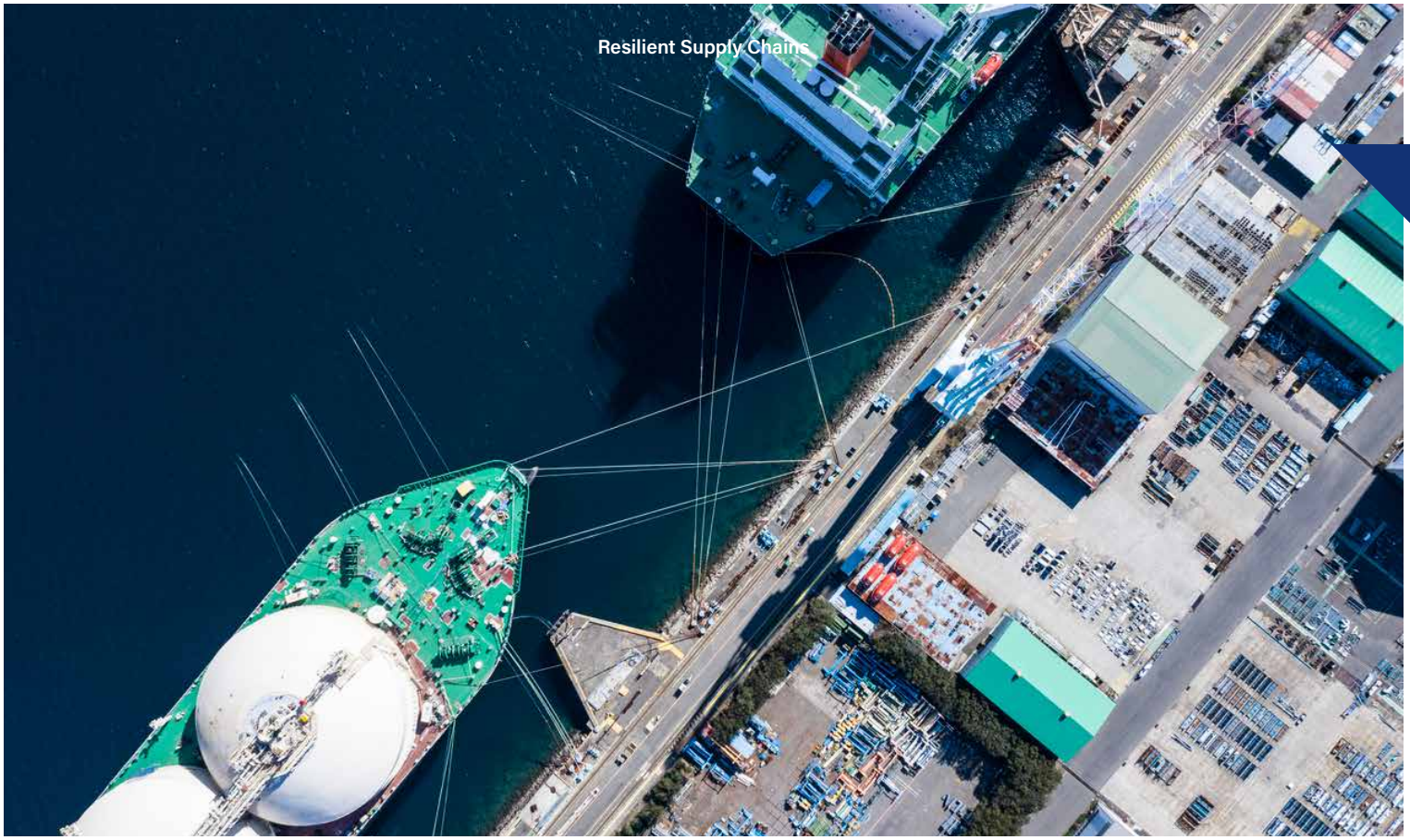
This makes for a better experience for shippers who will be able to choose an eBL platform based on service levels and capabilities and exchange electronic documentation with carriers, banks and other parties that may use different platforms.

100 PER CENT EBL BY 2030

The carriers' commitment to 100 per cent eBL by 2030 illustrates a readiness for change. 2030 is an aggressive target, but the standards to enable interoperability, and therefore streamline processes, are available, therefore the time to act is now. While a universal approach to legal and platform interoperability is still being worked through, viable options are available now for adopting eBL. Shippers and banks can start working with carriers and IPG&I-approved solution providers to switch from paper to eBL.

DCSA was established in 2019 to be the de facto standards body for the container shipping industry, and the carrier commitment to 100 per cent eBL epitomises the purpose of our organisation. Transforming document exchange through eBL will accelerate the digitalisation of container trade to benefit all shipping customers, providers of ocean shipping services and maritime supply chain stakeholders.

However, realising the far-reaching benefits that can be gained from universal eBL will require wide industry collaboration. Through collaboration and industry alignment, we can drive digital transformation of eBL and the container shipping industry, which will ultimately transform international trade.



"2030 IS AN AGGRESSIVE TARGET, BUT THE STANDARDS TO ENABLE INTEROPERABILITY, AND THEREFORE STREAMLINE PROCESSES, ARE AVAILABLE, THEREFORE THE TIME TO ACT IS NOW."

ABOUT THE AUTHOR:
As Program Director, Niels is responsible for the development of digital standards for DCSA's Data & Interface and Industry Blueprint initiatives. Niels works with carrier members and other industry stakeholders to align standards with common industry practices and promote adoption.

Prior to joining DCSA, Niels served with Deloitte Consulting for 14 years as a digital transformation consultant for companies such as Adidas, Ikea, Dutch Railways and Shell. He was also Operations Director for an Augmented Reality start-up for two years.

Niels has an M.Sc. in Information Management from the University of Tilburg and completed an Executive Education program at Nyenrode.

ABOUT THE ORGANISATION:
Digital Container Shipping Association (DCSA) is a neutral, non-profit group founded by major ocean carriers to digitise and standardise the container shipping industry. With the mission of leading the industry towards systematic collaboration, DCSA drives initiatives to make container transportation services transparent, reliable, easy to use, secure and environmentally friendly.

DCSA's open-source standards are developed based on input from DCSA member carriers, industry stakeholders and technology experts from other industries. DCSA member carriers include: MSC, Maersk, CMA CGM, Hapag-Lloyd, ONE, Evergreen, Yang Ming, HMM and ZIM.

ICTSI EXPANDS INTERMODAL SERVICES AT THE PORT OF MANZANILLO

"BLOCK TRAINS CAN HAVE A SIGNIFICANT IMPACT ON CONTAINER TERMINAL OPERATIONS IN TERMS OF EFFICIENCY, THROUGHPUT, COST SAVINGS AND CARBON REDUCTION."

Jose Antonio Contreras,
CEO, CMSA

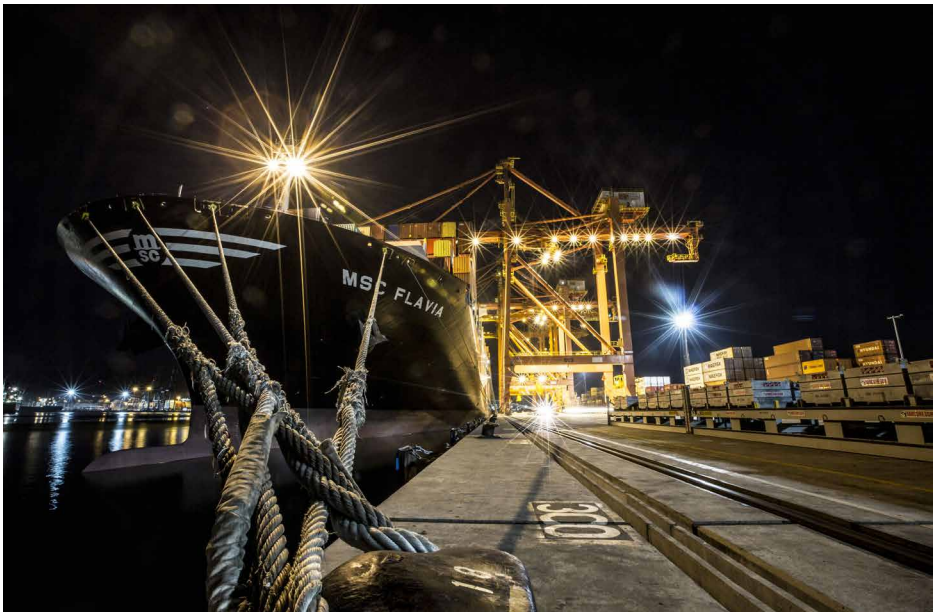
Contecon Manzanillo SA (CMSA) in Mexico expanded intermodal service at the Port of Manzanillo with the operation of the first block train of Walmart de Mexico. CMSA, International Container Terminal Services, Inc.'s (ICTSI) business unit operating the Specialized Container Terminal of the port's North Zone, coordinated with French liner CMA CGM and conglomerate Grupo México in the launch of the intermodal service last February.

The block train, fully dedicated to CMA CGM, transported a total of 216 containers – 202 of which were unloaded at Walmart's depot in Cuautitlàn. The operation is part of CMA CGM's third block train service in Mexico and serves as another milestone for CMSA, which recently obtained certification as the country's first carbon-neutral port.

"Through our collaboration and high-level connection with CMA CGM and Grupo México, we promote a new stage in the transport of cargo by train in Mexico. The service offers direct routes and takes 29 hours from point to point. This operation enabled us to cut 88.5 tons of carbon emissions and help the environment," said Anders Kjeldsen, ICTSI Senior Vice President for the Americas.

Block trains can have a significant impact on container terminal operations in terms of efficiency, throughput, cost savings and carbon reduction. Unlike trucks, trains can move more cargo in a single journey while producing less emissions.

"We are proud of the successful launch of our third block train service here in Mexico from Manzanillo with the support of Contecon Manzanillo and Ferromex. We are focused on further reducing our carbon footprint and will continue to operate more block trains here In Mexico," said Javier Moreira, CMA CGM General Manager in Mexico.



ABOVE
Expanded rail operations contribute to reduced carbon emissions at the terminal.

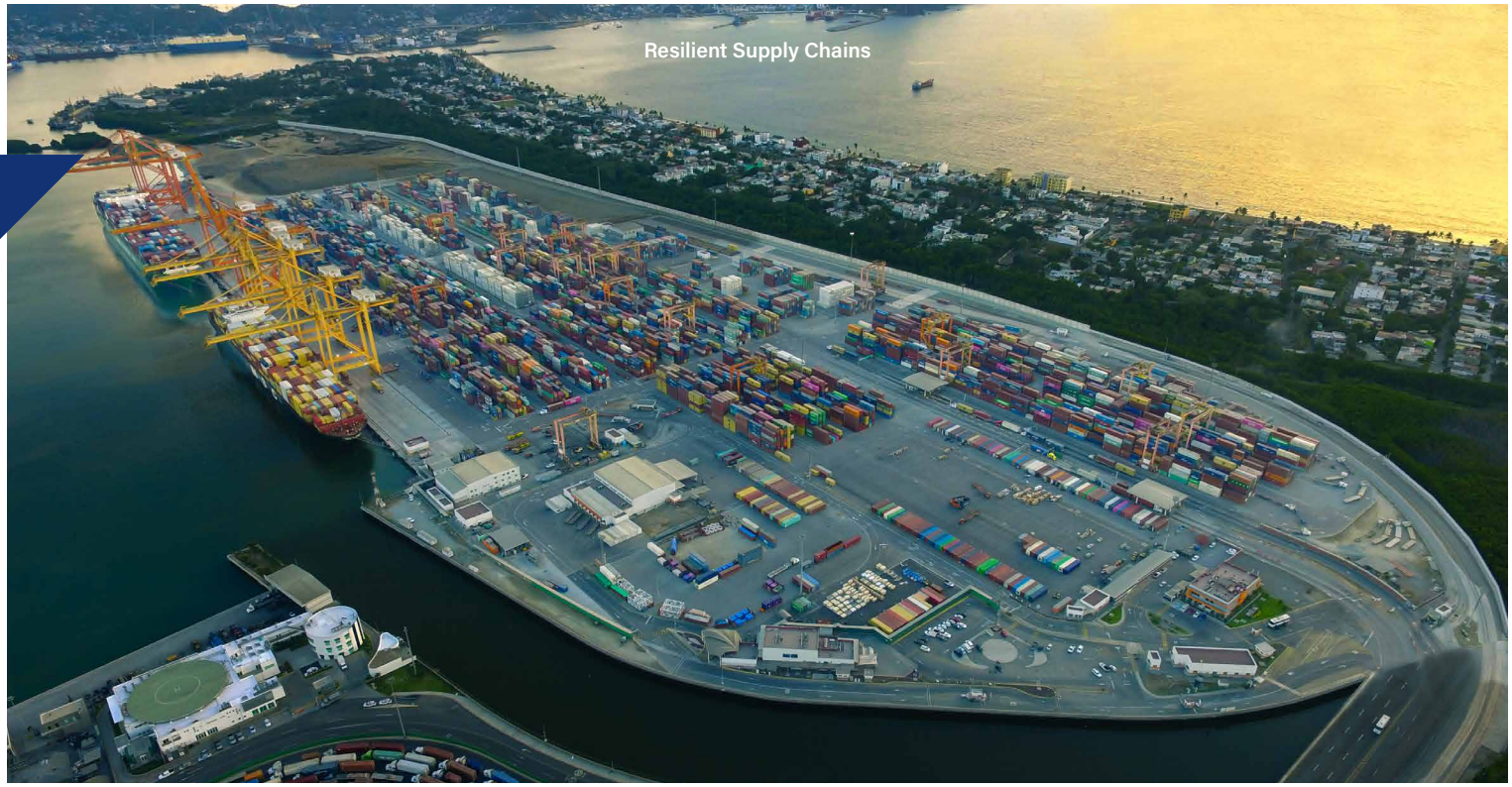
The service significantly improved transit times of intermodal cargo and reduce congestion and accessibility issues of roadways at the port.

CHALLENGES AT THE PORT OF MANZANILLO

The Port of Manzanillo has faced several challenges in recent years, including the logistics crisis and peak volumes caused by the pandemic, as well as port closures resulting from strict lockdowns in China. These challenges led to increased pressure on the port's capacity, resulting in congestion and delays.

To address these challenges, CMSA is investing $230 million to expand the terminal facilities with a new berth and yard, and purchase new container handling equipment. This expansion will increase the capacity of the port by 500,000 TEU over the next three years, with the first phase expected to be completed by December 2024.

Despite the challenges faced by the port, CMSA has remained committed to providing its customers with reliable and efficient supply chain solutions. The expansion of the port's terminal facilities will enable it to handle more cargo and reduce transit times, while the new access road will improve accessibility and reduce congestion. These investments will



position the port to better serve its customers and continue to grow in the years to come.

Moreover, the port authorities in Manzanillo (ASIPONA) have also started the construction of a new access road in February 2023, which is expected to be completed by March 2024. This new access road will improve the connectivity and accessibility of the port, enabling a smoother flow of traffic and reducing congestion in the area. These developments will help address some of the challenges associated with container transportation at the Port of Manzanillo.

ABOVE
The ongoing expansion at CMSA will create 600 new jobs.

PARTNERSHIP WITH CMA CGM

The partnership between CMA CGM and CMSA is a key development for the port. In 2020, CMA CGM moved its operations to Manzanillo, which initially faced several challenges due to the onset of the pandemic. However, through close collaboration, the two companies were able to overcome these challenges and provide good services to their customers despite the market complexities created by the pandemic.

Since the move, the partnership has continued to grow, with both companies working closely together to strengthen and improve their operations and provide their customers with a reliable and efficient supply chain solution. The partnership has enabled CMA CGM to leverage CMSA's state-of-the-art infrastructure and technology to better serve its customers.

Moving forward, the partnership is expected to continue to grow and evolve, with both companies exploring new opportunities to improve their services and expand their operations. This collaboration has enabled CMSA to attract new customers and retain existing ones, while also contributing to the growth and development of Mexico.

CMSA also continues to work very closely with other shipping lines such as MSC and COSCO for solutions that will further benefit their customers.

CARBON REDUCTION IMPACTS

CMSA is committed to reducing its carbon footprint and has implemented several measures to achieve this goal. These include investing in eco-friendly equipment, using renewable energy sources and implementing energy-efficient practices. CMSA recently obtained certification as the first carbon neutral port in Mexico. This certification is a testament to the company's commitment to reducing its impact on the environment.

The carbon reduction impact of these measures has been significant, with the port reducing its emissions and contributing to a cleaner environment. Additionally, CMSA

"THE EXPANSION OF THE PORT'S TERMINAL FACILITIES WILL ENABLE IT TO HANDLE MORE CARGO AND REDUCE TRANSIT TIMES, WHILE THE NEW ACCESS ROAD WILL IMPROVE ACCESSIBILITY AND REDUCE CONGESTION."

is continually exploring new and innovative ways to reduce its carbon footprint further. These efforts will not only benefit the environment but will also position the port as a leader in sustainable port operations, attracting environmentally conscious customers and improving its reputation in the industry.

WHAT'S NEXT IN MANZANILLO?

CMSA will be investing in additional rail infrastructure as part of its expansion plan, increasing the current 2-kilometre on-dock railway to 5 kilometres. This will further improve the efficiency and capacity of the port's intermodal operations, enabling it to handle more cargo and reduce transit times further. These investments demonstrate CMSA's commitment to provide a reliable and efficient supply chain solution, while also reducing the port's carbon footprint and improving its sustainability credentials.

CMSA continuously looks for ways to expand its services and provide its customers with a seamless supply chain. It has expanded its services to provide door-to-door logistics solutions, enabling the port to provide customers with a one-stop shop for their logistics needs from the port to the end destination.

This expansion has been achieved through strategic partnerships in logistics infrastructure, including transportation and warehousing. By providing door-to-door logistics solutions, the port can offer its customers greater flexibility, increased efficiency, and reduced costs.

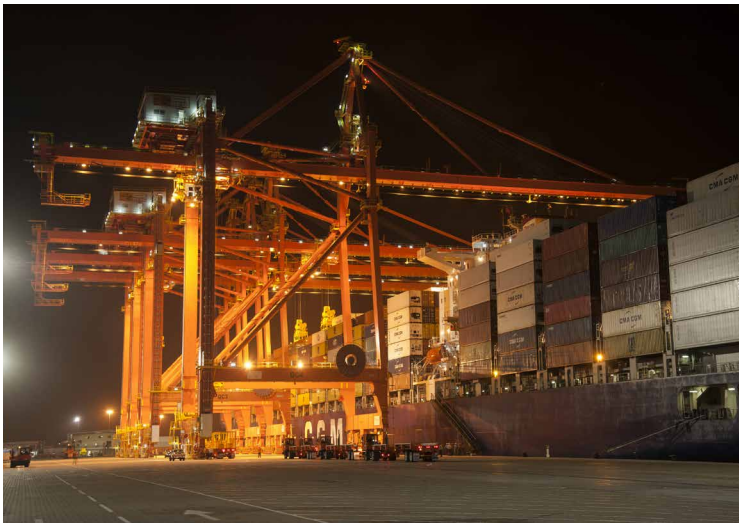
Additionally, this expansion of services enables the port to attract new customers and further improve relationships with existing ones by offering a more comprehensive range of services.

ABOUT THE AUTHOR :

Jose Antonio Contreras is currently the Executive CEO at CMSA, with more than 20 years of proving success delivering shareholder value, change management, leadership development and, revenue growth.

Jose is a robust problem solver recognised for maximising performance by implementing strategies in order to gain a competitive position, emerging political issues and relationships. He also has strong ability to push performance improvement whilst at the same time delivering growth. A dynamic and results-oriented leader with a strong track record of performance in turnaround and high speed organisations in different business sectors, cultures and countries.

RIGHT
Improved intermodal capability will help expedite the flow of cargo from the Port of Manzanillo to Mexico's main distribution centers.



"THESE EFFORTS WILL NOT ONLY BENEFIT THE ENVIRONMENT BUT WILL ALSO POSITION THE PORT AS A LEADER IN SUSTAINABLE PORT OPERATIONS."

ABOUT THE ORGANISATION:

Headquartered and established in 1988 in Manila, Philippines, International Container Terminal Services, Inc. (ICTSI) is in the business of port development, management and operations. ICTSI's portfolio of terminals and projects are located in developed and emerging market economies in the Asia Pacific, the Americas, and Europe, the Middle East and Africa. Independent with no shipping or consignee-related interests, ICTSI works and transacts transparently with all stakeholders of the supply chain. ICTSI continues to receive global acclaim for its public-private partnerships, which are focused on sustainable development, and supported by corporate social responsibility initiatives.

In June 2010, ICTSI signed a 34-year concession for the development and operation of the Second Specialized Container Terminal (TEC-II) at the Port of Manzanillo in Mexico. ICTSI established a subsidiary, Contecon Manzanillo SA de CV to operate the Port of Manzanillo. Ideally located to serve the growing Asian trade, CMSA is Mexico's gateway to the Pacific Coast and is close to major consumer markets, such as Mexico City and the country's largest industrial areas.

MARITIME SINGLE WINDOW: EMBRACING PORT CALL DIGITALISATION

Julian Abril Garcia,
Head of Facilitation Section,
IMO

At a recent joint symposium organised with the International Association of Ports and Harbors (IAPH) and BIMCO, and hosted by International Maritime Organization (IMO) to mark one year until it is mandatory for ports in Member States to operate Maritime Single Windows (MSWs) for the electronic exchange of information, a senior development official commented: "Given the importance, one is a little surprised at the lack of progress".

Observers might suggest that, as with so much over the last few years, the COVID-19 pandemic has delayed work on reaching this goal but in many cases, in fact, rather than involuntarily applying the brakes, the urgent need to reduce human contact caused by the pandemic became an unexpected driver towards digitalisation.

The international maritime sector must continue to build on that momentum if ports across the world are to hit the 1 January 2024 deadline as mandated by the FAL Convention.

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 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.

Efficient digital visibility across port operations assists, too, with our vital ongoing mission to decarbonise international shipping.

RIGHT
IMO Headquarters
©IMO

"EFFICIENT DIGITAL VISIBILITY ACROSS PORT OPERATIONS ASSISTS, TOO, WITH OUR VITAL ONGOING MISSION TO DECARBONISE INTERNATIONAL SHIPPING."

Ports are a crucial interface between the maritime and onshore supply chain, and IMO is involved on both sides of that relationship. In order that nobody is left behind, we are encouraging ports with valuable experience of operating their own MSWs to share it with those still at 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.

Time to accomplish this transformation is now short, but IMO is committed to supporting all Member States find 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

"AS MORE PORTS TRAVEL THIS DIGITALISATION JOURNEY AND SHARE WHAT THEY'VE LEARNT, IT BECOMES INCREASINGLY CLEAR THERE IS NO ONE-SIZE-FITS-ALL SOLUTION."

design a Maritime Single Window system specifically with small island developing states in mind – one, importantly, that can be replicated, modified and adapted as required by other ports facing similar issues.

Another example is IMO's Single Window for Facilitation of Trade (SWiFT) scheme, an initiative of Singapore facilitated by IMO. Under its auspices, prototypes of a digital platform designed for medium-sized ports are being developed by a Singapore Maritime Port Authority/Angola pilot project team based on the Antigua and Barbuda MSW design.

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 13. 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 coordinate 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.

It is not only a case of complying with FAL obligations but also of realising the opportunities for stakeholders that such digital innovation within the port community can bring.

Ports have reported that, since operating a Maritime Single Window, the process of approving customs declarations has shrunk from a few days to a few minutes, and port clearance requests are finalised in less than an hour.

And the benefits can extend further: some systems have integrated transport providers beyond the port – trucks and rail – into their platforms, allowing customers to seamlessly track their cargo along more of its route.

As more ports travel this digitalisation journey and share what they've learnt, it becomes increasingly clear there is no one-size-fits-all solution. The size of port, the types of trade and cargo that utilise it, where procedural bottlenecks occur, and whether any digital systems already exist that could be incorporated into the Maritime Single Window all need to be considered.

The right system for a port might be a stand-alone version, it may involve the public or private sectors – or both. The type of system is almost certainly less important than ensuring that the functionalities it incorporates are appropriate and effective for the scenario in which it operates.

Those who have successfully implemented Maritime Single Windows advocate for "up-stream" planning and piloting of new systems before full utilisation. Remember to build in safeguards against possible cyber-attacks. Be willing to listen to feedback from those who use the system and be prepared to adapt as technology develops. Not least, make sure all stakeholders are on board – some of the greatest challenges might not involve the technology but the management of change.

ABOVE
Ships at berth
©IMO

There is no doubt this is an ambitious programme of global ports digitalisation. IMO is resolute that it must happen, and the clock is ticking. But help is available. We will support Member States to realise our common goal of a streamlined digital port call sector and to seize the huge opportunities that digital future offers.

ABOUT THE AUTHOR
Julian Abril Garcia is Head of the Facilitation Section at the International Maritime Organization (IMO) where his responsibilities include working with Member States to ratify and implement the Convention on Facilitation of International Maritime Traffic. He is expert in maritime safety and security, facilitation and the human factor on a national and international level. Before he joined IMO in 2011, Julian Abril Garcia worked with the Spanish Maritime Administration and in merchant shipping, and holds a Master's degree in Merchant Marine from Cadiz University in Spain.

ABOUT THE ORGANISATION
The International Maritime Organization is a specialised agency of the United Nations which is responsible for measures to improve the safety and security of international shipping and to prevent pollution from ships. It is also involved in legal matters, including liability and compensation issues and the facilitation of international maritime traffic. It was established by means of a Convention adopted under the auspices of the United Nations in Geneva on 6 March 1948 and met for the first time in January 1959.

INTERMODAL EVOLUTION. RETROFITTING HARDWARE AND EXPANDING IN EFFICIENCY



Dr. Eva Savelsberg, Senior Vice President, INFORM, **Alex Van Winckel**, Director of Strategic Relations and Sales, INFORM, and **Matthew Wittemeier**, Director of Marketing and Sales, INFORM

There is a push in nearly all developed countries to move containerised cargo off roads and onto rail. This modal shift from road to rail is fueled by industry, consumer, political, and social pressures. While this is arguably a good outcome for nearly all stakeholders, at least one player, our intermodal terminal operators, are being moved into a direction where their operations must evolve to adapt to the increased volumes they are seeing today and that are being incentivised in the near future. In this article, we'll look at some of the core pressures behind the modal shift and how intermodal terminal operators can address the challenge of increased volumes most efficiently and cost-effectively.

UNDERSTANDING THE PRESSURES

A quick Google search of "rail vs truck which is better" returned over 49 million responses, and when you look at the first page of results (mostly reputable sources), it becomes clear that the primary advantage of rail vs. trucking is the significant cost and CO2 reductions possible.

According to the US Congressional Budget Office, the average cost to move cargo via rail was about 5.1 US cents per tonne-mile (3.3 Euro cents per tonne-kilometre) compared to 15.6 US cents per tonne-mile (10.2 Euro cents per tonne-kilometre) via truck. Furthermore, the report outlined that the external costs (e.g., road maintenance vs. track maintenance, congestion, etc.) were, on average, 7.5 times cheaper for rail over road transport.

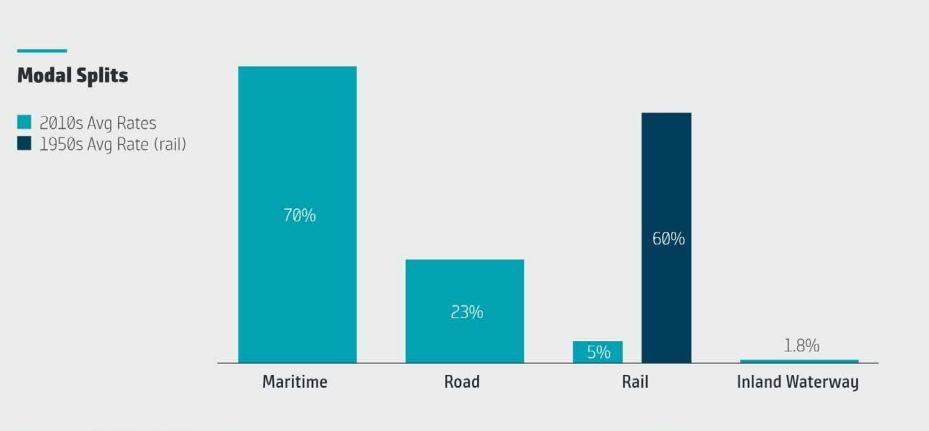


FIG 1.
Modal Splits

Also, according to a German government calculation, in Europe, the average freight train emitted around 18 grams of CO2 per tonne-kilometre (12 grammes of CO2 per tonne-mile), which was 16 times better than the average truck, which comes in at 112 grammes of CO2 per tonne-kilometre (77 grammes of CO2 per tonne-mile).

But there are other factors at play here. In many developed countries, attracting and retaining long-haul truckers is a significant issue, with access to skilled labour at all-time lows. Increased trucking congestion at many maritime terminals is also fueling a move towards rail. With the sharp rise in e-commerce over the past decade, consumers are demanding lower-cost goods with low- or no-cost shipping, adding further pressure to margins in supply chains that were already tight. Since the start of COVID-19 in 2020, the supply chain has been front and centre on the world stage and socially, Western societies are adding a lot of pressure onto logistics providers to improve their operations, build in transparency, focus on environmentally greener transport methods, and improve working conditions for supply chain "essential workers."

Combined, all of the pressures have created the perfect storm, so to speak, pushing politicians to prioritising cargo movement over rail and subsequently making funding available for stakeholders who are ultimately affected by these new changes. Over the past 10 years, the modal split of freight transport across Europe has largely remained unchanged at roughly 70 per cent maritime, 23 per cent road, 5 per cent rail, 1.8 per cent inland waterways, and 0.2 per cent air. Compared to the 1950s, when rail accounted for nearly 60 per cent of freight movements in Europe, this is a marked decline (see figure 1). The European Union (EU) plans to double rail's modal share by 2030, which would equate to a nearly 6 per cent increase in freight volumes

per year for intermodal terminals to accommodate.

INTERMODAL TERMINALS MUST EVOLVE

What is great news for consumers, shippers, and politicians translates into challenges for our intermodal terminal operators. They will need to evolve to accommodate the desired growth in the industry at a significant rate. To help them, government funding is available for projects across their terminals, including purchasing land, construction, improvement of rail track systems, improvement of road infrastructure, retrofitting of existing handling equipment, and the purchase of new handling equipment. All of these avenues are proven ways to add capacity and improve operational efficiency for terminal operations. However, we want to focus on the two that show the strongest return on investment (ROI) potential in our calculations – retrofitting and expanding efficiency.

WHY YOU SHOULD RETROFIT

Compared to the other options for expanding capacity and improving operational efficiency, retrofitting provides the strongest ROI for three reasons:

- **Builds on Existing Investments** – retrofitting leverages your existing equipment investments, allowing for a continued ROI on existing infrastructure assets.
- **Fast Project Cycles** – retrofitting is the quickest path to going live, starting the return period quickly. Lead times for new hardware are measured in months, and for cranes, years. Skipping new hardware

ABOVE
KTL Kombi-Terminal Ludwigshafen GmbH intermodal terminal, Ludwigshafen, Germany.

"COMPARED TO THE OTHER OPTIONS FOR EXPANDING CAPACITY AND IMPROVING OPERATIONAL EFFICIENCY, RETROFITTING PROVIDES THE STRONGEST ROI."

investments drives the time to go-live down decisively. Furthermore, retrofitting existing assets is much quicker than building up and commissioning new hardware.

- **Risk Is Compartmentalised** – any project on your terminal has some degree of risk, and retrofitting is no exception. However, the risk is compartmentalised for two reasons. One is that you're not making significant physical changes to your terminal's steel and concrete. Changes that aren't effective (while unlikely) can be rolled back more easily to a proven operating structure. The second is that you're changing smaller elements of your operation. The risk of compounding issues is smaller.

There are multiple paths for retrofitting that can be explored. Existing cranes can be retrofitted with renewed drives and/or cranes can be upgraded on your path toward automation. Retrofitting renewed drives will lower maintenance OPEX costs, provide a better overall performance, and lighten the environmental footprint of the lift hardware. These are the basics, but they start to paint the picture. Talk to your hardware manufacturer to get a fuller picture.

When we look at retrofitting crane hardware to provide automation, there is a prominent hardware provider with a solid stepwise solution. The first step is to move operators from the crane cabins to a remote operating station centrally located. Typically, this is done in a one-to-one format. Over time, more elements of the crane's operations can be automated, and eventually, you move to a one-to-two or even a one-to-three operator-to-crane configuration for operations, streamlining your ops. Aside from the obvious cost savings, there are immediate benefits to the lift staff's workplace health and safety. Both of which are positive outcomes for the humans in the equation.

EXPANDING EFFICIENCY

Like retrofitting, expanding efficiency is a quick path to improving operational efficiency and expanding a terminal's handling capacity. Expanding efficiency looks at the other side of the hardware/software equation and focuses on improvements that can be reached through software investments. The same advantages that are highlighted above for retrofitting hardware apply to software-based projects: you're building efficiency into your existing investments (including your new retrofit investments), the project timeframes are fast (measured in months as opposed to years), and through dedicated add-on optimisation modules, the risk is highly compartmentalised. Finally, the cost of software-based projects is comparatively small, even when compared to retrofitting, meaning a lower starting point for your ROI calculations.

In essence, optimisation solutions provide terminals with the ability to "milk their assets," squeezing the most out of their infrastructure investments – both concrete and steel. Smart AI and Operations Research (OR) algorithms can consider a vast amount of information in real-time. Compared to a human operator, an algorithm can process hundreds of transactions with dozens of variables without breaking a sweat. As much as 90-95 per cent of daily operations can be automated or supported in a more manual operation, with dedicated add-on optimisation modules, freeing up human operators to focus on the 5-10 per cent of decisions that require a human touch. This allows operators to move from being purely reactive to managing their operations in a proactive, exception-based way, significantly improving performance and bottom lines. Optimisation can be applied to yard stacking, horizontal transport operations, lift equipment, crane operations, and train load planning.

BUILDING OUT YOUR CRANES

If we continue the logic of improving crane operations, after retrofitting your existing cranes with renewed drives and implementing remote operation stations, the cranes will be able to move into a semi-automated mode of operation. To achieve this, you will require a software solution to sequence job orders. The typical terminal operating system (TOS) will build a job sequence, but it is almost guaranteed to be a first-in / first-out logic which is highly inefficient. Instead, an optimised work queue should be built for each crane that is online, considering the crane's real-time position, existing workload, and handling capabilities and matching these to the operation's desired optimisation goals (e.g., reduce empty travel, maximise performance, prioritise customer X, etc.).

DELIVERING OPTIMISATION

INFORM is a proven partner in delivering optimisation powered by AI and OR. With proven solutions for both maritime and intermodal terminal operators, we have a 25-plus-year track record of delivering operational efficiency for our customers. For intermodal terminal operators globally, we deliver our market-proven optimisation as an add-on to their existing TOS (again reducing cost, complexity, and time to market – think retrofitting your existing TOS). In Europe, we also have a bespoke TOS, our Syncrotess Intermodal TOS, which is built with our market-leading optimisation at its core. Finally, for those operators who have older equipment that hasn't necessarily got the in-built "smarts" or equipment control system (ECS), INFORM can help deliver this advanced component into your technology stack. Any of these approaches fit the existing funding models currently available in Europe. If you are not sure, you should reach out to our helpful team and have an obligation-free

“OPTIMISATION SOLUTIONS PROVIDE TERMINALS WITH THE ABILITY TO “MILK THEIR ASSETS,” SQUEEZING THE MOST OUT OF THEIR INFRASTRUCTURE INVESTMENTS – BOTH CONCRETE AND STEEL.”

conversation. We’re more than happy to point you in the right direction once we understand your challenges and goals.

THE WEAKEST LINK

We have routinely spoken about the need for investment in our hinterlands. While your maritime cousins often attract the attention with their shiny new investments in technology, the supply chain is only as strong as its weakest link. The current investment into intermodal terminals is a welcome change for the industry allowing the supply chain to improve collectively. As intermodal operators move down this path, it is important to not only try and emulate their bigger maritime cousins, but to look for proven venders in the intermodal space as the small differences in operations are important details that lead to big differences in your bottom lines.

ABOUT THE AUTHORS:
Dr. Eva Savelsberg is Senior Vice President of INFORM's Terminal & Distribution Center Logistics Division. She specialises in optimisation software that renders a wide range of operational processes which are more productive, agile, and reliable. Eva is also a lecturer at the University of Aachen (RWTH), where she received her Ph.D. in Mechanical Engineering in 2002. Eva has published five books and over 40 papers on innovation in freight transportation.

Alex van Winckel is Director Strategic Partnerships and Sales at INFORM's Terminal & Distribution Center Logistics Division focusing on how to drive optimisation in the logistics sector. Starting his career with INFORM in 2008, he has acquired 15 years of logistics industry knowledge working on projects for HHLA, UK Mail, Hermes, Posten Norge, and APM Terminals.

Matthew Wittemeier is Director Marketing and Sales at INFORM's Terminal & Distribution Center Logistics Division, where he’s become a thought-provoking contributor to many industry publications and conferences. He’s co-author of the multi-award winning 2038: A Smart Port Story – a novella about the future of technology and the social challenges it may bring.

ABOUT THE ORGANISATION:
INFORM specialises in AI and optimisation software to improve operational decision-making. Based in Aachen, Germany, the company has been in the optimisation business for 50 years and serves a wide span of logistics industries, including maritime, intermodal, and inland terminals. With a broad range of standalone and addon software modules, INFORM’s unique blend of algorithmic-based software expertise, rich industry experience, and big-world thinking delivers enormous value for their customers.

MAIN
Kuenz FREERIDER RTGs at Norfolk Southern´s Austell Terminal

ENERGY STORAGE SYSTEMS ON CRANES ENABLE SUSTAINABLE SOLUTIONS FOR INTERMODAL TERMINALS

Philipp Gmeiner,
Product Manager, Kuenz

The intermodal industry is constantly on the lookout for new solutions to make operations more sustainable. For terminal operators, it is vital to reach their sustainability goals and at the same time improve their performance and cost-efficiency. With new approaches, a fully electric power supply for container handling equipment can be achieved, also in exceptional cases where it was not possible before.

THE INTERMODAL FACILITY OF NORFOLK SOUTHERN IN AUSTELL

Norfolk Southern Corporation is one of the biggest railroad carriers of the United States with many terminals on the East Coast. One of these intermodal terminals is located in Austell just outside Atlanta, Georgia. At this terminal, a major transition takes place – going from "Wheeled operation only" to a combination of "Wheeled operation" and "Ground stacking operation". So one part of the terminal will be operated by six Kuenz Freerider Rubber Tyred Gantry Cranes (RTGs), which are not only capable of loading and unloading trucks and trains, but also of handling a container stack. With this transition, the space of the terminal will be used more efficiently and as a result, the terminal will more than double its international intermodal capacity.

The Kuenz Freeriders feature the well-known gantry design with an exceptionally stiff and aerodynamic structure. Moreover, an innovative and stiff hoist system with a micro-motion system directly on the trolley and a rotating spreader improves the canes´s productivity. Additional assistance systems such as an anti-collision system and camera views complete the crane features.

However, one of the most important aspects in choosing the best RTG solution for a terminal is missing from this list – the power supply.

SYSTEMATICALLY TO THE MOST SUITABLE SOLUTION

In the operation existing today, mainly diesel gensets are the power source for the RTGs. The main problem of an RTG powered by a conventional diesel genset is that the size of the diesel engine is determined by the peak power demand, which occurs only in very specific situations. This means the electric output power of the genset has to be more than 400 kilowatts. However, during most of the operational time, the genset is immensely oversized which leads to very high fuel consumption and emissions. As well as additional challenges through high noise levels and maintenance efforts due to the large capacity genset.

The next and obvious consideration is about a combination of a smaller diesel genset and a Lithium-ion battery as an energy storage system – also known as a diesel-electric hybrid solution. The advantages are manifold. In this case, the diesel genset is only used to charge the battery. Therefore, the required power is much lower (120 kilowatts electrical output) and the power demand is at a constant level. Moreover, the diesel engine runs only around 50 to 70 per cent of the operational time. The battery is not only charged by the genset, but also by recuperation and reuse of the energy from braking and lowering the loads. This feature increases the savings regarding fuel consumption even more so that in total the savings reach up to 60 per cent. Reduced fuel consumption consequently means a decrease concerning emissions. Compared to the above-mentioned large capacity genset, this hybrid solution would have led to an annual reduction of carbon emissions of more than 1,000 tonnes for six cranes. Taking

"THESE ELECTRIC CRANES NOT ONLY SUPPORT CAPACITY EXPANSION, BUT THEY ARE ALSO MORE RELIABLE AND WILL REDUCE OUR CARBON EMISSIONS."

ABOVE
All-electric hybrid solution

"With the help of Kuenz, we are installing six new, fully electric cranes at our Austell Intermodal terminal," said Norfolk Southern Director Terminal Operations, Brad Carper. "These electric cranes not only support capacity expansion, but they are also more reliable and will reduce our carbon emissions. Through increased reliability, our customers will have a better experience. Ultimately, this technology will help enable Norfolk Southern to unleash the power of our Intermodal franchise and grow into the future."

all aspects including maintenance effort into account, the amortisation period for adding the diesel-electric hybrid solution is typically between two and three years.

However, the diesel-electric hybrid is often only an intermediate consideration. Also for Austell the real goal was a zero-emission operation with fully electric RTGs powered by cable reels. Besides the tremendous reduction in operational costs, there is also the benefit of a physical connection to the terminal network via fiber optics in the cable. Especially to establish the possibility for an upgrade to remote operation at a later stage, fiber optics are the best and most reliable solution for communication between the cranes and the terminal network.

Usually, the way to go is a cable reel with a medium-voltage supply using a voltage level of for example 15 kilovolts. Powering the cranes by means of medium-voltage offers the advantage that high power levels can be distributed to the cranes while the cable cross section can be kept relatively small and therefore light and cost-effective.

Nevertheless, for many intermodal facilities it can be very challenging to enable a medium-voltage power grid, which would often lead to excessive infrastructure costs. This was also the case at the facility in Austell. So the requirement was that the cranes should be powered by means of a low-voltage supply with 480 volts and furthermore with a maximum shore power of 100 kilowatts. On the other hand, the peak demand of each crane is more than four times higher. Therefore, Kuenz came up with the idea to implement an energy storage system on each crane.

THE WIDESPREAD BENEFITS OF THE ALL-ELECTRIC HYBRID SOLUTION

A Lithium-ion battery is used as an energy storage system. It is charged on the one hand by the shore power and on the other hand by recuperation and reuse of the energy from braking and lowering the loads. So all the recuperation energy is directly reused on the crane and the demand from the shore power is kept at a constant level of 100 kilowatts. The peak demands of the drives are provided by the energy storage system.

In comparison to conventional RTGs, carbon emissions from the diesel engines are entirely eliminated which results in an enormous reduction of more than 2,100 tonnes CO2 for six cranes per year. Furthermore, the operational costs are cut tremendously. On the one hand, because there are no costs for diesel fuel, and on the other hand because of much less maintenance effort and downtime.

Moreover, the noise level is reduced significantly and the battery system provides power whenever the cranes are disconnected from the shore power. For example, when the cranes are changing lanes or driving to a maintenance location. Otherwise, another small genset or small battery would be necessary to provide power for these maneuvers.

"THE APPLICATION AT THE TERMINAL IN AUSTELL SHOWS THAT THE ENERGY STORAGE SYSTEMS MAKE IT POSSIBLE TO POWER THE CRANES WITH LOW-VOLTAGE AND WITH A POWER LEVEL OF ONLY 100 KILOWATTS."

FURTHER APPLICATIONS AND OPTIONS

For fully electric powered RTGs there are two main solutions for the shore power supply – cable reel systems and conductor rail systems (also called bus bar systems). Also for the latter one, an all-electric hybrid system can be realised. In this case, the lower and constant power demand enables the advantage of reduced costs concerning the conductor rail system itself.

If it is expected that block changes or lane changes have to be executed very often, there are suitable automated solutions available for both power supply systems. Then the RTG automatically disconnects and connects to the shore power supply before and after the block change.

THREE KEY REASONS FOR IMPLEMENTING ENERGY STORAGE SYSTEMS ON CONTAINER CRANES

All reasons are applicable not only for RTGs but also for Rail Mounted Gantry Cranes (RMGs), which is a new approach in the industry.

- **Lowering the voltage level:** The application at the terminal in Austell shows that the energy storage systems make it possible to power the cranes with low-voltage and with a power level of only 100 kilowatts. Besides the benefit of avoiding excessive infrastructure costs for a medium-voltage supply, the low-voltage supply may provide additional advantages in other use cases. If redundancy is essential, the low-voltage level grid can be backed up by means of one or more stationary gensets. Furthermore, the maintenance work for medium-voltage equipment requires specially trained staff, which is not the case for low-voltage.

- **Peak shaving:** The objective of peak shaving is the minimisation or even avoidance of power peaks. The reduction of power peaks concerning the RTGs in Austell is already described above. But also for large RMGs an energy storage system leads to a significant decrease regarding peak demands and therefore can reduce so-called peak demand charges as well as subsequently operational costs. For example, the short-term power peaks of large RMGs, which are higher than 900 kilowatts, can be lowered by 50 per cent. The demand charges are usually calculated based on the average power level within a 15-minute interval. These average power levels can be reduced by 30 to 40 per cent.

- **Keeping the energy on the crane:** For terminals with a stable power grid and multiple cranes, the energy from recuperation usually is directly used by other cranes or further terminal systems such as lighting or reefer racks. Then the overall power demand is subsequently close to a constant level. However, for terminals with few cranes and where recuperation to the grid is not feasible or not cost-effective, an energy storage system on the crane is advantageous as well. Through this, the regenerated energy from the drives is stored in the battery and the overall energy expenses are reduced. Typically, up to 30 per cent of the energy can be stored and reused. Especially in times of rising energy costs, this is an important aspect.

ABOUT THE AUTHOR:
Philipp Gmeiner is in charge of Product Management for container cranes at Kuenz. Previously he worked for several years as Senior Mechanical Engineer at Kuenz and has a background in Sales Engineering and Project Management for commercial vehicles.

He studied at the Vienna University of Technology and KTH Royal Institute of Technology in Stockholm and has a Master's degree in Mechanical Engineering & Management.

ABOUT THE ORGANISATION:
Kuenz, founded in 1932, is one of the oldest mechanical engineering companies in western Austria. As one of the leading innovators in crane construction, the company has established itself as the market leader in Europe and North America. Besides its headquarters in Hard, Austria, Kuenz employs around 500 people at six other locations in Austria, Slovakia, Italy, Belgium and North America.

MSC ID-BASED CONTAINER PICK-UP: ENHANCING SECURITY OF SUPPLY CHAINS TO KEEP TRADE FLOWING

"WE ARE PROUD TO INTRODUCE ID-BASED CONTAINER PICK-UP, WHICH PROVIDES INCREASED SECURITY AND EFFICIENCY FOR EVERYONE IN THE SUPPLY CHAIN. THIS TECHNOLOGY IS THE FUTURE AND WILL HELP TO MAKE PIN CODE FRAUD A THING OF THE PAST."

Marc Beerlandt,
CEO, MSC Belgium

BACKGROUND

On 7 February 2023, MSC Belgium introduced ID-based container pick-up, at MSC PSA European Terminal (MPET) in Antwerp.

This is a critical step for the future of cargo shipping – not just because it makes the process more efficient. The technology protects not only the security of the overall container, but the cargo inside, as well as the security of all personnel interacting with the containers.

Antwerp is a gateway port for trade in Europe, and vitally important for the import/export of goods throughout the region. But this can mean that malicious actors also attempt to use the port for criminal activity. PIN code fraud is a well-known problem in Antwerp, and ID-based pick-up will directly combat it.

ID-based pick-up is a pioneering technology, and the final piece in the puzzle for the holistic Secure Container Release (SCR) application developed by the Antwerp start-up T-Mining.

SCR is the digital representation of the Delivery Order, a document that in many ports was replaced by PIN codes over the last decade. PIN codes were sent to different parties across the supply chain via email, which was quicker than the traditional Delivery Order, but not secure enough for the needs of the supply chain in Antwerp.

SCR digitises and secures the data exchange related to import containers arriving in the port. Typically, data is exchanged between Ocean Carriers, Consignees, Freight Forwarders, Transporters, and Terminals via blockchain, providing a more secure process for this exchange. Ultimately, SCR enables a 100 per cent PIN code-free release process for cargo.

ABOVE
Secure Container Release (SCR) Rollout Phases

"ID-BASED PICK-UP IS A PIONEERING TECHNOLOGY, AND THE FINAL PIECE IN THE PUZZLE FOR THE HOLISTIC SECURE CONTAINER RELEASE (SCR) APPLICATION DEVELOPED BY THE ANTWERP START-UP T-MINING."

DEVELOPMENT OF SCR

The process for developing SCR started in 2017, with a proof of concept developed by MSC Belgium and T-Mining. After a successful development period, and with a green light from headquarters in Geneva, MSC Belgium decided in 2020 to go to market and onboard customers with the first phase of this solution on a voluntary basis: the Secure Release.

SCR facilitates the end-to-end process of delegating the right to pick up a container at the terminal in a highly secured and controlled way via blockchain. Only parties involved in the release chain can both access the release data and transfer the SCR token that represents the pick-up right to another party in the chain. The trail is auditable by the competent authorities if needed, and is accessible only to them and directly connected parties in the release chain.

Longstanding processes don't change overnight, so the strategy was introduced in a phased roll-

ABOVE
MSC PSA European Terminal (MPET)

out enabling SCR to be adopted in steps. Phase 1, called Secure Release, is when the carrier decides to replace the PIN code. The first release party receives the cargo with no PIN code, but a PIN is used further on. Phase 2, Secure Transfer, is when the second cargo transfer can be made without a PIN. Phase 3, the final phase, is ID-based pick-up. This phase enables transporters to assign the right to truckers to pick up a container at the Terminal without using a PIN code.

MSC and MPET are currently the only companies to have reached this final stage, which will improve security across the supply chain.

In this case, for ID-based pick-up the trucker identifies themselves on the terminal using their Port ID "alfapass" combined with a biometric check which is validated by the terminal via the SCR blockchain.

COLLABORATION BETWEEN MSC AND ANTWERP PORT AUTHORITIES

In the second half of 2022, we ran a successful proof-of-concept for this third and last step which ultimately enabled us to further scale up to a full market release. From 1 June 2023, taking a container out from the MPET Terminal will not be possible with a PIN code. All containers transiting through MPET will use SCR and ID-based pick-up.

As we progressed through this journey, MSC were not the only ones to realise that there was an issue with PIN code fraud. The Antwerp Port Authorities also recognised and acknowledged the same challenges, and set out to overcome them. They decided to put the removal of PIN codes into legislation. While MSC went to market voluntarily with Secure Release in 2020, new Port Authority regulation in Antwerp has made the removal of PIN codes obligatory and emphasized biometric pick-up.

The changing regulation means that the focus of everybody involved in the supply chain in Antwerp was shifted towards this issue. While PIN code fraud had clear public visibility, there was relatively low awareness in the involved parties, and change management processes take a long time given the number of stakeholders involved. The shift brought about a new urgency. As the first actors to engage in this area, MSC's SCR and ID-based pick-up technology is fully compliant with all harbour police regulation in Antwerp. Furthermore, the emphasis on biometric information means that the technology is future proofed.

As you can imagine, the timing of this process was not just impacted by changing Port Authority regulation. COVID-19 also was a formidable challenge, as in March 2020 significant IT resources were re-allocated for other uses. By September and October of the same year though, our teams had successfully managed to on-board all relevant parties.

In addition to launching our ID-based pick-up technology, MSC recently signed a joint declaration with the governments of Belgium and the Netherlands, along with other major carriers, for closer collaboration to tackle the issue of illicit trade that has plagued global supply chains. This declaration will see MSC collaborate even further with the port of Antwerp on technology-based security solutions.

GLOBAL UPTAKE OF ID-BASED PICK-UP

This technology is not just applicable to Belgium – it has global use and can be installed in any port around the world. Secure transfer is relatively straightforward to scale up, once the systems are in place. The real question is: "Does it make sense for my port or company to advocate for adoption?" Each port, carrier, or freight forwarder will have specific security needs – but need to act collectively for the benefit of the customers and the safety of their employees. While ID-based pick-up is a bit harder to install, as it has specific hardware requirements, that is often the reality of IT changes. It is our belief that it is the right way to go.

We at MSC are dedicated to solving this problem and we are passionate about keeping trade flows moving and people connected by safeguarding global supply chains. In 2022 alone MSC spent $100 million on measures to improve cargo security. We believe in technology as a solution to not only PIN code fraud, but to wider security issues that we have seen in the industry. Overall, while it took us some time to convince and onboard customers, it soon became clear that it was common sense and is the best way forward. We are proud to be the first to bring this solution to market, and look forward to seeing it expand to ports and terminals across the globe.

ABOVE
Secure ID-Pick Up gate system

"SCR FACILITATES THE END-TO-END PROCESS OF DELEGATING THE RIGHT TO PICK UP A CONTAINER AT THE TERMINAL IN A HIGHLY SECURED AND CONTROLLED WAY VIA BLOCKCHAIN."

ABOUT THE AUTHOR:
Marc Beerlandt has worked for MSC Mediterranean Shipping Company since 1997 when he joined the business as a Sales and Marketing Manager. He became Commercial Director of MSC Belgium in 1999, a position he held until 2010. Since 2010, Marc has been CEO of MSC Belgium and MSC Luxembourg, managing the company's operations and directing its business agenda and organisation.

ABOUT MSC:
MSC Mediterranean Shipping Company, headquartered in Geneva, Switzerland, is a global leader in transportation and logistics, privately owned and founded in 1970 by Gianluigi Aponte. As one of the world's leading container shipping lines, MSC has 675 offices across 155 countries worldwide with over 150,000 employees. With access to an integrated network of road, rail, and sea transport resources which stretches across the globe, the company prides itself on delivering global service with local knowledge. MSC's shipping line sails on more than 260 trade routes, calling at over 520 ports.

For more information visit **www.msc.com**

MAIN
A vessel entering the Port of Port Hedland

A NEW ERA FOR PILBARA PORTS AUTHORITY

Roger Johnston,
Pilbara Ports Authority, CEO

Pilbara Ports Authority (PPA) is the world's largest bulk export port authority, responsible for the ports of Ashburton, Dampier, Port Hedland and Varanus Island. The already large remit is set to expand in the future as four Shipping and Pilotage Act 1967 ports are transferred, and five greenfield ports in the region are developed. In 2021-22, PPA achieved a record 733.1 million tonnes of throughput of which 687.4 million tonnes was iron ore. This result came following a decade of strong performance, with technological advancements and port efficiencies driving continued growth in port capacity. PPA is on track to surpass its record again in the 2022-23 financial year, which would be a fourth consecutive year of record-breaking achievements exceeding 700 million tonnes throughput.

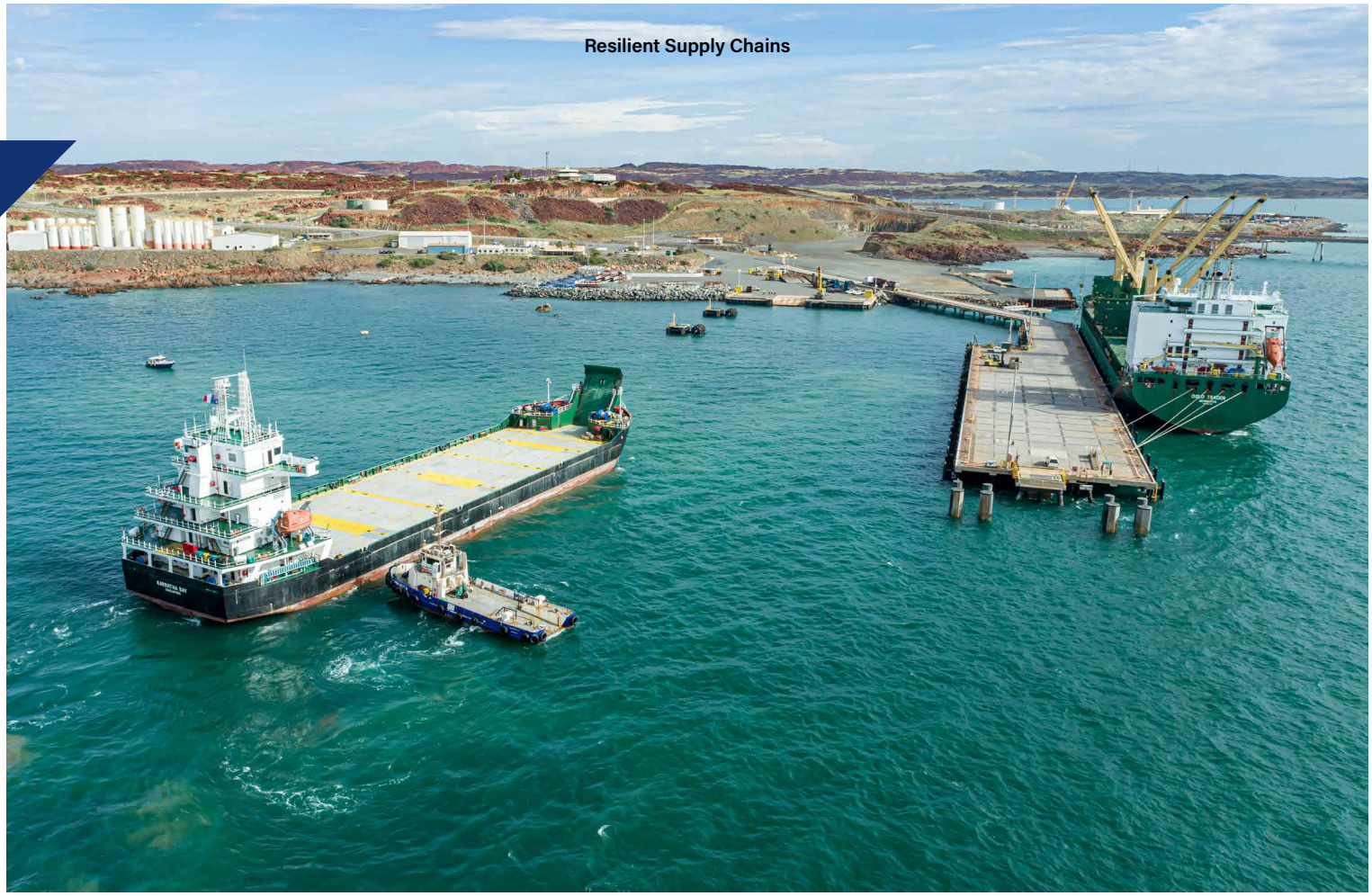
PPA is committed to supporting the throughput aspirations of port users, creating opportunities for growth, building sustainable communities, and delivering strong economic results. In 2021-22, the value of commodities passing through PPA's ports was estimated to exceed $165.8 billion. This was despite the ongoing impacts of the COVID-19 pandemic, experienced by businesses worldwide, which highlighted the need for robust and resilient supply chains.

PPA is embarking on several transformational infrastructure projects to meet the future needs of existing and new port users. To support growth in iron ore exports, PPA has undertaken a review of the Port Hedland Development Plan. The updated Plan has been endorsed by the Western Australian Government and will enable iron ore exports to grow to 660 million tonnes per annum, a 41 per cent increase in capacity compared to the 2012 Development Plan. The review of the plan included a range of technological assessments, including navigation simulations, hydrodynamic studies and scenario testing. The Plan now includes a bulk liquids berth, new common user cargo berths and the development of a new cape size export berth.

"PPA IS ON TRACK TO SURPASS ITS RECORD AGAIN IN THE 2022-23 FINANCIAL YEAR, WHICH WOULD BE A FOURTH CONSECUTIVE YEAR OF RECORD-BREAKING ACHIEVEMENTS EXCEEDING 700 MILLION TONNES THROUGHPUT."

A key part of the updated Plan is the development of Lumsden Point, which will establish two additional berths at the Port of Port Hedland, increasing the total number of berths to 21. While the majority of berths are privately owned and operated, Lumsden Point will provide highly sought after multi-user capacity. As Australia progresses on its plans to reach net-zero, the Pilbara will become a key region for the nation in the generation of wind and solar power. In order to reach this goal, a large amount of cargo will need to be transported into the Pilbara, including wind turbine blades and towers. Due to the size of the wind turbines alone, there is currently no path to import this cargo locally and have it transported to its ultimate location. The new berths at Lumsden Point, with connected access roads and service corridors, will provide a local import path for cargo to support the transition to clean energy.

Another key component of the green energy future is battery manufacturing, an industry that cannot survive without a supply of critical minerals. According to the International Energy Association, each electric vehicle requires six times the mineral resources of a petrol-powered car, equating to more than 200 kilogrammes of minerals per vehicle. The demand for lithium and copper concentrates alone (two of the necessary critical minerals) is expected to grow tenfold by 2030. Western Australia is the only Australian jurisdiction to mine, or have reserves of, all the minerals



used in the manufacture of rechargeable batteries and energy storage systems.

Western Australia is the largest lithium supplier in the world, accounting for 52 per cent of global supply in 2021, a figure which is likely to grow in future years prompting exporters to increase production at existing mines and announce new mines and expansion projects. The development of two new berths at Lumsden Point will allow for additional export capacity for critical minerals, ensuring that Western Australia is well placed to capitalise on forecast growth.

The Port of Dampier will also play a significant role in growing capacity, with PPA progressing plans for a new multi-user facility that will encourage trade diversification and create regional jobs. The Northern Australia Infrastructure Facility announced a $160 million investment in a new wharf, which will be capable of berthing Panamax bulk carriers, as well as cruise ships and cargo vessels to support direct freight shipping between Singapore and the Pilbara.

ABOVE
The Port of Dampier is set to expand with the establishment of a new multi-user wharf

Supporting the uptake of a direct shipping network will reduce the carbon footprint of freight delivered into the Pilbara. Direct shipping between Asia and the Pilbara reduces reliance on trucking products from Fremantle, or elsewhere in Australia, to the Pilbara. Direct freight shipping also has several other benefits, including improving supply chain reliability, reducing gas emissions, traffic congestion and road maintenance. The service has grown faster than anticipated since being implemented, with COVID-19 highlighting the importance of supply chain certainty. PPA has since expanded its First Point of Entry facilities to accommodate the 10-fold increase in inbound cargo. PPA is progressing on plans to expand the direct shipping service, installing a First Point of Entry wash pad and inspection facility at the Port of Ashburton. This will also support port proponents seeking to unlock iron ore assets located in the West Pilbara, facilitating additional trade through its ports.

In line with the Western Australian Climate Policy, PPA is identifying and implementing

“AS AUSTRALIA PROGRESSES ON ITS PLANS TO REACH NET-ZERO, THE PILBARA WILL BECOME A KEY REGION FOR THE NATION IN THE GENERATION OF WIND AND SOLAR POWER.”

"AS PPA PROGRESSES ON PLANS FOR THE FUTURE, THE LESSONS LEARNED THROUGHOUT COVID-19, OF ADAPTABILITY, FLEXIBILITY AND RESILIENCE WILL UNDERPIN THE GROWTH OF ITS OPERATION OVER THE NEXT DECADE."

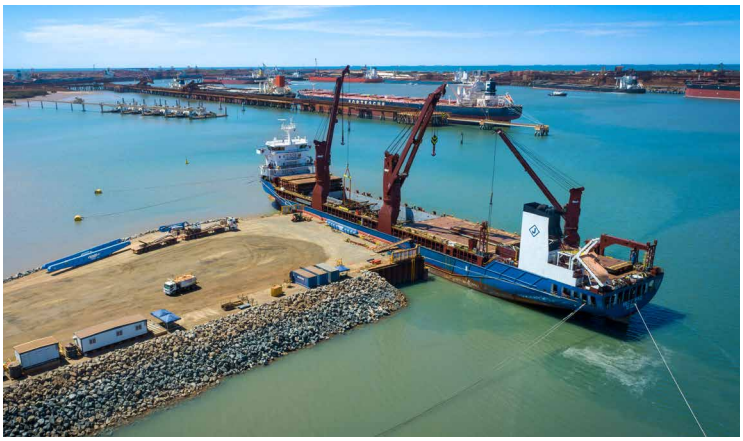
projects to reduce the carbon footprint associated with its own operations. It has partnered with Carbon Neutral since 2004 to offset carbon emissions from PPA vehicles and machinery. In January of this year, a Memorandum of Understanding was signed with the Port of Himeji in Japan to increase renewable energy trade opportunities between Western Australia and Japan. Late last year, it signed a Collaboration Agreement with Yara Clean Ammonia to undertake a feasibility study into ammonia bunkering in the Pilbara, an important step on the path towards a net zero shipping industry.

As the impact of COVID-19 has faded, PPA recently looked back at the challenges it faced, the lessons learned and what was accomplished as an organisation. Its role in facilitating trade, despite the challenges of a pandemic, ensured Western Australia continued to power the nation. PPA's ports continued to operate 24/7 to meet the demand of proponents, and over the last three years of record-breaking throughput, its people adapted to the continually changing landscape to meet operational goals. As PPA progresses on plans for the future, the lessons learned throughout COVID-19, of adaptability, flexibility and resilience will underpin the growth of its operation over the next decade.

As the CEO, I was proud to lead PPA through such a transformational time, and to ensure the stability of the organisation when so much was changing. When I was appointed CEO of the then Port Hedland Port Authority in 2012, Port Hedland achieved a total annual throughput of 246.7 million tonnes, a figure which has more than doubled since then to 561.1 million tonnes. We are well progressed on plans, which will see that figure grow even further, while supporting the transition to a net zero future and continuing to deliver strong economic returns for Western Australia. I am proud of what we have achieved as an organisation throughout my tenure, and I am looking forward to watching the continued growth of PPA's operations, when I hand over the role of CEO to Samuel McSkimming mid-year.

ABOUT THE AUTHOR:
Roger Johnston was appointed CEO of the former Port Hedland Port Authority by the Minister for Transport in January 2012. He holds a Bachelor of Science, is a Board Member of Ports Australia and is a member of the Australian Institute of Company Directors.

ABOUT THE ORGANISATION:
Pilbara Ports Authority was established in 2014 following the Ports Legislation Amendment Act 2014, amalgamating the port authorities of Dampier and Port Hedland. It has since grown to encompass the ports of Ashburton, Dampier, Port Hedland and Varanus Island. PPA will also oversee the operation of several greenfield ports in the region as they are developed.



LEFT
Lumsden Point in the Port of Port Hedland which when fully developed, will provide two new berths