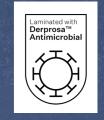
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On the cover:

Pertamina Mandalika International Street Circuit in Indonesia

(page 56)

Cover designed by

Fawzeeah Yamin

Associate Publisher

Eric Ooi (eric.ooi@tradelinkmedia.com.sg)

Editor

 $Fabia\ Sugandy\ (seac@tradelinkmedia.com.sg)$

Marketing Manager

Felix Ooi (felix.ooi@tradelinkmedia.com.sg)

Media Sales Consultant

Jasmine Gan (jasmine.gan@tradelinkmedia.com.sg)

Head of Graphics Department/ Advertisement Coordinator

Fawzeeah Yamin (fawzeeah@tradelinkmedia.com.sg)

Circulation

Yvonne Ooi (yvonne.ooi@tradelinkmedia.com.sg)

Any other matters: info@tradelinkmedia.com.sg Website: http://seac.tradelinkmedia.biz





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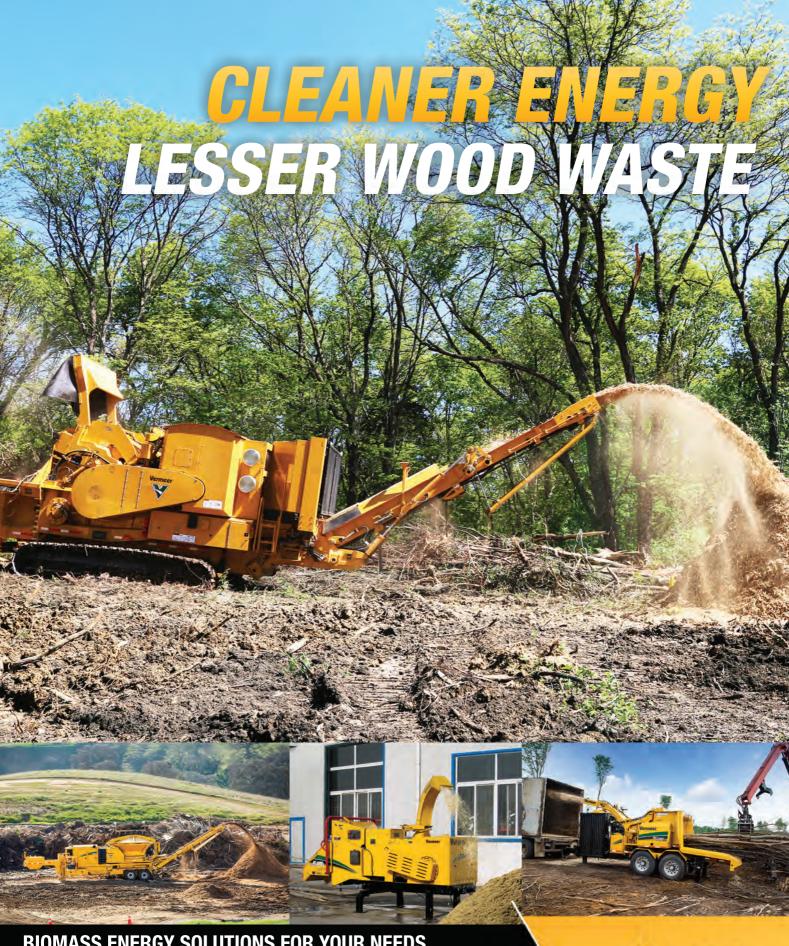
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Mr. Akiyoshi Ojima, Echo Japan Corporation Grande Maison Rm 303, 2-2, Kudan-Kita 1-Chome, Chiyoda-ku, Tokyo 102, Japan Tel: +813 3263 5065, Fax: +813 3234 2064 Email: ojima@echo-japan.co.jp



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World's tallest PPVC residential building tops out

The Avenue South Residence development in Singapore has topped out with the last PPVC module being placed atop the 56-storey building. Developer UOL Group Limited and its joint venture partners – Singapore Land Group and Kheng Leong Company (50:30:20) – along with main contractor United Tec Construction, held a topping out ceremony for the project on 25 February, attended by Singapore's Minister for National Development Desmond Lee.

UOL is one of the first developers in Singapore to adopt PPVC (prefabricated prefinished volumetric construction) for its developments, in line with the government's push for productivity and sustainability. The other projects by UOL – The Clement Canopy and more recently, Clavon – have also used this construction method.



Sitting on the doorstep of the Greater Southern Waterfront, the 1,074-unit Avenue South Residence comprises two 56-storey towers reaching 192 m and five low-rise conservation blocks. The development has been dubbed the world's tallest PPVC residential building, and is integrated with a park that connects to the 24-km-long Rail Corridor.

According to UOL, the PPVC method improved productivity of this project by about 40% in terms of manpower and time savings. The technology also reduced pollution and noise as the apartment modules were built offsite, thus improving the health and safety of construction workers and people living and working near the project site. In addition, quality control was improved as the PPVC modules were built in a controlled factory environment.

In all, more than 3,000 freestanding volumetric apartment modules completed with internal finishes, fixtures and fittings, were built in a factory in Tuas and transported to the construction site to be stacked one on top of the other.

"We are happy to have the opportunity to work with UOL again to construct Avenue South Residence, the largest residential development that uses the PPVC method. While there were some challenges such as the Covid-19 disruptions, productivity still went up about 40% compared with conventional methods without compromising on project quality and safety. I believe this is the sustainable way forward for construction," said Allan Tan, managing director of United Tec Construction.

"Avenue South Residence has demonstrated how government policies and initiatives, together with industry adoption of digitalisation and technology, can help the built environment industry improve productivity, attract talent and build resilience to grow for tomorrow," explained Liam Wee Sin, chief executive of UOL Group. "We thank Minister Desmond Lee for gracing the topping out ceremony of the world's tallest PPVC residential development."

Mr Liam added, "Our industry continues to face headwinds aggravated by Covid-19 such as foreign labour shortages, low productivity and supply chain disruptions. To overcome some of the issues, we must adopt digitalisation for integrated digital delivery; decarbonisation to address long-term climate change



ABOVE: The PPVC method improved productivity of this project by about 40% in terms of manpower and time savings.

LEFT: An artist's impression of the 1,074-unit Avenue South Residence at Silat Avenue.

BELOW: Singapore's National Development Minister Desmond Lee (in the centre) officiated the project's topping out ceremony.



issues; and develop industry alliance to accelerate transformation as exemplified in this project."

The Avenue South Residence development is expected to be completed by the second quarter of 2023. ■





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Lendlease expands investment in Malaysia's TRX project

Lendlease and TRX City Sdn Bhd have expanded their investment in Tun Razak Exchange (TRX) in Kuala Lumpur, Malaysia, by acquiring an additional 1.2-acre plot of land within the international financial district for a mixed-use development featuring hotel, residential and retail.

This is the second joint-venture agreement signed by Lendlease and TRX City on the 70-acre project, touted to be Kuala Lumpur's next CBD. Both parties are also currently developing a 17-acre lifestyle centrepiece of the district, The Exchange TRX.

gateway of TRX, the Raintree Plaza, which is linked to the Bukit Bintang shopping belt via a 700-m pedestrian walkway.

"We see strong potential in Malaysia and are excited to support Kuala Lumpur in achieving new levels of sustainability and liveability. Our continued collaboration with TRXC [TRX City] represents a strategic partnership with an organisation that shares our vision and purpose of creating value through places where communities thrive," said Stuart Mendel, managing director and head of Malaysia at Lendlease.

The Exchange TRX, which is still under construction, is Lendlease's largest integrated development in Asia so far. It will encompass six residential towers (known as TRX Residences), Malaysia's first Kimpton Hotel, office and a large-scale retail destination crowned by a one-of-a-kind, 10-acre rooftop park.

"We are very pleased with the progress of The Exchange TRX to date, and this contributed to our decision to acquire an additional plot within the master development," explained Mr Mendel. As a future-ready development with high commercial potential, Tun Razak Exchange's prime location and international standards of



Stuart Mendel (left), managing director and head of Malaysia at Lendlease with Dato' Azmar Talib, CEO of TRX City, the master developer for the TRX project.

development positions it as a globally recognised landmark for Kuala Lumpur."

TRX is a significant public-private project of national importance, bringing together the best practices aligned to economic, social and governance (ESG) principles. This new landmark has attracted leading global and domestic investors on the back of its strong sustainability framework that includes district-wide green infrastructure, such as an onsite wastewater treatment and recycling plant and an expansive, lush public realm that makes up almost a quarter of the development.

The district, located at the heart of the capital, has joined forces with

Kuala Lumpur City Hall to enhance the facilities surrounding the area, carrying out major road upgrades for Jalan Tun Razak and streetscape improvements in its neighbourhood, helping to build community and improve lives beyond its border.

As Malaysia's first international financial district and Kuala Lumpur's future CBD, TRX will strengthen Kuala Lumpur's position as an international finance centre by creating a seamless and central business environment for financial services firms, multinational companies (MNCs) and other businesses. The first phase of the project opened in 2019, when one of Southeast Asia's tallest buildings – Exchange 106 – and the new HQ for Prudential Malaysia started operating.

Dato' Azmar Talib, CEO of TRX City Sdn Bhd, the master developer for the TRX project, said, "This year is going to be significant for TRX, as we start opening our doors to HSBC and Affin Bank in their new HQs, in addition to other new tenants. We are excited to see the TRX community growing, as we move closer to realising our vision to make TRX, Malaysia's own international financial centre and the city's new lifestyle hub."

New large-scale renewable energy and data infrastructure projects for Korea

Diode Ventures, a wholly owned subsidiary of Black & Veatch, has entered into a joint venture agreement with Energy Innovation Partners (EIP) to develop, finance, build and operate renewable energy and data infrastructure projects in South Korea.

Working together as The Green Korea Inc, the joint venture will offer the full life-cycle of project development for solar, wind, battery energy storage, data centre and more, helping to advance the country's sustainability initiatives.

South Korea imports nearly 96% of its energy, which presents a particularly "tough challenge" for a country that is working towards a 20% reduction in carbon emissions by 2030 and a net-zero economy by 2050, explained Diode. To get there, the country will need to significantly expand its renewable energy generation portfolio.

Diode is a developer of energy and data infrastructure serving the commercial, industrial and technology sectors. Based in the US, the company has a global presence in over 100 countries. "We believe the growing Korean market offers substantive opportunities to add value for our clients and support the evolution of greener, more sustainable energy infrastructure," said Brad Hardin, president of Diode Ventures. "The EIP team is a trusted partner for Diode, and we are excited to work with them under the banner of The Green Korea Inc to perform development, engineering, procurement and construction services that will bring these critical projects to life."

South Korea has recently unveiled its Green Growth National Strategy and Korean New Deal 2.0, which invests 220 trillion won (US\$185 billion) across the economy, including billions in green infrastructure and renewable energy. Diode highlighted that the Green Korea Inc partnership is a "direct answer" to the country's needs, as it embarks on these large-scale projects to reduce carbon emissions and increase sustainability across its economy.



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Make no mistake – this 2-axle is a big deal

Introducing the future of the Tadano all terrain line. Jointly developed with the vast experience of both Tadano's Lauf and Zweibrücken locations in Germany, the AC 2.040-1 is an extremely versatile and compact crane. Showcasing exceptional strength at steep boom angles, it can lift 7.6 t at an 8 m radius when fully telescoped (35.2 m). A robust and reliable undercarriage provides excellent gradeability and acceleration. And for operation in confined areas, the eco-friendly E-Pack can run this nimble powerhouse. This is your ideal, ready-to-use taxi crane!

Learn more about the AC 2.040-1 and other news we have planned for the future at: the start of something big.onetadano.com

FiCO PanU provides concrete solutions for Aqua City

FiCO Pan-United Concrete Joint Stock Company (FiCO PanU), a subsidiary of Singapore's Pan-United Corporation Ltd, has signed a 2022-2024 cooperation agreement with Vietnam's Novaland Group to provide sustainable concrete solutions for the Aqua City project.

Under the agreement, FiCO PanU will set up two onsite batching plants at the site of Aqua City, a large-scale smart ecourban integrated development in Dong Nai province undertaken by Novaland, by 2022. Collectively, the two plants will supply about 700,000 cu m of ready-mix concrete to the Aqua City project over a two-and-a-half-year period. FiCO PanU has commissioned the first plant in December 2021.

Located in Bien Hoa, Dong Nai, the Aqua City project comprises residential units and high-end amenities such as schools, hospitals, a sports complex, and a shopping and entertainment complex, among others.

The convenient location of the batching plants onsite will facilitate the efficient and timely supply of concrete. This will also minimise fuel, energy and water use across the project operations and reduce embodied carbon emissions associated with the delivery of raw materials. Additionally, it allows the construction site to benefit from a continuous supply of concrete and ensures the efficient progress of the project, to meet project completion deadlines

FiCO PanU will develop high-quality concrete and high-performance low-carbon mortar using its PanU CarbonCure carbon capture and utilisation (CCU) technologies over the abovementioned period, first, for the Aqua City integrated development, and subsequently, for other Novaland developments.



An artist's impression of Aqua City mixed-use development, located in Dong Nai province, Vietnam.

"This partnership also highlights our shared commitment towards sustainable building development needs for the Vietnamese market and our contributions to the achievement of Vietnam's stated goal of net-zero carbon emissions in 2050," said Steven Loh, general director of FiCO PanU.

FiCO PanU and Novaland have an established working relationship spanning more than 10 years. FiCO PanU has supplied ready-mix concrete required for foundation uses to building constructions for diverse Novaland projects across Ho Chi Minh City in Districts 1, 2, 4 and 7, as well as in Phu Nhuan, Tan Binh and Go Vap. ■

Bok Seng Logistics takes delivery of Goldhofer MPA 8 semitrailers

Singapore-based Bok Seng Logistics Pte Ltd has invested in a transport solution from Goldhofer for the first time, with the acquisition of two MPA 8 semitrailers.

"We are convinced that the two eight-axle trailers with the MacPherson axle system are a perfect fit for our logistics portfolio," said Vincent Teo, senior director at Bok Seng Logistics.

Bok Seng specifically chose the MPA version because of the advantages of the low-maintenance axle technology in combination with a high axle load and the "extremely" low loading height, according to Goldhofer.

The MPA 8 has an axle load of 15.6 t per axle line. So, each vehicle can easily handle operations with a total weight of more than 150 t. They can carry high and wide loads with unit weights of up to 120 t, as well as long and heavy items such as concrete trusses, bridge elements and more, thanks to a 10.8-m loading deck extension for a total length of 25.3 m.

Bok Seng attached particular importance to the low loading height of 885 mm, as the company needs to handle a large number of upcoming long-distance journeys with railroad cars on routes with bridges and tunnels, explained Goldhofer. With a winch mounted on the gooseneck for this purpose, the cars can be quickly pulled onto the loading deck.

Bok Seng has been active in the lifting and heavy haulage



The Goldhofer MPA 8 semitrailer has an axle load of 15.6 t per axle line. So, each vehicle can easily handle operations with a total weight of more than 150 t. The semitrailer also features a very low loading height.

industry for more than 40 years. From intermodal transportation and warehousing to the management of large-scale and complex logistics projects, the company offers a wide range of services across the Southeast Asian region. ■







Singapore's construction demand to reach S\$27-32 bil

The Building and Construction Authority (BCA) projects the total construction demand in Singapore to reach between \$\$27 and \$\$32 billion in 2022. The public sector is expected to contribute about 60% of the total demand, accounting for \$\$16-19 billion. This is supported by various public housing projects, including those under the Home Improvement Programme, as well as healthcare developments and infrastructure works such as the Cross Island MRT Line (Phase 1).

The private sector construction demand is forecast to reach between \$\$11 and \$\$13 billion, comparable with the volume in 2021. Given the latest property cooling measures, residential building demand is anticipated to moderate year-on-year amid more cautious market sentiments. However, commercial building demand is projected to rise as hotels and attractions undergo refurbishment to prepare for inbound tourism revival, and older commercial premises are earmarked for redevelopment to enhance their asset values. In addition, industrial building demand is expected to see some support from the construction of energy storage facilities and biopharmaceutical manufacturing plants.

The preliminary total construction demand for 2021 grew by 42% to about \$\$30 billion compared to the preceding year, largely driven by public housing and infrastructure projects as well as an improvement in investment sentiments. This was about 7% higher than the upper bound of BCA's earlier forecast of \$\$23-28 billion, mainly due to rise in tender prices resulting from manpower and materials cost inflation.

The public sector construction demand increased from \$\$12.2 billion in 2020 to \$\$18.2 billion in 2021, underpinned by major projects such as the Cross Island MRT Line, Jurong Region MRT Line, Tuas Water Reclamation Plant and new Build-To-Order (BTO) units. Likewise, the private sector construction demand expanded from \$\$8.9 billion in 2020 to \$\$11.8 billion in 2021, supported by

higher demand for residential, commercial and industrial building developments as the economy recovers.

Outlook for 2023-2026

Over the medium-term, BCA forecasts the total construction demand to reach between \$\$25 and \$\$32 billion per year from 2023 to 2026. The public sector is once again expected to lead the demand and contribute \$\$14-18 billion per year within the period, with about half of the demand coming from building projects and civil engineering works.

Besides public housing developments, there are also various major developments in the pipeline, such as MRT projects including the Cross Island Line (Phases 2 & 3) and its Punggol Extension and the Downtown Line Extension to Sungei Kadut, the Toa Payoh Integrated Development, redevelopment of Alexandra hospital and a new integrated hospital at Bedok.

The private sector construction demand is expected to remain steady from 2023 to 2026, reaching about \$\$11-14 billion per year, in view of healthy investment appetite amid Singapore's strong economic fundamentals.

BCA pointed out that construction demand forecast in 2023-2026 excludes any potential awards of construction contracts for the development of Changi Airport Terminal 5 and its associated infrastructure projects as well as the expansion of Integrated Resorts, as their construction timelines are still under review due to the impact of the pandemic.

Furthermore, the total nominal construction output (value of certified progress payments) is projected to increase to \$\$29-32 billion for 2022, from the preliminary estimate of about \$\$26 billion for 2021. This is due to a steady level of construction demand and the backlog of remaining workloads that were affected by the Covid-19 pandemic since 2020. ■

Tadano GR-900EX-4 rough terrain crane debuts in Philippines

Tadano Asia Pte Ltd and its exclusive Philippine distributor, Monark Equipment Corporation, have announced the delivery of the first Tadano GR-900EX-4 rough terrain crane in the Philippines. The machine was acquired by Hammer Head Builders and Development Corporation.

The GR-900EX-4's first assignment with Hammer Head is already taking place on a major project for Taiheiyo Cement, where they will perform both demolition and expansion work at one of Taiheiyo's plants in San Fernando, Cebu province.

"The Tadano brand has good quality and durability," said Manny Javines, managing director and president of Hammer Head Builders and Development Corporation. He also noted that acquiring the GR-900EX-4 allowed the company to promote its expanded project capacity while reducing the bid costs.



Manny Javines (right), MD and president of Hammer Head Builders and Development Corporation with Maricon C. Maprangala, account manager of Monark Equipment Corporation, in front of the Tadano GR-900EX-4.

The 90-t-capacity Tadano GR-900EX-4 features an asymmetrical outrigger extension width control, an integrated counterweight, sequential and nonsequential telescoping modes, and the popular Hello-Net system. With a maximum lifting height of 47.1 m (64.4 m with the bifold jib) and maximum load radius of 42 m (52 m with the bi-fold jib), the crane is ideal for Hammer Head's multi-faceted project with Taiheiyo as well as future customer projects.

Hammer Head undertakes foundation, civil, structural, electrical and mechanical contracting work, including demolition and dismantling. Accredited as a Quadruple-A contractor by the Philippine Contractors Accreditation Board (PCAB), the company has numerous locations throughout the country including Antipolo, Rizal and an office in Makati, Metro Manila.



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New industrial city development in Laos breaks ground

Thailand-based developer Amata Corporation Public Company Limited has signed a concession agreement with the Laos government to commence the construction of Amata Smart & Eco City Natuey, located in Luang Namtha province. The groundbreaking ceremony for the project was held in January 2022.

This new industrial city development, which covers 410 ha of land in the first phase, is set to become an "exemplary model" of modern industrial park with smart and eco features, targeted at investors from around the world, according to Amata. It is also expected to enhance the economic growth of Laos in a "sustainable manner" and provide opportunities for the local people with employment and supportive services.

Amata said there is a possibility for site expansion of up to 20,000 ha in total. The development will be managed through its fully owned subsidiary, Amata City Lao Sole Company Limited.

Vikrom Kromadit, chairman and acting CEO of Amata, shared that the plan is to invite global multi-



ABOVE AND BELOW: In the first phase, Amata Smart & Eco City Natuey will cover 410 ha of land.



national companies and the government sectors from China, Japan, Singapore and Thailand, such as Yokohama Industrial City or Japan External Trade Organization (JETRO) to participate in the Amata Smart & Eco City Natuey project.

He emphasised that Amata will focus on working with these four countries, in addition to Laos, to develop the project "to its full potential" while discussing cooperation to support trade and investments as well as to support Laos to become a "competitive, attractive and modern" FDI destination.

The new Amata Smart & Eco City Natuey has the potential to serve a wide range of international investors from various industries, explained Mr Kromadit. These include logistics and warehousing, machinery, rubber and plastic products, food and beverage processing, chemicals and pharmaceuticals, and more. "Amata will develop the cleanest, most modern and

safest industrial city in Laos," he said. ■

Dingli starts work on new 'intelligent factory' in China

Chinese aerial platform manufacturer Dingli has started work on its 'intelligent factory phase 5' project, located in Zhejiang province. Occupying a 61-acre site and a total construction area of 240,000 sq m, this new facility will be able to produce 4,000 machines per year, including electric boom lifts (36-50 m), electric scissor lifts (33-36 m), and vehicle-mounted insulated boom trucks, among others.

The phase 5 development, with a total investment of 2.2 billion yuan, will "open a precedent in the field of intelligent manufacturing of large-scale, high-end intelligent aerial work platforms in the global industry," said Dingli. It is being built in accordance with the "Future Factory" construction standards.

Dingli is currently expanding its manufacturing plants in phases. According to the company, the entire project so far has already covered 178 acres and a construction area of over 590,000 sq m.

Dingli revealed that in the past year, it has "taken the lead in realising the electrification of a full range of products in the industry." Relying on the strength of global technology research and development, the company has continued to deepen the strategy of "new era of electrification of non-road mobile machinery", and its products have been sold to more than 80 countries and regions around the world.

In 2020, Dingli acquired a 24% stake in the German company Teupen, which also provided strong technical support for the development of its insulated boom trucks.

As part of an internationalisation process, Dingli is expanding its





ABOVE AND LEFT: When completed, the new factory will be able to produce 4,000 machines per year, including electric boom lifts, electric scissor lifts, and vehicle-mounted insulated boom trucks, among others.

global sales network – in North America, Europe, South America, the Middle East, and Australia. ■

Surbana Jurong teams up with Nippon Koei and DHI to build 'more resilient' cities

Surbana Jurong has signed a Memorandum of Understanding (MOU) with Japan-based engineering consultant Nippon Koei and DHI Water & Environment (S) Pte Ltd, a Danish water and environment consulting company, to help clients build safer and more resilient cities and townships across the globe.

The three partners are looking to set up a Centre of Excellence leveraging the strengths of each to help clients set climate change targets and measure their performance as well as secure financing to fund sustainability projects. Nippon Koei has deep expertise in disaster prevention and renewable energy, having participated in major public-private partnerships in urban development programmes. DHI is consultant to 140 countries in the conservation, re-distribution, quality control and flow management of water environments spanning rivers, reservoirs, oceans, coastlines, cities and factories. DHI actively collaborates in joint projects with the World Health Organization and the United Nations.

Surbana Jurong highlighted that industry projections estimate that enhancing the resiliency of infrastructure could save US\$4.2 trillion from climate change damages globally. The company further mentioned that the signing of this latest MOU has its roots in earlier collaborations that it entered respectively with Nippon Koei in 2020 and DHI for the last 13 years.

Surbana Jurong and Nippon Koei have provided technical expertise for the development of the 9,450-ha New Clark City in the Philippines, a disaster management and resiliency study for Danang City in Vietnam, and also a study on the cooperation for infrastructure project formulation between Japan and Singapore undertaken for the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT).





ABOVE: An artist's impression of New Clark City in the Philippines. Surbana Jurong and Nippon Koei have previously worked together to provide technical expertise for this landmark project.

LEFT: The MOU signing between Surbana Jurong, Nippon Koei and DHI.

Surbana Jurong and Nippon Koei successfully integrated vast amounts of climate and natural disaster data into traditional engineering disciplines embracing materials science, data analytics, Al and digital technology. These were used in flood visualisation, seismic, sea level rise and even landslide simulation analysis.

DHI has worked with Surbana Jurong for more than 13 years to formulate Singapore's climate change framework on coastal adaptation, inland, coastal flooding as well as flood risk engineering studies at Labrador Park, Marina South, Marina East and East Coast

Third generation family member to lead Vermeer operations



Vermeer Corporation, the global manufacturer of agricultural, underground construction, surface mining, tree care and environmental equipment based in Pella, lowa, the US, has appointed Mindi Vanden Bosch (left) as vice president of operations.

"Vermeer is a part of who I am. I love the people, I love the product we build, I love the impact our equipment makes. Having watched

Vermeer grow as an organization through the leadership of my grandfather, my uncle, my mother and now my brother, I'm excited to take the experiences I've had to help lead the team and the important work they do," said Ms Vanden Bosch.

Prior to joining Vermeer in 2008, Ms Vanden Bosch held roles in continuous improvement at Cascade Engineering and treasury management at Fifth Third Bank. At Vermeer, she has held leadership roles in marketing, finance, human resources,

continuous improvement and most recently served as managing director for the Forage Solutions Product Group.

"Mindi's passion for people and her love for problem solving bring important qualities to our operations. Personally, I'm proud to have my sister take this role and oversee such a critical part of our business and lead a large, important part of our workforce," said Jason Andringa, president and CEO of Vermeer.

Vermeer Corporation is family-owned and -operated, celebrating nearly 75 years of operation. The Vermeer family and Vermeer leadership have built intentional succession plans for family members who want to be a part of the business. Both Mr Andringa and Ms Vanden Bosch have worked extensively with the board of directors, company leadership and family office to meet the leadership requirements.

"Operating a family business requires incredible intentionality. The Vermeer family saw that early on and implemented important steps to help build a successful business while maintaining healthy family involvement. Having Mindi move into this role demonstrates the forward-thinking of those involved in business planning," said Brian Gardner, chair of the board at Vermeer Corporation.

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Four lifting experts join MyCrane team

The world's first digital platform for the search and selection of cranes, MyCrane, has strengthened its team with the appointment of four executives. Each of them brings many years of experience in the lifting industry.

These new appointments include: Erik Altena as head of strategic development; Alexander Kouklev as business development director for Russian Far East and Asia Pacific (APAC); Alan Faulds as managing director for the UAE and Oman; and Igor Dobrovolskiy as managing director for Russia.

"Alongside growing our global network by appointing franchise holders to operate our service, MyCrane is investing in our core team to grow our portfolio and introduce new products and services. Our new appointments will help us to do exactly that," explained MyCrane founder Andrei Geikalo, himself a former commercial director at global engineering specialist Mammoet. "I am delighted to welcome such highly experienced professionals to the MyCrane family, all of whom share my passion for digitalising the crane rental business."

Erik Altena and Alexander Koukley

In his new role, Mr Altena will focus on the strategic development of MyCrane's global partnerships, including franchises. He will work on new products and services, and coordinate MyCrane's cooperation with other start-ups innovating in the crane industry.

Mr Altena entered the lifting industry after earning a master's degree in civil engineering at the Delft University of Technology. Thereafter, he joined Mammoet at the company's global HQ in Utrecht, Netherlands, as a project engineer.

In recent years, Mr Altena was in Mammoet's global market development & innovations department, working on technologies like artificial intelligence (AI) and machine learning (ML) to help the end-customer optimise crane utilisation. He developed a new product, CraneFact — a device that uses smart sensors to track crane movements and the utilisation of heavy equipment on site.

Meanwhile, as business development director for the Far East of Russia and APAC, Mr Kouklev will handle business development and sales in these regions, and will also support the platform's marketing activities.









FROM LEFT: Erik Altena, head of strategic development; Alexander Kouklev, business development director for Russian Far East and Asia Pacific; Igor Dobrovolskiy, managing director for Russia; and Alan Faulds, managing director for the UAE and Oman.



The MyCrane digital platform aims to simplify the process of crane rental procurement.

Mr Kouklev spent 16 years working at Mammoet, where he served as general director at Mammoet Sakhalin, responsible for the development of all business activity in Sakhalin region and other locations in the Russian Far East. He has held other roles at Schlumberger and Exxon Neftegas Limited.

Mr Koukley's skills include project management, heavy lifting and transportation engineering and operations, equipment planning/repair/maintenance, logistics and procurement.

Alan Faulds and Igor Dobrovolskiy

Mr Faulds he will lead the development of MyCrane's business in the UAE and Oman. Formerly employed by Sarens, he was manager of site operations at the Tengizchevroil (TCO) project in Kazakhstan.

Mr Faulds began his career with Mammoet, working in Southern Africa for several years at all levels of lifting operations before moving to Dubai as Mammoet's head of operations for Middle East and Africa. His work has also taken him to Australia and Europe.

"I joined MyCrane after realising this is exactly what the sector is crying out for. Modernisation and digitalisation are long overdue and have been met with great enthusiasm from both clients and suppliers," said Mr Faulds.

As for Mr Dobrovolskiy, he will lead the development of MyCrane's business in Russia. "Knowing all the challenges of the crane procurement process from the client perspective, I decided to join a start-up business because I can see huge potential to change the industry," he said.

An engineer specialising in the development and operation of oil and gas fields, Mr Dobrovolskiy's extensive industry experience has seen him work in numerous regions in Russia, holding senior positions at top Russian oil and gas companies such as Lukoil, Transneft and Slavneft.

Digitalising crane rental business

The new MyCrane platform (www.mycrane.com) simplifies the process of crane rental procurement, allowing users to submit details of their lifting requirements in order to receive personalised quotes from a range of registered crane providers.

For the first time, customers can simply and quickly request a crawler, mobile or tower crane (between 6 and 750 t capacities) without having to rely on manual processes. The MyCrane service is operated in countries around the world by a network of local franchisees (with support from MyCrane's head office team in Dubai).

Besides the lifting services search, MyCrane also features a Marketplace to advertise used equipment, rigging equipment, spare parts and auxiliaries, plus industry vacancies. Consultancy services, such as engineering for heavy lift projects, are offered on a truly independent basis, meaning clients are presented with a full range of solutions and service providers from the whole of the market, and the most cost-effective solution.

What's more, the upcoming MyCrane Selector tool will allow users to quickly and easily identify what crane should be used, as well as the crane's capacity and optimum configuration.

Manitou Group unveils its low-carbon trajectory

Manitou Group has unveiled the two main targets of its 2030 low-carbon trajectory: reduce its direct and indirect carbon emissions by 46%, while reducing the CO2 emissions of machines by 34% for every hour of use. This approach is based on scientific data through the Science Based Targets initiative, a programme supported by the United Nations, Carbon Disclosure Project (CDP), World Resources Institute (WRI) and World Wide Fund for Nature (WWF).

After presenting its new CSR roadmap to all stakeholders in 2021, Manitou outlines its 2030 low-carbon pathway. Constructed in line with the Science Based Targets initiative, this trajectory relies on the single international reference defined according to the reports of the IPCC (Intergovernmental Panel on Climate Change).

Using 2019 as the benchmark year, the first target applicable in scopes 1 and 2 involves reducing direct and indirect CO2

emissions by 46% by 2030 throughout all of Manitou's worldwide locations. The second target concerns the emissions in scope 3 (value chain), with a 34% reduction in the CO2 emissions generated for every hour of use of the machines produced by the group.

"It is an extremely important and transformative stage for the group. Climate issues are a genuine concern, but also an opportunity to reinforce our competitive edge by transitioning to a low-carbon intensity economy," said Manitou's president and CEO Michel Denis. "We are doing everything to steer the ecological transition towards a more sustainable economic model. We have set ambitious vet realistic targets that we can achieve by innovating with our customers, suppliers and employees. Eighty nine percent of our indirect emissions (scope 3) come from the use of products. It is therefore a collective approach for the whole value chain."

To accomplish these targets, Manitou will rely on a number of tactics: develop new electric ranges and innovate with hydrogen; continue the work undertaken in the last 10 years on the energy efficiency of equipment; reinforce ecodesign with a global life cycle approach; increase the use of recycled materials in purchases of components and parts; use low-carbon solutions for upstream and downstream freight; develop the activity of spare parts from the circular economy; and reduce the energy consumption of its sites and roll out a green energy procurement programme.

Manitou's low-carbon pathway will be studied by experts in the Science Based Targets initiative with a view to confirming it, hopefully by the end of the half-year.



Manitou is headquartered in Ancenis, France, with office locations worldwide. The group is also present in the Asian market.





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New study finds better data strategies could save global construction industry US\$1.85 trillion

Autodesk and management consulting firm FMI Corporation have released the results from a new study, 'Harnessing the Data Advantage in Construction,' which surveyed over 3,900 professionals across the global construction industry on their data practices in 2020.

In the study, Autodesk and FMI estimate that 'bad data' – data that is inaccurate, incomplete, inaccessible, inconsistent or untimely, and can't be used to derive actionable insights – may have cost the global construction industry US\$1.85 trillion in 2020.

However, survey respondents who had strategies in place to collect, manage and analyse usable data reported benefits such as fewer project delays and budget overruns, less rework, fewer change orders and reduced safety incidents, suggesting implementing formal data strategies could enable construction teams to prevent future losses and gain competitive advantages.

"Organisations are adopting technology, but our study shows there is opportunity for them to gain even more from their investments," said Jay Bowman, research and analytics lead at FMI. "Without data strategies in place, the construction industry is leaving significant amounts of money and opportunities for more positive project outcomes on the table.

"The good news is that implementing data strategies is entirely within an organisation's control, and our research identified a few ways some teams are successfully collecting, managing and using their data to support decision making."

Key findings from the study include:

1). Bad data is leading to poor decision-making and outcomes. Thirty percent of respondents indicated that more than half of their project data is 'bad' and results in poor decision making more than 50% of the time.

Decisions made using 'bad data' are estimated to have cost the industry US\$88.69 billion in rework alone, accounting for 14% of all rework performed in 2020. These findings suggest construction teams and organisations need relevant, accurate and complete data sets to make consistently high-quality data-driven decisions.

- 2). Intentional data strategies support more consistent, data-driven decision-making. The respondents who said they always incorporate project data into their decision-making (12%) are employing intentional data strategies to enable this, including regularly reviewing data for quality (40%); standardising data collection, reporting and monitoring practices (38%); and structuring data in a common data environment for centralised access (38%).
- 3). Data management and analysis skills are seen as critical for team success. Most respondents (60%) stated the presence of data management and analysis skills are important for construction teams to work effectively.

When asked what project management and analysis skills will be most important for the future in the construction industry, respondents ranked workflow optimisation (57%), data management strategy (51%), data analytics (47%), data visualisation (40%) and data security (39%) as their top five skills.

"As the construction industry continues its rapid digitisation, it's important to remember that the utility of technology extends





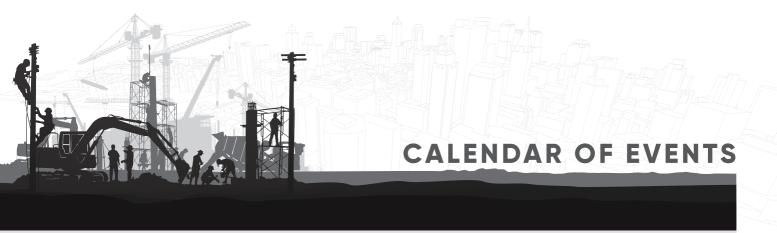
TOP AND ABOVE: Bad data is leading to poor decision-making and outcomes, according to a new study by Autodesk and FMI. It surveyed 3,900 professionals across the global construction industry on their data practices in 2020.



Other findings from the study include: intentional data strategies support more consistent, data-driven decisionmaking; and data management and analysis skills are seen as critical for team success.

beyond its immediate functions to identifying risks and opportunities with data-driven insights," said Allison Scott, director of construction thought leadership, Autodesk Construction Solutions.

"This study quantifies the immense value of putting frameworks in place to capture and manage data. Organisations that implement formal data strategies stand to gain the most ROI from their technology investments, so it is important to collaborate with vendors and determine how to make the best use of the data being collected."



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BuildTech Asia 2022

15 to 17 Mar 2022

Singapore Expo Singapore

Website: www.buildtechasia.com

BICES 2022

7 to 10 May 2022

National Convention and Exhibition Centre (Tianjin)
Tianjin, China
Website: www.e-bices.org

Geo Connect Asia 2022

1 to 2 Jun 2022

Sands Expo & Convention Centre Marina Bay Sands, Singapore Website: www.geoconnectasia.com

Trenchless Asia 2022

27 to 28 Jul 2022

Kuala Lumpur Convention Centre Kuala Lumpur, Malaysia Website: www.trenchlessasia.com

Worldbex 2022

31 Aug to 3 Sept 2022

World Trade Centre Metro Manila Metro Manila, The Philippines Website: www.worldbex.com

ConsBuild Asia 2022

28 to 30 Sept 2022

Show DC Hall Bangkok, Thailand Website: www.consbuild-asia.com

Cambuild 2022

7 to 9 Oct 2022

Diamond Island Exhibition & Convention Centre

Phnom Penh, Cambodia Website: www.cambuildexpo.com

bauma China 2022

22 to 25 Nov 2022

Shanghai New International Expo Centre Shanghai, China Website: www.bauma-china.com

bauma Conexpo India

31 Jan to 3 Feb 2023

India Expo Centre (IEC) Greater Noida, Uttar Pradesh, India Website: www.bcindia.com

// Events outside Asia

Hillhead 2022

21 to 23 Jun 2022

Hillhead Quarry Derbyshire, England, United Kingdom Website: www.hillhead.com

bauma 2022

24 to 30 Oct 2022

Munich Trade Fair Centre Munich, Germany Website: www.bauma.de

World of Concrete 2023

17 to 19 Jan 2023

Las Vegas Convention Centre Las Vegas, Nevada, USA Website: www.worldofconcrete.com



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IPAF MCWPs & Construction Hoists for Managers course

A new course aimed at those managing, planning or commissioning the use of mast climbing work platforms (MCWPs) or construction hoists (CHs) has been launched by the International Powered Access Federation (IPAF).

The course has been made available following intensive development and is designed to mirror the popular MEWPs for Managers course currently available as eLearning, classroom-based or instructor-led remote learning via IPAF approved training centres.

Paul Roddis, IPAF training manager, said, "IPAF is proud to announce that the new one-day IPAF Mast Climbing Work Platforms (MCWPs) & Construction Hoists (CHs) for Managers training course launched on Monday, 31 January 2022.

"Candidates will learn the differences between categories, limitations and advantages of each, and how to select a suitable supplier. The course also covers how to manage installation, use, maintenance, training, inspection, thorough examination, and dismantling of MCWPs and hoists, safely and effectively.

"It is initially available in English, in instructor-led format. The content has been created to provide candidates with the skills required to plan, manage and oversee the use of MCWPs and construction hoists on site. IPAF intends to continue to develop this course into eLearning and to add language translations once the initial roll-out is complete.

"This new course fills an acknowledged gap in industry training and adds to IPAF's growing global training programme. Last year, despite a slow start owing to the pandemic, IPAF certified more training candidates in the powered access industry than ever before; adding new courses will continue to complement IPAF's market-leading, ISO-accredited training offer."

Ángel Ibáñez, IPAF's representative for MCWPs and related products, said, "I welcome this new training option for those planning and managing MCWP and hoist operations; it has been developed with the assistance of the IPAF training department and external partners, including many of our dedicated MCWP and hoist members, and I thank all involved for bringing this



Mast climbing work platforms.

indispensable new course to the market.

"Last year was a record year in terms of IPAF MCWP training, with our approved training centres around the world delivering well in excess of 2,000 PAL Cards for the first time ever – despite the pandemic and a very slow start to the year in many countries, owing to continuing restrictions to curb the spread of the virus.

"It's a common misconception that planning, operating and overseeing the use of MCWPs and hoists is a simple, even fool-proof process, where nothing much can go wrong once the machines are erected. However, our experienced specialist equipment rental and manufacturer members will tell you this couldn't be further from the truth!

"Untrained and inexperienced operators and supervisors increase the risk of unsafe operations, which in turn lead to accidents on site and damage being caused to rented machines, which is costly to rectify and can cause significant delays to work projects as repairs are effected or new machines brought into place.

"I am sure our members and the wider construction industry will welcome this valuable addition to IPAF's burgeoning specialist training offer. It's another step towards ensuring safe and effective operations of MCWPs and hoists on site."

New document decodes MEWP Safe-Use Program requirement

A new document has been produced by IPAF explaining what a MEWP Safe-Use Program is and why users need to have one in place. This document is a comprehensive guide to the requirement, part of updated ANSI A92 standards that went into effect during 2020. It is available free as a digital download or as a professional print-ready version that can be co-branded with company logos for use by mobile elevating work platform (MEWP) rental company workers and clients.

IPAF's MEWP Safe-Use Program Guide is free to download in two formats, one that is designed to be shared digitally and printed as required on an office or workplace printer. The other option features a professional print spec with cover option that can be co-branded and printed in volume to supply to depots, branches or showrooms.

Tony Groat, IPAF's North America regional manager, who also sits on both the ANSI and CSA drafting committees, said, "The ANSI/SAIA A92.222 standard defined the requirement for all MEWP users to develop a safe-use program specific to MEWPs. While OSHA promotes all employers to create a program to be used as a framework for addressing safety and health issues, a generic program may not adequately address the unique requirements for MEWP operations.

"IPAF's MEWP Safe-Use Program Guide provides employers of MEWP operators a roadmap to follow and checklist to assist in their development of a plan that considered all of their responsibilities set in the safe-use standard. It considers requirements for the application, inspection, training, maintenance, repair, and safe operation of MEWPs. As this standard requirement is already in effect, the guide will be a great asset to completing this task."

As part of a planned suite of technical guidance aimed at decoding new requirements in updated ANSI and CSA standards, IPAF has also published Wind Rating: Using MEWPs in Wind. This IPAF guidance document covers the hazard of exposure to wind, which can create instability and potential tip-over of MEWPs. This guidance reviews: wind ratings for MEWPs – indoor and outdoor; where MEWP may safely be operated; awareness of dual wind rated MEWPs; and suggested safe operations.

IPAF Load & Unload course available in other languages

Information gathered in a worldwide project to report accidents and near-misses has informed a major update to a comprehensive training course on how to load and unload MEWPs and other plant equipment safely from trucks or trailers.

Analysis of global data gathered by IPAF (via www.ipaf.org/accident) shows most accidents, resulting in lost-time injuries and even on occasion fatalities, during delivery of MEWPs occur during loading or unloading. As a result, IPAF decided to overhaul its existing Load/Unload course, with the updated training course now available in Spanish, Italian, German, French and English.

"IPAF has invested time and resources into updating its ongoing worldwide accident reporting and analysis project, leading to a new comprehensive industry-facing Global Safety Report. In 2020, we updated and relaunched our Incident Reporting Portal, aimed at gathering even more granular data about not just accidents but also near-misses," said Peter Douglas, CEO and managing director of IPAF.

"Statistically the most likely people to be involved in a MEWP-related incident are those loading and unloading and these operatives are key to our industry. Analysing data has allowed the updated training course to directly address those issues that affect people loading or unloading, and provide knowledge and recommended protocols to help prevent accidents before they happen.

"This is exactly the reason why we place so much emphasis on our accident reporting project — only through good data and exhaustive analysis of accidents and near-misses can we identify high-risk situations, uncover underlying causes of why operators get into difficulty and address these through our training programme, industry technical guidance, Andy Access safety campaigns and Toolbox Talks series."

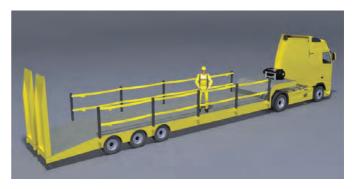
Paul Roddis, IPAF training manager, added, "The IPAF Load/Unload course was reviewed off the back of the accident statistics showing that the people most likely to be harmed in a MEWP-related incident are delivery drivers. We believed that there was more the course could offer in terms of equipping and protecting operatives loading and unloading MEWPs, and we wanted to do more to help protect them. This updated training course does exactly that.

"We set up a working group formed of members of the IPAF training committee, led by Martin Wraith, an IPAF auditor and qualified training instructor, as he also has significant experience within the haulage industry.

"The revamped training is still an instructor-led theory course, though it has a completely new look and feel. We were able to incorporate information directly from the incident-reporting portal, to fine-tune the training so that it addresses the most common problems and risk scenarios anyone loading or unloading machines might face.

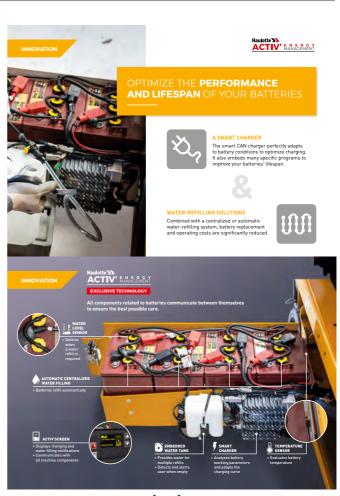
"In terms of visual enhancements, the new course incorporates a new IPAF fleet of delivery vehicles starting with a 4x4 with trailer, a 3.5 t flat-bed van, a 7.5 t beaver-tail, as well as a 26 t rigid and a 40 t articulated HGV trailer."

All information covered in the course content conforms to EN 12195 'Load-restraining on-road vehicles – Safety' and references both the IPAF best practice guidance 'Load and Unload' and 'Loading And Unloading Mewps on the Public Highway'.



Analysis of global data gathered by IPAF shows most accidents, resulting in lost-time injuries and even on occasion fatalities, during delivery of MEWPs occur during loading or unloading.

Mr Roddis continued, "This is an excellent new course to complement those that IPAF training centres already offer. It is highly recommended learning for anyone operating, hiring, maintaining, delivering or managing MEWPs; there is a great deal in the training course that is applicable to a range of plant machines, including dumpers, diggers, telehandlers, rollers or forklifts."



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Concrete industry professionals gather at WOC 2022

World of Concrete (WOC) has recently concluded its 47th edition, drawing close to 37,000 registered professionals, announced the show organiser Informa Markets. Held from 18 to 20 January 2022 (education: 17 to 20 January) in Las Vegas, the US, WOC 2022 took over 632,000 net sq ft of the newly expanded Las Vegas Convention Centre (LVCC). The show hosted over 1,100 participating companies in the expo hall, just over 150 of which were first-time exhibitors.

"The level of engagement from companies of all sizes and corners of the industry was very encouraging, especially following the past couple challenging years, and points to the revival of the trade show industry and continued growth of the construction and masonry sectors," remarked Jackie James, group director of World of Concrete. "We are thrilled with the positive feedback we've received from our community, buyers and suppliers alike, and look forward to seeing a wealth of new business partnerships and industry innovation resulting from the event."

WOC's educational programme serves as an incubator for knowledge sharing and technical know-how, helping the industry overcome challenges and tap into new opportunities for growth. With more than 11,000 expert-led sessions, this year's highly curated education explored a balance of technical and forward-looking topics, ranging from 3D printing in concrete construction, women in construction, waterproofing: the next generation of solutions, and more.

Not only does the industry gather at WOC for deal-making and education, but also to witness and demo the most cuttingedge products available on the market and experience the latest industry developments that lay the groundwork for the

coming year. Trends from the 2022 edition include, among others: greater jobsite productivity, with new battery systems that deliver more power to the hand tools used to perform demanding concrete tasks, such as drilling, cutting and demolition; introduction of equipment that is automating concrete construction activities, including 3D printing, rebar tying and drilling overhead holes; entrance of new materials that increase contractor productivity while still ensuring durable repairs; streamlined data management systems that enable contractors to tighten a project's critical path; and product and equipment updates that reduce a project's carbon footprint and increase contractor productivity.

Other highlights

Returning for the 17th consecutive year, the Concrete Industry Management (CIM) programme organised its silent & live auctions, generating an "all-time record" of more than US\$1,740,000, shared Informa. The CIM programme has been developed specifically for the concrete industry to provide students with a four-year Bachelor of Science degree in Concrete Industry Management.



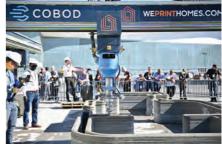


ALL IMAGES: World of Concrete recently concluded its 47th edition, drawing close to 37,000 registered professionals and over 1,100 participating companies.



Furthermore, the Spec Mix Bricklayer 500 World Championship event crowned Mason Cole Stamper as the 'World's Best Bricklayer,' along with his mason tender, Jeff Becker. Scott Tuttle and mason tender Brian Tuttle locked in the second most coveted award at the event, the Spec Mix Top Craftsman, laying 730 brick in one hour.

New this year and central to WOC's core values, Informa formalised the show's commitment to sustainability in collaboration with renewable energy partner/sponsor Hilti. The programme was intentionally executed with three objectives: inspiring sustainable development, environmental responsibility, and social responsibility – each pledge supporting





the WOC's commitment to shaping the concrete industry for a sustainable future.

Thanks to Hilti's renewable electricity sponsorship, Informa said WOC's electricity use is powered by sustainable and renewable energy sources, saving an estimated 204 t of CO2e. ■

Website: www.worldofconcrete.com

Next CICEE set for May 2023

The next edition of Changsha International Construction Equipment Exhibition (CICEE) is scheduled to take place from 12 to 15 May 2023 at the Changsha International Convention and Exhibition Centre, Hunan province, China. Covering an exhibition area of 300,000 sq m, the show is estimated to attract 1,800 exhibitors and 400,000 visitors, including 30,000 visitors from overseas.

CICEE is jointly organised by the China Machinery Industry Federation, China Construction Machinery Society and Changsha Municipal People's Government. The last edition of CICEE was held in May 2021, featuring close to 100 business forums and summit meetings. According to the organisers, the show recorded more than 1,450 exhibitors and 300,000 visitors, with three million visitors attending online.

In 2023, CICEE will keep focusing on the concept of "digitalisation, internationalisation and specialisation," said the organisers. There will be some improvements in four areas:

1). Reforming the concept and enhancing the exhibition's core competitiveness

CICEE 2023 will put more emphasis on business transactions and making the exhibition a platform for global construction machinery companies to enter the Chinese market. It will also help Chinese construction machinery companies to expand into the international market, and enable global construction machinery manufacturers and other global construction companies to connect and collaborate.

The show will highlight "new technologies, new achievements and new products such as intelligence, digitalisation and new energy" in the construction machinery industry, explained the organisers. These include 5G, AR, VR, immersive interaction, new media marketing, digital management tools and other new technologies. About 10 million online visits will be expected.

2). Expanding on cooperation and increasing global exposure CICEE 2023 will further increase international publicity and promotion, and deepen international agency cooperation. It will also forge new partnerships with foreign governments, chambers of commerce and associations, builders' organisations, construction associations, and global media.

The organisers added that by setting up "overseas workstations" in Latin America, Southeast Asia, the Middle East and Africa, as well as by establishing an "overseas procurement network" for the exhibition, which involves more than 30,000 international buyers and visitors, the show can benefit from greater global exposure.

3). Refocusing on the platform to improve the exhibition's service capabilities

The CICEE organising committee will serve as a "bridge and link" to support the development of the global construction machinery industry. The committee has established the Changsha International Construction Machinery Market Research Institute, in cooperation with national industry associations.

According to the organisers, the institute will share the international construction machinery market information every month, publish an international construction machinery procurement index every six months, and edit and publish 'International Construction Machinery Development Report' every year.

With such initiatives, the organisers said an "industry media resource database" can be put in place, while the local and







ALL IMAGES: The next edition of Changsha International Construction Equipment Exhibition (CICEE) is scheduled to take place in May 2023.

global industry media "will be united" to form an international media alliance in order to create an international press centre for construction machinery.

4). Developing the activities to revitalise the exhibition

CICEE 2023 will feature 30 international competitions, industry forums and 100 business summits. These include: global construction machinery CTO summit, global construction machinery industry chain conference, global construction machinery procurement conference, One Belt One Road infrastructure summit, intelligent construction machinery innovation competition, and intelligent construction machinery performance show.

Zhou Xianbiao, secretary general of China Construction Machinery Society, mentioned that the CICEE organising committee has also launched the 'Golden Gear' awards that aim to recognise new, innovative technologies and products at the exhibition.

In addition, the CICEE organising committee has signed a strategic cooperation agreement with the China Chamber of Commerce for Import and Export of Machinery and Electronic Products (CCCME) and the China Foreign Contractors Association. ■

Website: https://en.chinacicee.com

Hillhead 2022





Find out more at hillhead.com





Gomaco's new paving technology and electric machine

Gomaco has advanced paver controls and automation, and is introducing new intelligent valves on its line of equipment including the GP3 slipform paver. This GP3 machine has the capability of slipforming up to 9.14 m wide, and is available as a two-track or four-track paver.

The new self-programming valves eliminate the need to set thresholds. Working with the paver's G+ control system, the valves understand and can automatically react and self-adjust to the dynamics of the machine.

Initially the valve reacts to the machine set-up and adjusts accordingly, but the operator can make fine-tuned sensitivity adjustments from any display at any time. Gomaco's G+ software recognises the change requests and immediately makes those adjustments. This allows automatic correction of the paver's elevation, steering, pivoting, travel control, anti-slip positive traction of the tracks and more.

G+ controls now incorporate Gomaco's new vibrator monitoring system with the ability to monitor, control and diagnose each individual vibrator on the paver. The touchscreen display illustrates the performance of each vibrator. The operator can see where adjustments need to be made and can make those adjustments electronically for an instant and on-the-go response.

Gomaco's Navigator display software brought all the G+paver accessories together for easy control and monitoring on an optional touchscreen display. It is now fully Wi-Fi capable to allow wireless control from multiple display screens anywhere on the paver. A wireless extension allows ground personnel the ability to view and make fine-tuned adjustments to the paver's performance and configure settings for the GSI, side bar inserters, tie bar inserters, and power transition adjuster using any tablet or phone.

Machine-to-machine communication is now possible using the Gomaco Navigator display and G+ control. When a Gomaco paving train is at work on a project, the GP3 paver has the ability to 'talk' to the other Gomaco equipment on the same project with a G+ control system. For example, if a Gomaco placer/spreader is operating in front of a GP3 paver, the paver and the concrete being placed in front of the paver is too low, it can tell the placer/spreader to raise its strike-off and allow more concrete to be placed.

The savvy new technology is advancing throughout Gomaco's entire line of concrete slipform paving equipment. The new self-programming valves are also being integrated into Gomaco's full line of curb and gutter machines.

World's first battery-powered slipform curb machine

Furthermore, Gomaco has introduced the world's first battery-powered slipform curb machine, the CC-1200e. It has been built for mobility and navigating around jobsites, measuring only 2.5 m long and 2.38 m wide. Its rear track and two front-wheel assemblies allow up to 28.3 mpm auxiliary travel speed to move from one pour to the next or loading/unloading on a new project.

"We have been working towards an electric curb machine for almost two years now," explained Kevin Klein, Gomaco's vice president of engineering/research and development. "It has been an interesting and exciting challenge for our entire design engineering team, but especially demanding for the controls and software engineers. We take pride in leading the industry in new product innovations and adding another 'world's first' to our resumé."



Gomaco GP3 working on a paving project at the Ankeny Regional Airport in Iowa, the US.



Gomaco has introduced the world's first battery-powered slipform curb machine. the CC-1200e.

The CC-1200e electric curb machine is equipped with a power dense 48 VDC lithium-ion battery pack. This results in zero-exhaust emissions, reduced vibrations and zero engine noise. According to Gomaco, the lithium-ion batteries provide enough power for a full day of paving. Charging options include the standard eight to 10-hour normal charge rate or an optional two-hour fast charge system.

The CC-1200e features the simple-to-operate Gomaco G+control system with a full function radio remote control, which puts all machine operations in the hands of the operator. Travel control, manual three-point grade control, cross auger directional controls, vibrator control dial, warning lights, and emergency stop are all located on the remote's control panel.

The rotary-sensored slew drive steering on the machine's front wheel assemblies allows smoother paving, easier control, and maximum turning capability with the ability to slipform a 610 mm radius, depending on the mould profile.

The compact CC-1200e also has a 0.54 cu m hopper capacity with up to 381 mm of horizontal sliding capabilities for easy alignment with ready-mix trucks. The hopper features a 305-mm-diameter by 1.68-m-long auger to move the concrete at variable speeds up to 43 rpm.

Curb moulds can be interchanged easily and be positioned on either side of the machine for right-side or left-side paving. The variable speed electric vibrator is coordinated with the stop switch to provide automatic on/off vibrator control synchronised with the forward travel of the paver.

Website: www.gomaco.com

EarthCam 4D brings construction digital twins to life

EarthCam, a provider of webcam technology and services, has introduced EarthCam 4D, empowering virtual design and construction (VDC) teams to overlay and synch live imagery with their digital twins. An intuitive time-line allows users to scroll backward and forward in time to view live imagery in relation to their 4D models.

Built on the Bentley iTwin platform, EarthCam 4D augments Bentley Systems' Synchro 4D models with high-resolution photos from multiple cameras throughout the jobsite, overlaid in precise alignment. Viewers can zoom in and out, and the associated live images remain synched. Unique transparency/opacity and model colour adjustments enable new and powerful ways to compare and contrast models with reality over time.

"EarthCam 4D is a great and quick tool to help communicate project schedule with our customer, trade partners and public," said Michal D Wojtak, Mortenson's integrated construction director for sports and entertainment. "The ability to easily compare current and future states of work is valuable to project leadership teams."

"We are delighted to collaborate with EarthCam, and their EarthCam 4D application, which allows for construction teams to monitor planned construction against actual progress. In addition, EarthCam's solution integrates time-lapse imaging with interactive 3D models that are tied to the construction schedule data, adding tremendous value to clients," explained Sheena Gaynes, director of business development for iTwin platform at Bentley Systems.

"Digital twins are radically increasing productivity in construction," added Brian Cury, CEO and founder of EarthCam. "Thanks to Bentley iTwin, we're able to merge the highest resolution imagery from our cameras to Synchro 4D models, and build valuable applications to increase our clients ROI."

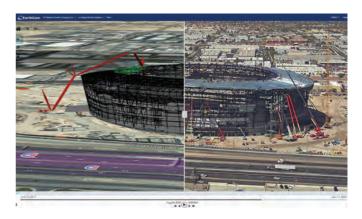
"The partnership between EarthCam and Bentley is bringing construction digital twins to life by simplifying the visual communication of project status to all stakeholders. Now anyone can compare what is happening on the jobsite to what was planned virtually within a simple web viewer powered by Bentley's iTwin technology," said Rich Humphrey, VP of construction at Bentley Systems. "By mixing 4D models from Synchro with EarthCam's reality models, all stakeholders on the project can quickly see the progress of the project, identify issues, and keep the project on time and on budget from anywhere."

EarthCam 4D is the first solution that fully synchronises time-sequenced images to 4D planning models – stakeholders no longer need multiple software interfaces and different stored image sources to access this critical comparative information.

Having real-time imagery synched with a Synchro 4D model in a single interface provides immediate, real-time evidence of every steel beam placement, and every window installation against 4D models, simplifying project management for Synchro users worldwide.

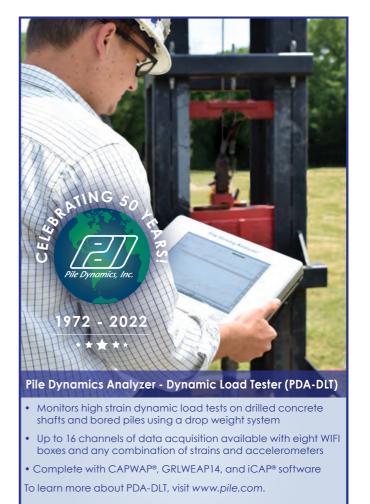
EarthCam's Control Center 8 software has been widely used in the industry for smart project documentation, promotion and security. EarthCam works with industry leaders around the globe to make construction project management less costly and more efficient using powerful visual data.

Website: www.earthcam.net/earthcam4d





ABOVE AND LEFT: With EarthCam 4D, project teams can synch live imagery with their digital twins. This application makes it easier to monitor planned construction against actual progress.





SOUTHEAST ASIA CONSTRUCTION

Southeast Asia Construction (SEAC) is a trade magazine based in Singapore, published bi-monthly since 1994 and distributed to a qualified readership all over Asia. The magazine features various construction projects in the region and globally. It also covers the latest on construction equipment, materials, technology and management, as well as major regional and international trade shows.



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Ammann's updated articulated heavy tandem rollers

Ammann has released two new articulated heavy tandem rollers that meet the world's strictest emissions standards and feature an updated design. The ARX 90 StV and ARX 110 StV are powered by engines that are compliant with EU Stage V and US EPA Tier 4f emissions requirements.

Suitable applications for the machines include medium and large jobsites, transport construction (municipal and town roads, motorways, airfields, etc) and building construction (houses and industrial zones).

The ARX 90 has an operating weight of 9,720 kg and maximum weight of 11,170 kg, while the ARX 110 features an operating weight of 10,560 kg and maximum weight of 12,010 kg. Both models offer a drum width of 1,680 mm and maximum working offset mode of 1,850 mm.

The rollers all utilise a Deutz TCD3.6L4 engine. The differences between models result in the after-treatment structure, where there are varied systems for reducing pollution and NOx. According to Ammann, newly released models are equipped with the most technologically advanced aftertreatment system.

Compaction output is high, and the system is efficient. Each drum is fitted with an independent vibratory pump. The rollers also have a heavy-duty, two-stage vibrator with a variable range of frequencies.

The ARX 90 and ARX 110 are built to be compact and drive vibration into the targeted materials and away from the operator. The design also provides visibility and comfort that helps make operators productive throughout their shift.

These tandem rollers are easy to control, with articulated steering with oscillation and a mechanism that enables work in crab mode up to 17 cm on both sides. A differential lock is standard.

The cab is very spacious, comfortable and quiet. Operator-friendly features include a multifunctional display in the steering wheel, adjustable steering column, and control switches on the armrest.

A rotating and sliding seat enables visibility with excellent sight lines to drum surfaces, edges and spraying bars. The operator can slide the seat beyond the machine contour for even better visibility. The onboard diagnostics can quickly alert operators to issues.





heavy tandem rollers are built to be compact and drive vibration into the targeted materials and away from

> LEFT: The machines are also easy to control, featuring articulated steering with oscillation and a mechanism that enables work in crab mode up to 17 cm on both sides.

Every machine is ready for installation of Ammann ServiceLink for monitoring of machine functions, fuel consumption, required service intervals, etc. Customers can also install telematics solutions from other providers if they prefer, said

The optional ACEforce system is highly intuitive to operate, with all information in a simple format on the central display. The system offers advanced functions for effortless and safe machine operation and compaction guidance. ACEforce also recognises if the machine is experiencing a double jump; if so, the system immediately informs the operator of corrective measures to prevent machine damage.

With oscillation, the drums can maintain constant contact throughout compaction. The process uses less force but delivers both vertical and horizontal energy - essentially massaging the aggregates

Oscillation excels on sensitive jobsites, such as bridges or when working over sewers or utility lines, explained Ammann. In addition, oscillating rollers can safely work on mats that are too hot or too cold for traditional compaction methods. Oscillating compactors also seal joints without damaging cold mats.

Website: www.ammann.com

New Cat 333 excavator features simplicity, versatility

The new Cat 333 excavator from Caterpillar provides optimal performance with higher durability and enhanced comfort. The machine gives more digging force and increased bucket size, which helps tackle any job and improve the overall efficiency. A fuel-efficient hydraulic system and extended maintenance intervals reduce the overall costs. Reinforced structures and increased track width offer more stability and durability when working in tough applications.

Equipped with a Cat C7.1 engine, the Cat 333 has all the power needed to work with a wide range of materials and applications. There are two operating modes available on the machine: 'Power' and 'Smart' mode.

The Smart mode automatically matches the engine speed and hydraulic power to required digging conditions, providing up to 10% higher fuel savings in any application without compromising actual measured productivity. The high-efficiency electric fans cool the engine on demand to help minimise fuel consumption, and the auto reverse function makes it easy to keep cores clean.

The Cat 333 is also designed to extend the life of fuel, oil and air filters, and provides extended maintenance intervals and reduces the maintenance costs. The air intake filter with pre-cleaner has double the dust holding capacity of the previous air intake filter. The oil and fuel filters are grouped together and located on the right-hand side of the machine for easy maintenance.

The hydraulic oil filter provides improved filtration performance, antidrain valves to keep oil clean when the filter is replaced, and longer life with a 3,000-hour replacement interval – 50% longer than previous filter designs. All the daily maintenance check points like engine oil, coolant level and hydraulic oil level can be easily checked from the ground level. S-O-S ports simplify maintenance and allow for quick, easy extraction of fluid samples for analysis.

The Cat 333 is able to operate in tough conditions. The excavator is fitted with reinforced booms, sticks and linkage to enhance durability. The increased track width of +150 mm gives more critical stability to work with large buckets or on uneven surfaces while still being within transport width requirements.





ABOVE: The new Cat 333 excavator offers more digging force and increased bucket size, which helps tackle any job and improve the overall efficiency.

LEFT: The machine is also designed to extend the life of fuel, oil and air filters, and provides extended maintenance intervals and reduces the maintenance costs.

New features such as automatic hydraulic oil warm up enables the machine to work faster in colder temperature and prolong the component life. The grease lubricated track links reduce travel noise and prevent debris from entering to increase undercarriage life. The sloped track frame prevents mud and debris accumulation, decreasing risk of track damage and thus enhancing the reliability and durability.

The Cat 333 is also simple to operate and ensures excellent comfort by minimising operator fatigue and improves the overall operator efficiency and productivity. The engine can be simply started with a keyless push-to-start button, which reduces complexity. The cab offers a mechanically suspended adjustable seat, and all the controls are ergonomically positioned to minimise operator movements. The operator cab has a high-resolution 203-mm

touchscreen monitor to view the machine information, which helps in navigation.

Furthermore, the Cat 333 is designed with safety in mind. The standard ROPS cab meets ISO requirements. It features smaller cab pillars, larger windows and a flat engine hood design that enables greater visibility into the trench and in each swing direction. The excavator is also equipped with a nonmetallic fuel tanks, which increases the operators' visibility to the right side of the machine and provides much easier three points of contact should personnel need to climb up to the upper platform.

The anti-skid punch plate on the service platform prevents slipping, and recessed bolt heads minimise tripping hazards. A ground-level shutoff switch stops all fuel to the engine when activated and shuts down the machine in emergency and enhances safety.

Website: www.cat.com

Power Curbers offers ConnectSmart Telematics system

Power Curbers has introduced its new ConnectSmart Telematics system. This solution offers a variety of fleet management tools, bringing more visibility to slipforming contractors. Companies can now monitor their Power Curbers and Power Pavers equipment on a real-time dashboard, which is accessible with a web browser or app on mobile devices.

The dashboard enables fleet managers to monitor the live location of machinery across the globe. According to Power Curbers, specific areas like job sites, storage yards and service areas may be 'geofenced' to send immediate alerts if the unit isn't where it should be.

The equipment's current status is always visible, so contractors know whether their machine is running, parked or in transit. The ConnectSmart Telematics system also displays and tracks when the vibrators are on or off in real-time. This is "critical" for slipformers as it allows them to analyse when their unit is idling versus pouring, highlighted Power Curbers. Managing idle time is essential for maximising fleet efficiency and sustainability through reduced fuel consumption and lowered emissions.

Maintenance is more manageable as well, added Power Curbers. Companies can remotely monitor equipment's hours to uphold appropriate service intervals and see live engine outputs through the dashboard. These outputs include fault codes to aid with troubleshooting and repairs.

Website: www.powercurbers.com

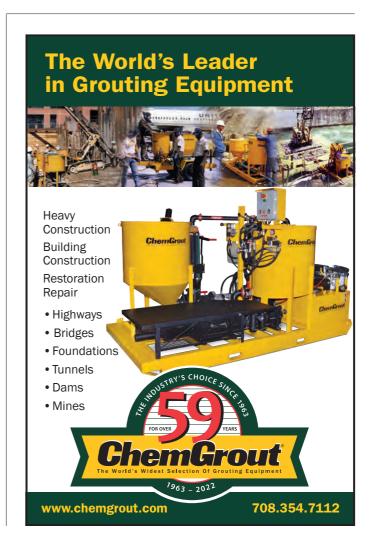






ABOVE AND BELOW LEFT: With ConnectSmart Telematics, companies can now monitor their Power Curbers and Power Pavers equipment on a real-time dashboard, which is accessible with a web browser or app on mobile devices.

BOTTOM LEFT: ConnectSmart Telematics also displays and tracks when the vibrators are on or off in real-time. This is critical for slipformers as it allows them to analyse when their unit is idling versus pouring.





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Liebherr's newly updated 3D lift planning software

The new Liebherr Crane Planner 2.0 is applicable to several Liebherr mobile cranes, all Liebherr crawler cranes with lifting capacities of up to 300 t, as well as hydraulic rope excavators.

This latest version of 3D lift planning software offers additional features, and can be used for further Liebherr LTM mobile cranes. Besides the existing LTM 1750 9.1, it is now available for the LTM 1650-8.1, LTM 1450-8.1, LTM 1300-6.2, LTM 1250-5.1 and LTM 1230-5.1. More telescopic mobile cranes will be added to the programme at regular intervals, with the LTM 1350-6.1 set to be the first.

According to Liebherr, users of the current version will enjoy the benefit of the new crane models and functions automatically and free-of-charge following the update. This also includes the new distance tool, which enables objects such as machines and buildings to be positioned relative to each other with centimetre precision.

The Crane Planner 2.0 helps users to identify solutions and procedures for their lifting work in advance. As a result, complicated heavy lifts with crawler cranes, or relatively quick and easy taxi lifts by mobile cranes, can be completed safely.

The software combines an interactive 3D visualisation of the machines, the loads and surrounding objects with dimensions, a positioning tool and Google Maps, without the need for more costly CAD programmes or high performance computers, said Liebherr. The results of the planning process can be exported in the form of a report and sent to the customer.

Liebherr further highlighted that the combination of a 3D user interface with the exact machine data of the load moment

limitation from the Liccon crane control system is "unique." The data displayed in the Crane Planner 2.0 are determined using the same calculation logic as the live data generated by the real mobile and crawler cranes. Key data – like ground pressures, support pressures, lifting capacities and centres of gravity – are calculated simultaneously. Each time the configuration, load or geometry is changed, a new calculation is performed.

Free and Pro versions

Challenging planning tasks can be carried out in 2D using the 'Free' version. The range of functions is similar to the Liccon work planner. The 'Pro' version also contains detailed interactive 3D models of the cranes, plus a library with various 3D objects such as buildings, roads, machines and load objects. Map views from Google Maps and 3D data can be included in the display in the correct scale.

The Crane Planner 2.0 is easy to use, added Liebherr. Neither special expertise nor extra hardware is required, apart from a standard PC. The software can be downloaded from the Crane Planner home page. A free licence for both the Free and the (feebased) Pro versions can be obtained from the licence shop.

What's more, there is a 'Trial' version that allows users to enjoy a 30-day free trial of the Pro version. Whilst using the Crane Planner 2.0, the calculations of the machine planning data, including lifting capacities, support and ground pressures, are performed online to ensure they are always up-to-date.

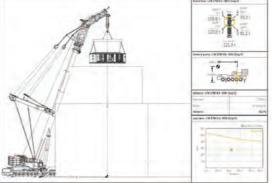
Website: www.liebherr.com/craneplanner



Liebherr's Crane Planner 2.0 features a new distance tool, which enables objects to be positioned relative to each other with centimetre precision.



The combination of a 3D user interface with the exact machine data of the load moment limitation system is unique.



The software allows for fast generation of precise reports, including a combination of all planning data (support pressures, centres of gravity, lifting capacities, etc) for all the machines during every single step of the job.



The displayed data are determined by the same calculation logic system as the live data generated by real mobile and crawler cranes.

Wirtgen rolls out two world premieres

The new WPS 102i is the latest addition to Wirtgen's range of two-track placer/spreaders. The concrete can be placed for working widths from 4 to 12 m, at thicknesses of up to 500 mm. This model was recently unveiled at the World of Concrete (WOC) exhibition, which was held in Las Vegas, the US, from 18 to 20 January 2022.

Thanks to the fully modular machine design with standard hydraulic quick-change couplings, the WPS 102i can be as quickly and easily reconfigured as its 'little brother', the WPS 62i, said Wirtgen. This ensures fast transport from job to job and maximum machine availability. The new WPS 102i can also

be precisely controlled by stringline scanning, stringless 3D applications, or Autopilot 2.0 from Wirtgen.

Another world premiere is the SP 94i, a fully modular, 10-m-class inset slipform paver that can perform a variety of applications, including construction of wide roads and highways, airport aprons, taxiways and runways.

The TeleMold on the SP 94i enables fast and flexible alteration of the working width by up to 1 m on each side, resulting in an overall increase of 2 m. Wirtgen highlighted that short reconfiguration times will lead to "high machine availability and utilisation rates" for paving contractors.

Besides the quick-change elements of the mould, the TeleMold is also equipped with a quick-change system for the metering gate and vibrator mountings. This means that crews can pave and reconfigure the working width "all on the same day." The system can be fitted to SP 64i, SP 94i and SP 124i slipform pavers.

Furthermore, the Wirtgen SP 15i offset slipform paver is available with two new features. The machine now has a retractable extension for the operator's platform, providing operators with a better overview of: the paving results, the concrete feeding system, the transfer hopper, and the inside of the compaction chamber of the mould.

Also new for the SP15i is the 'Curb Depressor Mold', fitted

with a hydraulically adjustable inset integrated in the mould. This is used for the construction of lowered curb profiles, e.g. for driveway access, which significantly reduces the need for manual reworking.

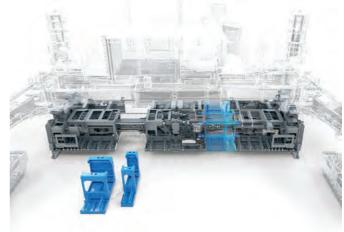
At WOC, Wirtgen showcased its complete concrete paving train – comprising the new WPS 102i placer/spreader, an SP 94i slipform paver and a TCM 180i texture curing machine. The solutions were rounded off by the SP 15i and SP 25i offset pavers.

Website: www.wirtgen.com

MIDDLE: The new Wirtgen SP 94i inset slipform paver with TeleMold. The machine is suitable for various applications, including construction of wide roads and highways, airport aprons, taxiways and runways.

RIGHT: Wirtgen concrete paving train: a placer/ spreader is usually deployed in combination with a slipform paver and a texture curing machine when paving with pre-placed steel rebar.













AUGUST 31 TO 2022 SEPTEMBER 3











Comansa helps build Philippines' new landmark

Two Comansa 21LC660 tower cranes have been working on the construction of Cebu-Cordova Link Expressway (CCLEX), which will connect Cebu City and Mactan Island in the Philippines. This major project aims to alleviate the heavy traffic that currently passes through the existing two bridges.

The CCLEX is set to become a new landmark in the country, awarded by CCLEC (Cebu Cordova Link Expressway Corporation), a subsidiary of MPTC (Metro Pacific Tollways Corporation), to Cebu Link Joint Venture (CLJV) that comprises Acciona, First Balfour and D.M. Consunji Inc (DMCI).

In order to meet the specific requirements of the project, the Comansa 21LC660 flat-top cranes (36-t version) from the 2100 series were selected. This crane model has been designed for maximum performance in projects involving particularly heavy loads, like bridge construction. The 80-m-long booms have also made it possible to provide a wide and accessible perimeter on-site surrounding the two main pylons on which the bridge was built.

The project was divided into three sections: the Cordova viaduct and causeway; the cable-stayed bridge, which is the main bridge; and the access viaducts on Cebu City side. Comansa's tower cranes have been in operation to construct the main (cable-stayed) bridge. When completed, it will span approximately 650 m and be supported by two towers of 150 m height each.

Tower 1 is located a distance from the coast and is not accessible by land, so the tower crane had to be erected with a crawler crane mounted on a boat. Tower 2 is also far from the coast, but in this case a temporary island/dock has been built, thus allowing materials to be delivered for the bridge construction. The tower crane was erected with a crawler crane from this provisional island.

The modular system used by Comansa, with its compact pieces, played an important role in this project as it enabled the tower cranes to be set up within such "complicated circumstances." The cranes carried out several tasks, including lifting heavy equipment – e.g. mobile cranes, boom trucks and concrete pumps weighing up to 32 t – onto the deck during the construction phase.

Throughout concreting operations, the cranes helped to lift 5 cu m concrete buckets (weighing about 12 t) from the pile cap onto the deck and move them in a 40-m working radius, in order to feed the static pumps used for delivering concrete to the segment being built. Other tasks performed by the cranes include lifting and placing pylon formwork and prefabricated pylon rebar cages (about 8 t), lifting rebar bundles for structural works, anchor boxes lifting and installation for the stay cables, and stay cable installation.

The ability to automatically change reeving, combined with the Power Lift system, allowed the cranes to easily adapt to a wide range of loading manoeuvres, handling different volumes and weights.

Given the bridge's location in a country that is often affected by typhoons during the rainy season, the tower cranes have been designed to handle winds of up to 250 km/hr. In addition, due to their height and proximity to the Mactan-Cebu Airport, both the cranes and the booms have been fitted with safety lights in compliance with civil aviation regulations.

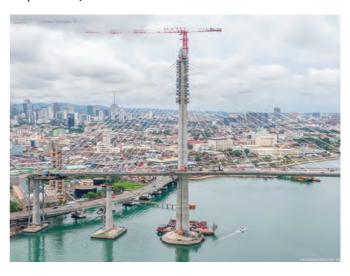
According to Comansa, the cranes were struck by lightning during construction, "but thanks to their lightning protection, the operators were unharmed and the tower cranes were able to continue working after undergoing mechanical and electrical





TOP AND ABOVE: Two Comansa 21LC660 tower cranes at work on the Cebu-Cordova Link Expressway (CCLEX), one of major infrastructure projects in the Philippines slated for opening this year.

BELOW: The cranes feature a modular system and they can handle winds of up to 250 km/hr.



checks," which was assisted by the Comansa technical team through its online support. The CCLEX is scheduled for opening in the first quarter of 2022. ■

Website: www.comansa.com



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Terex MPS supplies aggregates to Pan Borneo Highway

Malaysia-based quarrying and asphalt company Asas Nikmat Sdn Bhd (ANSB) has selected a 350-tph Terex MPS plant to supply steady, reliable aggregates for the Pan Borneo Highway project – Malaysia's biggest road project that spans over 2,000 km, connecting two East Malaysian states, Sabah and Sarawak. Once complete, it will establish a transportation backbone and deliver significant economic benefits to the region.

Construction of such a major infrastructure project relies on securing a reliable supply of aggregates of suitable quality. ANSB, one of the local aggregate producers selected for the job, turned to Terex MPS for a solution that would meet its needs.

"Our previous dealings with Terex MPS gave us confidence that their equipment is reliable and well-engineered," said Andrew Wah, director at Asas Nikmat Sdn Bhd. "We required a plant that could provide a large output capacity while having the flexibility in producing different types of aggregates, based on the project's demand."

The solution was a 350-tph Terex MPS plant, consisting of a ST47 single toggle jaw crusher that features large gape feed openings, high production and low operating costs. These rugged machines are manufactured with heavy-duty parts for constant operation and long life. As well as this, the plant features three cones, G30 cone crusher (which suited the project's need to be able to take in large lump of 345 mm from the 6-in by 9-in tunnel), J35 cone, and TC1000 cone.

Together this equipment provides a robust, reliable solution for feeding 700 mm sandstone at approximately 350 tph to produce -50 + 0 aggregates, to be used for road base throughout the highway project. It has been operating onsite for about two years and will continue to perform for many years until the project has been completed.

"The equipment is performing above our expectations, delivering more capacity, better shaped product and requiring less maintenance," said Mr Wah. "What we have also appreciated is the support provided by Terex MPS – the team were a great

help and resource during the planning and commissioning of the plant.

"They were able to communicate effectively with our team to ensure that it was optimised to meet our specifications while also achieving the robust safety, functionality and performance standards needed for our jobsite. The result is a plant that is operating effectively, with minimal downtime."

Benjamin Tong, sales manager at Terex MPS said, "ANSB has an excellent reputation for providing their customers with the highest quality service and products that perform for their requirements. Having them choose Terex MPS for this large-scale construction project is a terrific testament to the safety and high performance of our equipment, coupled by the close aftermarket support we provide to our customers to make sure our equipment is operating as required."

Website: www.terex.com/mps





ALL IMAGES: The Terex MPS plant helps build the Pan Borneo Highway in Malaysia, by producing aggregates to be used for road base throughout the project.



DRILLING IT...LIKE VERMEER



development with the new D130S and D60S horizontal directional drills (HDDs) designed exclusively for emerging markets. These machines will be available in select nations throughout Latin America, Middle East and Africa, Asia Pacific and select countries in Europe.

"We understand that operators in Asia, Latin America and other developing nations are looking for a drill that's specifically for their market," said Colm Rafferty, vice president of developing markets at Vermeer. "That's why we designed the D130S and D60S with the power and productivity they have; so that operators in these areas could have drills that meets their needs."

The new HDD models are manufactured at the Vermeer manufacturing facility in Tianjin, China, and built with "the same high-quality parts and components that Vermeer is known for around the world," said the manufacturer. The new naming structure indicates a new generation of the pipeline drills from Vermeer for the emerging markets, which comes with several enhanced features that enable high functionality, productivity, and ease of use.

According to Vermeer, the need for the D130S and D60S came from hearing that operators in developing nations needed a way to facilitate greater connectivity and support the development of both rural and urban areas.

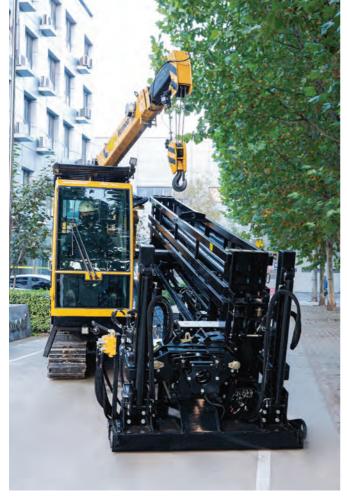
"With new infrastructure needing to be developed, including telecommunications (fibre optics), water, electricity, gas and oil pipeline installations across varying ground conditions and locations, a new machine was necessary to take on challenging, large diameter drilling projects without worrying about space restrictions," explained Vermeer.



TOP AND ABOVE: The Vermeer D60S HDD has 266.9 kN of thrust and pullback and 12,202.4 Nm of rotational torque.

"Both drills are capable of tackling those infrastructure projects. They are also designed to keep surface disruption to a minimum, which helps in densely populated or residential areas."

"We wanted to create machines that built upon their predecessors, still delivered the same high manufacturing quality and were specific to operators drilling in developing nations," added Mr Rafferty. "These drills are compact, powerful, and productive enough to appeal to operators large and small, and I believe can make a big difference in a company's drilling capabilities and efficiencies."









ABOVE LEFT AND ABOVE: The Vermeer D130S HDD is equipped with 578,200 kN of thrust and pullback and 20,337 Nm of rotational torque.

FAR LEFT AND LEFT: Other features on the D130S include an operator-controlled rod loader, climate-controlled cab, optional crane and optional front-mounted stakedown system.

BELOW: The D130S and D60S HDDs are designed exclusively for emerging markets. They will be available in select nations throughout Latin America, Middle East and Africa, Asia Pacific and select countries in Europe.

The D130S is equipped with 578,200 kN of thrust and pullback and 20,337 Nm of rotational torque, helping it penetrate through different and difficult terrains. Other features on the machine include an operator-controlled rod loader, climate-controlled cab, optional crane and optional front-mounted stakedown system.

The D60S has 266.9 kN of thrust and pullback and 12,202.4 Nm of rotational torque, making it one of the most powerful drills in its class. The additional features on the machine include a tethered remote control, ease of serviceability, three-speed gearbox, operator-controlled rod loader and climate-controlled cab.

Another enhancement made to both drills is the Plus+1 control system to maximise precision and reliability. Paired with the drill's AutoSteer system, which automates certain drill head motions, it allows operators to set and adjust rotation duration and direction, while maintaining a pre-set thrust pressure to get through hard ground conditions. To top it off, the console design of the drill was updated to provide a user-friendly bore path adjustment experience for the operator.

Website: www.vermeer.com



ELECTRIFYING THE FUTURE



Electric glass attachment boom lift

Dingli recently launched a new electric glass attachment boom lift, the BT2615ERTGS. It is powered by 80-V, 520-Ah maintenance-free high-capacity lithium battery pack with quick charging of 1.5 hours.

The BT2615ERTGS has a maximum suction capacity of 1,500 kg and maximum lifting height of 26.02 m. The machine is equipped with eight independent suction pads without pipelines, and can be operated with a wireless remote control.

According to Dingli, the BT2615ERTGS was developed based on the previous (engine-powered) model, the BT26RTGS. They feature the same boom frame design. "The swivel angle of the snatch mechanism has been upgraded from +/-90° to 360° continuously, making work safer and more convenient," added the company.

The other electric model, the BT2612ERTGS, was introduced earlier. It offers a maximum suction capacity of 1,200 kg. Dingli said this machine can handle 13 large, heavy glass panels per day on average, with a maximum of 16 panels.



The earlier model of Dingli electric glass attachment boom lift, the BT2612ERTGS, offers a maximum suction capacity of 1,200 kg. This machine can handle 13 large, heavy glass panels per day on average.



ABOVE AND RIGHT: The electric glass attachment boom lifts are powered by 80-V, 520-Ah maintenance-free high-capacity lithium battery pack with quick charging of 1.5 hours.



Electric articulating boom lift

Dingli has also unveiled a new electric articulating boom lift, the BA22ERT, which provides a maximum working height of 22.22 m and maximum horizontal reach of 12.43 m. The safe working load for the machine is 230 kg, and it can accommodate up to two people.

Equipped with 375-Ah tubular battery, the BA22ERT delivers zero noise and zero emissions. The machine is suitable for indoor and outdoor applications, especially in areas that have strict environmental requirements such as residential sites, airports, and shopping malls.

Dingli further highlighted that the new BA22ERT boom lift is able to operate for a long duration and with high energy efficiency.

In addition, the machine is designed for excellent stability on jobsites. It features four-wheel steering and four-wheel drive (4WS/4WD), a gradeability of 30%, and "special axle for construction machinery," revealed Dingli. The components are located on both sides of the chassis for easy maintenance.

According to Dingli, its electric boom lifts now cover working heights ranging from 16 to 30.3 m. ■

Website: http://en.cndingli.com



BEST OF BOTH WORLDS

AVAILABLE FOR THE GLOBAL MARKET, THE NEW TADANO AC 2.040-1 IS THE FIRST MODEL TO BE JOINTLY DEVELOPED BY TADANO'S LAUF AND ZWEIBRÜCKEN (DEMAG) FACILITIES IN GERMANY.





TOP AND ABOVE: The AC 2.040-1 all-terrain crane is the first member of the new Tadano AC family.

he AC 2.040-1 all-terrain crane is the first member of the future Tadano AC family, signalling the completion of the brand merger (between Tadano and Demag) – all Tadano Group cranes will be sold exclusively under the Tadano brand name.

"That's why this market launch is really special for us – after all, the new AC 2.040-1 is the first crane to combine the best of our two worlds with the know-how from Zweibrücken and Lauf," said Dr Frank Schröder, VP of all-terrain crane product line.

Innovative features

The AC 2.040-1 is suitable for a wide range of applications, such as roofing projects, photovoltaic system installations, and lifting containers and other materials on jobsites. The crane is compliant with EU Stage V emission standards, while Stage 3 engines will be offered to low-regulated markets, according to Tadano.

The IC 1 Plus control system on the AC 2.040-1 has automatic counterweight detection, a capacity radar and a work area display. The system determines the crane's lifting capacity for every boom position as a function of the superstructure's slewing angle. This enables the AC 2.040-1 to make use of the maximum available lifting capacity with any outrigger configuration, including asymmetrical ones. When combined with the Flex Base system, the outriggers can be extended to any point within their range.

The Tadano Surround View camera system shows both the maximum possible extension lengths for the outriggers and the counterweight tailswing radius. The system also provides assistance on the way to the jobsite by making it easier for crane operators to notice pedestrians and cyclists when turning.



The IC 1 Remote telematics solution enables efficient crane and fleet management, and shows both the location of the AC 2.040-1 and all its operating information on the monitor. This system helps with scheduling projects and routine maintenance, ensuring that the crane will have the highest possible availability for assignments. Moreover, it can be used to read error codes so that service team members can read the corresponding data 'remotely' and run fault analyses to quickly diagnose and fix problems.

The E-Pack with its 32-kW electric motor is optionally available and allows the AC 2.040-1 to work whisper-quiet and with zero emissions indoors and at night-time in residential areas.

Compact and manoeuvrable

The Tadano AC 2.040-1 is ideal for use on constrained jobsites. It features steerable rear axle with automatic programmes for extremely tight radii and crab steering. The compact design with an optimised weight also provides outstanding taxi crane capabilities. The AC 2.040-1 can carry up to 1.1 t of counterweight while staying under an axle load limit of 12 t.

This two-axle crane has been designed for excellent gradeability and acceleration, as well as quiet travel operation, particularly in comparison to larger cranes — an aspect that is becoming increasingly important against the backdrop of stricter noise emission limits in urban environments.

A rear storage box is fitted on the AC 2.040-1, which has been carried over from the Tadano ATF 40G. The box continues to be available with or without a wood rack and is removable. "This solution is extremely popular among our customers, and we expect it to be a fixture in all future AC developments," said Dr Schröder.

In terms of lifting performance, the AC 2.040-1





ABOVE LEFT. ABOVE AND LEFT:

The AC 2.040-1 is equipped with several innovative features, including the IC 1 Plus control system, Tadano Surround View camera system, IC 1 Remote telematics solution, and E-Pack with a 32-kW electric motor.

BOTTOM: The crane is ideal for use on constrained jobsites. It features steerable rear axle with automatic programmes for extremely tight radii and crab steering.

raises the bar when it comes to steep boom positions. With a fully extended boom length of 35.2 m at a radius of 8 m, it can lift loads of up to 7.6 t – "something that no other crane in this class can do," said Tadano.

Equipped with its powerful hydraulic boom, the crane can handle heavy lifts with loads of up to 31.9 t without requiring any additional sheaves. "This enables the AC 2.040-1 to take care of a very broad range of lifts without carrying out timeconsuming setup changes, making it both

a fast and versatile machine," highlighted Dr Schröder.

The AC 2.040-1 also has the ability to telescope under load with "impressive" lifting capacities, added Tadano. The runner ensures fast and efficient work on jobsites, and can be carried directly on the crane to the left of the main boom. Finally, if the maximum main boom length of 35.2 m is not enough, the crane's range can be extended with a 9-m-long extension that can be offset by up to 40°.

Website: www.tadano.com



ACHTON TRACK

onstruction of the 4.31-km Pertamina Mandalika International Street Circuit on Lombok Island's southern coast began in June 2020, as part of the Indonesian government's campaign to promote new international tourist destinations. Paving works began in February till August 2021, with the entire project completed by October 2021.

The circuit was ready to host its first race – the finale of the FIM Superbike World Championship (WorldSBK) season – during 19-21 November 2021. The next event will be the MotoGP international motorcycle racing in March 2022, which returns after a 24-year hiatus.

Operated by the Mandalika Grand Prix Association (MGPA), the generally flat circuit features 17 turns – many of them medium- or high-speed – with just a few hard braking areas. It has met the Fédération Internationale de Motocyclisme (FIM) Class A level, and is also aiming to meet the Fédération Internationale de l'Automobile (FIA) Grade 1 level to be eligible for consideration as a potential future Formula 1 venue.

BELOW: Stone mastic asphalt (SMA) was used to pave the surface layer of the 4.31-km Pertamina Mandalika Circuit, making it less slippery and more resistant to intense heat and heavy loads.



Tough surface

As the resort area of Mandalika forges ahead with its multi-billion dollar transformation into a luxury coastal resort worthy of rivalling nearby Bali, the track will become the only street circuit in the prestigious MotoGP calendar functioning as an ordinary road when no events are scheduled.

A Lintec CSD3000 containerised asphalt plant, which is believed to be the largest mixing plant in the country, has been key to delivering this new, premium-quality racetrack in record time. Two units of Linnhoff TSD1500 MobileMix asphalt plants were also deployed to produce the asphalt mix for the run-off areas.

The surface layer is specially paved using stone mastic asphalt (SMA) mixture, which combines the tough coarse aggregate Tau stone from Palu, Central Sulawesi, with performance grade (PG) 82 polymer-modified bitumen (PMB). Also added was limestone filler from Ponorogo and Probolinggo, East Java, and cellulose fibre additives from Germany, only the highest-quality materials were used.

Such asphalt mix is ideal for the project. By strengthening the structure of the surface layer so that it remains strong through stone-by-stone contact, its high cohesive strength provides greater resistance to intense heat and heavy loads. Additionally, by remaining non-slippery in wet conditions, this mix is especially suitable for racetracks in tropical regions.

The Lintec CSD3000 features effective screening, accurate weighing, proper and efficient drying, and an output of up to 240 t per hour. This high-capacity asphalt plant was chosen to minimise the paving joints for a smoother racetrack surface. It supplied a total of over 50,000 t of hot mix asphalt for the three layers of the main track; namely the asphalt concrete (AC) base layer, AC binder layer, and the SMA surface layer.

"The contractors appreciated the consistent quality of the finished mix," said Teo Siang Leong, general manager (sales) at Lintec & Linnhoff Asphalt Pte Ltd. "And, because of our unique double screen drum technology, they benefited from considerable energy savings as there is no hot elevator or vibrating screens – this also resulted in higher reliability and required less maintenance work."

Indonesia's first

As the first asphalt plant of this size to be used in Indonesia, the Lintec CSD3000's





LEFT: Paving works began in February till August 2021, with the entire project completed by October 2021.

ABOVE: The Lintec CSD3000 asphalt plant supplied more than 50,000 t of hot mix asphalt for the street circuit.

BELOW: Two Linnhoff TSD1500
MobileMix asphalt plants produced
90-100 t of hot mix asphalt per hour,
and were primarily used for the run-off
areas around the main track.



innovative modular construction (the entire plant is built inside ISO shipping containers for safe, economical transportation) allowed for fast installation and commissioning after arriving on the jobsite.

Two Linnhoff TSD1500 MobileMix asphalt plants also worked on the project. These mid-size models of the range produced 90-100 t of hot mix asphalt per hour, and were primarily used for the run-

off areas around the main track.

The run-off areas play host to a large paddock facility containing 40 garages, along with temporary grandstand seating for 50,000 fans and 7,700-person-capacity hospitality suites, all of which will be removed at the end of each race schedule. Moreover, there is a standing tribune area catering for 138,000 spectators.

Website: www.lintec-linnhoff.com

Connecting Jakarta



The MRT Jakarta Phase 2 project is currently underway. It continues the north-south corridor railway line from the Bundaran HI roundabout to West Ancol for a total of 11.8 km.

he Indonesian capital Jakarta is a highly populated city with immense congestion. To address this issue – and also reduce carbon emissions from the road traffic – the provincial government Daerah Khusus Ibukota (DKI) Jakarta decided to build the city's first mass rapid rail system in 2013. Phase 1 was already opened in 2019, while Phase 2 is still underway.

The project is being carried out by DKI Jakarta's land transportation authority PT Moda Raya Terpadu, known as PT MRT Jakarta (Perseroda). The company will operate the entire commuter rail line, MRT Jakarta, once it is complete.

"Previously in Indonesia, not only in Jakarta, the government was focused on private vehicle infrastructure development, such as toll roads, urban roads and parking areas. Today, the trend is slowly changing with the government now giving more attention to support an integrated public transportation system that is able to raise public interest in the shift from private vehicles to public transportation," explained Silvia Halim, director of construction at PT MRT Jakarta (Perseroda).

Expansive rail network

Despite often stand-still traffic, there has been minimal interest in using public transit, with most Jakartans believing that driving is the most effective form of travel. Many have expressed concern about the comfort, safety and longer commute times associated with unintegrated mass transit, according to Ms Halim. However,

the development of MRT Jakarta as a safe, unified and sustainable rapid railway is expected to change public perception and in turn increase public transit use.

MRT Jakarta is an expansive rail network that will ultimately connect all corners of the greater metropolitan area to its centre. The layout will disperse future city growth and create new urban centre, which will provide more opportunity for development in Jakarta's suburbs and stimulate the economic value of the areas around each station.

As part of this planned urban expansion, increased accessibility to transit stations in the suburbs will alter traffic patterns, contributing to a reduction in roadway congestion. PT MRT Jakarta (Perseroda) aims to raise public transportation use from around 30% currently to as high as 60% in the future.

"Stations have been built at strategic points across the capital city of Jakarta and are connected to other modes of public transportation to make it easy for passengers to reach their destinations," said Ms Halim.

A decades-long project

The approximately 23-km north-south corridor was planned to be delivered in two phases. Phase 1 consisted of building a 16-km line from Lebak Bulus Grab Station to Bundaran HI Station. This section was built first because the majority of Jakarta's working population lives in the area.

Phase I was opened to commuters in March 2019, comprising 13 stations. Given the public's reliance on vehicular travel, PT MRT Jakarta (Perseroda) expected usage to grow slowly. Citizens were reportedly "sceptical" about the railway, citing concern over fare costs and its integration with other mass transit systems.

Ms Halim mentioned that the Jakarta government has "provided subsidies for the operation of the MRT Jakarta so that the costs are in accordance with the public's ability."

Since operation of the transit system began, traffic congestion has reduced, vehicle speed has increased by 3%, and particulate matter pollution has decreased by 18%, according to a 2021 study from Institute for Economic and Social Research, University of Indonesia. In 2019, the rail line saw almost 95,000 more passengers per day, 30,000 more than anticipated. One of the reasons for its swift success has been the reliability of the automated train system.

"In an effort to support citizen mobility, MRT Jakarta's service operations have managed to achieve a 99.88% on-time performance that includes the time to travel from one station to another, a 99.92% exact train dwelling time at stations, and 99.82% arrival punctuality at stations," revealed Ms Halim.

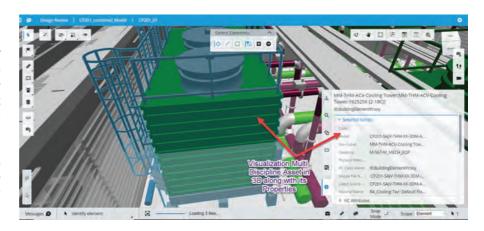
As commuters have been able to successfully ride on this rail line and recognise its consistency for several years, the public now has greater confidence in the next stage of the project, according to MRT Jakarta's president director William Sabandar, during his interview with McKinsey & Company in 2019.

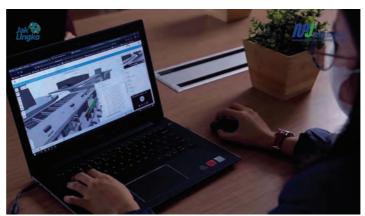
Phase 2 of the project continues the north-south corridor railway line from the Bundaran HI roundabout to West Ancol for a total of 11.8 km. Currently under construction, Phase 2 is being divided into two stages, with the first stage stretching to Harmoni Station scheduled to be operational in April 2025, and the second stage projected to be completed in 2027.

Digital solutions

PT MRT Jakarta (Perseroda) used Bentley Systems' digital twin and project management software to centralise project information and streamline design collaboration.

Due to the global pandemic that postponed Phase 2, MRT Jakarta was asked to speed up this next stage of the project, which meant ensuring there were no delays caused by data inaccuracies, blockages in





ABOVE: PT MRT Jakarta (Perseroda) used Bentley Systems' digital twin and project management software to centralise project information and streamline design collaboration.

LEFT: Using a connected data environment enabled real-time access to rail design and saved approximately 10% of time.

design reviews, or miscommunications. Using a connected data environment enabled real-time access to rail design and saved approximately 10% of time.

In parallel with the completion of the north-south corridor, MRT Jakarta is developing and preparing an east-west corridor stretching from Kalideres to Ujung Menteng, considered Phase 3. While Phase 4 will involve construction of railway lines that form an outer loop in the southern section of Jakarta.

Easy access to railway stations

PT MRT Jakarta (Perseroda) is focused on urban regeneration and developing infrastructure that "excels in all ways." Consequently, the railway stations follow the guidelines of a transit-oriented development (TOD) masterplan, which improves access to the station and offers a better pedestrian experience through open green spaces and enhanced sidewalks, bridges and streetscapes for those walking and bicycling to the station.

"Not only are MRT stations close to office areas, but they are also located near a variety of shopping and culinary centres, as well as popular tourist attractions," said Ms Halim. The guidelines of development around the MRT stations incorporated

improved connectivity to these locales and preservation of any existing heritage sites near the stations.

Additionally, the stations are energy efficient, utilising electricity as their main power source, and they are equipped with LED lighting, non-CFC air conditioning, and energy-efficient platform screen doors at train entrances that block heat from the rail.

"The creation of MRT Jakarta represents a breakthrough in public transportation," concluded Ms Halim. "Not only does it increase mobility, but MRT Jakarta also brings with it a number of other benefits, such as improving the quality of the city's air and becoming a solution to the capital's serious traffic congestion problem while transforming people's life habits as they gradually switch from the use of private vehicles to public transportation."

Website: www.bentley.com

Note: The MRT Jakarta Phase 2 project has been named a finalist of Going Digital Awards in Infrastructure 2021 (under the Rail and Transit category) by Bentley Systems.

All images © PT MRT Jakarta (Perseroda)



Preserving Casa Batlló

asa Batlló is one of popular tourist and cultural attractions in Barcelona, Spain, which has been designated a UNESCO World Heritage Site. Originally designed in 1877 by Emilio Sala Cortés, the place owes its fame mainly to the architect Antoni Gaudí. In the early 1900s, Casa Batlló was bought by a textile businessman named D. Josep Batlló y Casanovas, who commissioned Gaudí to carry out reconstruction in 1904.

The initial plan was to destroy the building, but Gaudí reportedly managed to convince that a renovation was the better solution. So, he redesigned the interior and changed the facade completely, transforming the place into an artistic and architectural jewel. According to a few experts, this was considered a pioneer of the 20th century avant-garde movement.

Today, Casa Batlló belongs to the Bernat family and it is open to the public for cultural visits and social events.

Meeting current standards

Since 1940, Casa Batlló has undergone restoration, renovation, structural and consolidation work several times with the aim of turning it from a mainly residential use to a more public use – for administrative, commercial and cultural purposes – and to bring the structure in line with new norms and standards.

With that in mind, a master plan was approved in 2014 to ensure the building meets current fire norms and standards as well as to improve the route followed by visitors through the internal spaces of the building.

Joan Olona, a member of the technical team that drew up the master plan, shared the works that have been performed on Casa Batlló. "The first phase was dedicated to a thorough analysis of solutions that would improve accessibility to and evacuation from the building, to bring the functionality of this house/museum in line with the requirements of its new type of use.

"As far as the actual restoration work was concerned, there were three main areas we worked on. The first area was the main floor with renovation work on the original render that had either disappeared or become unrecognisable. The second area concerned restoration work on the facade and attic that completes the building, while the third area was the chimneys on the roof. In addition, work was also carried out on the upper and lower parts of the courtyard."

Mr Olona pointed out that the master plan has established a guideline. "The restoration of any work by Gaudí must ensure that his original architectonic decisions are maintained, and it shouldn't be limited to a purely practical intervention, but should attempt to reconstruct the critical context of the architecture.

"What is more, Casa Batlló itself is the result of work by Gaudí on a pre-existing building. For us, this was an even more complex challenge, because when carrying out restoration work, we have to verify what is the actual work of Gaudí, what came before him and what came after him."

Structural strengthening in the interiors

Following the master plan, between 2015 and 2017, a stairway and lift were designed and installed to improve access between the various floors of the structure, from the basement to the attic. The lift runs between the second floor and the roof, whereas the







OPPOSITE AND TOP: Casa Batlló was built in the centre of Barcelona in 1877. In 1904 Antoni Gaudí redesigned the place and turned it into an artistic and architectural jewel.

ABOVE AND LEFT:
Structural strengthening work was carried out on the arches, vaulted ceilings and masonry using Mapei systems, consisting of Planitop HDM Restauro, Mapegrid G 220 and Mapewrap G Fiocco.







LEFT AND FAR LEFT: The crystal spheres were fastened to the mouths of the chimneys using Mapewrap G Fiocco impregnated with Mape-Antique I.

LEFT: On the external faces of the vaulted ceilings, some of the cracks were 'stitched' with Maperod G.

staircase connects all the floors and occupies an area measuring 5.5 m by 3 m.

The staircase has a metal structure which has been deliberately kept at a certain distance from the nearby walls, apart from in several points where the ceramic covering has been partially removed. The staircase does not create any problem of stresses or loads on the nearby walls, but to make them stronger and more ductile, the masonry has been strengthened using composite materials from the Mapei structural strengthening and masonry restoration lines.

Work started with the application of a first coat of Planitop HDM Restauro two component, pre-blended, fibre-reinforced, high ductility mortar made from natural hydraulic lime (NHL) and Eco-Pozzolan to level off the substrate. Mapegrid G 220 alkali-resistant glass fibre mesh was then placed on the mortar.

The strengthening work was undertaken before demolishing the part under the wall, leaving just the right amount of Mapegrid G 220 mesh so that it could be folded back onto the opposite side and the reinforcement intervention could be completed by making an overlap.

Holes were drilled in the masonry and Mapewrap G Fiocco unidirectional high-strength glass fibre cords were inserted into the holes, creating a series of 'structural connections' inside the existing masonry. After that, a second layer of Planitop HDM Restauro was applied to complete the intervention.

A final skim coat was applied to the masonry using Mape-Antique FC Civile, a salt-resistant, fine-grained mortar made from lime and Eco-Pozzolan. The same system was used for the structural strengthening work on the arches and vaulted ceilings in a number of areas inside Casa Batlló and in the attic.

The Planitop HDM Restauro, reinforced with the Mapegrid G 220, was also applied on the substrate for the trencadis (broken mosaics), the glass and ceramic mosaic covering the facade, to repair

the old cracks and prevent them from opening up and fracturing the ceramic coverings. Instead of using a mortar, Maperod G pultruded glass fibre bars were chosen for crack-stitching, as this product is suitable for repair and structural strengthening work on damaged concrete, wood and masonry elements.

New spheres for chimneys on the roofs

Mapei's involvement in the Casa Batlló project began in 2015 until 2020. The company also took part in restoration work on the crystal spheres positioned above the chimneys towering over the roof. To fasten the spheres to the mouths of the chimneys, the Mapewrap G Fiocco glass fibre cord was used again, this time impregnated with Mape-Antique I super-plastic, salt-resistant, fillerised hydraulic binder made from lime and Eco-Pozzolan.

Mr Olona further highlighted that the team discovered two different types of mortar had been originally used to bond the fragments of ceramic covering the facade. These include "a white one, presumably lime-based, and a grey one made from Portland cement."

Two different mortars had also been used on one of the groups of chimneys on the roof, he added. "In this case, we found that mortar made from Portland cement had been used along with a natural cementitious mortar. Thanks to an interview the architect Bassegoda gave in 1970 to Josep Bayó, the owner of the construction company that built Casa Batlló, we know that these chimneys used to be adorned with crystal spheres containing coloured sand.

"So, while carrying out the restoration work, we also had new crystal spheres made and, instead of the steel cornices originally used that had caused them to break, we adopted a system consisting of fibre-reinforced mortar and glass fibre cords to fasten the spheres to the mouths of the chimneys."

. Website: www.mapei.com.sg

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