

# SOUTHEAST • ASIA CONSTRUCTION

MAY - JUNE 2021



## Cover Story:

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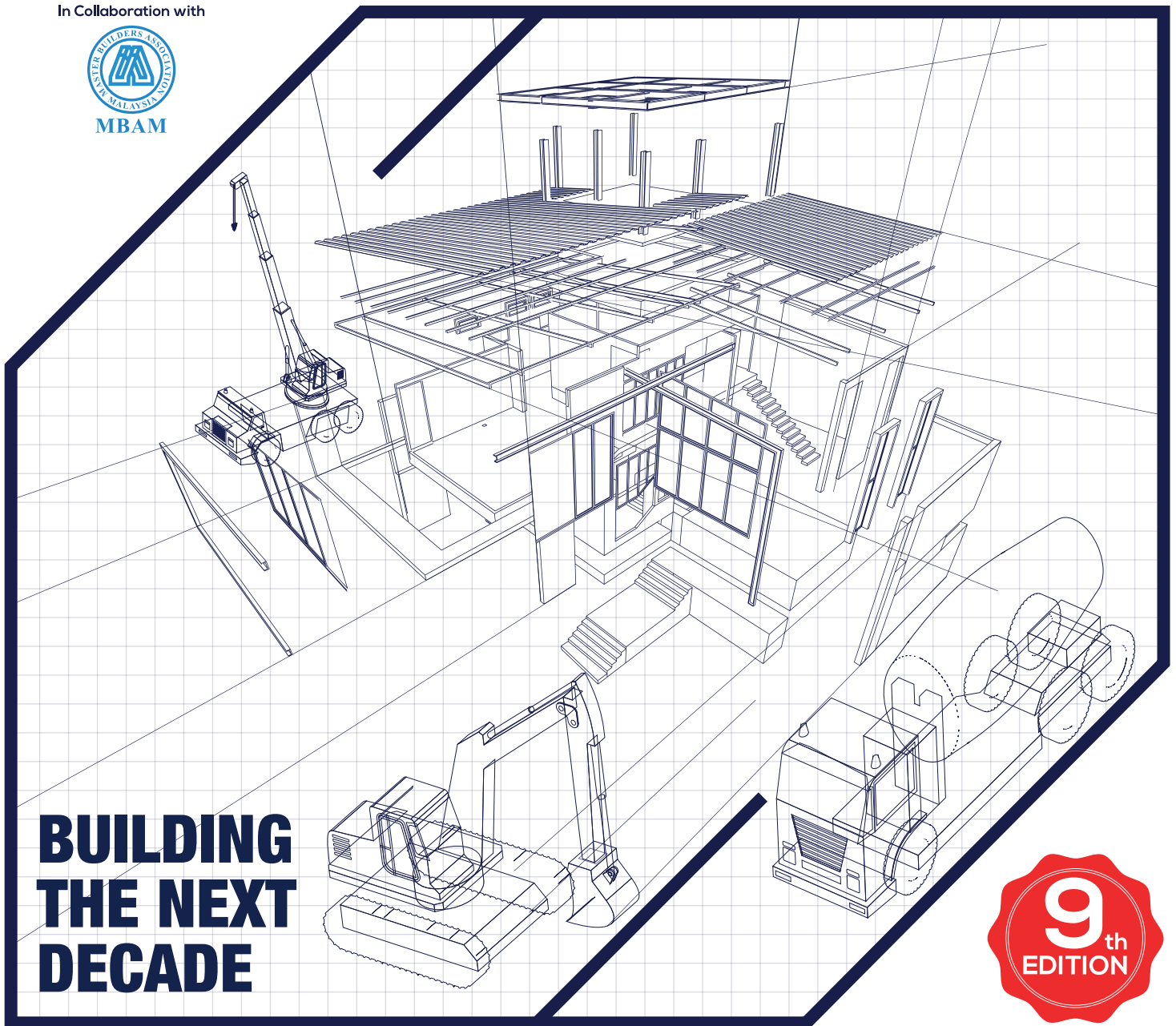
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The Cebu-Cordova Link Expressway project in the Philippines

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### Cover designed by

Fawzeeah Yamin

### Publisher

Steven Ooi (steven.ooi@tradelinkmedia.com.sg)

### 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)

### 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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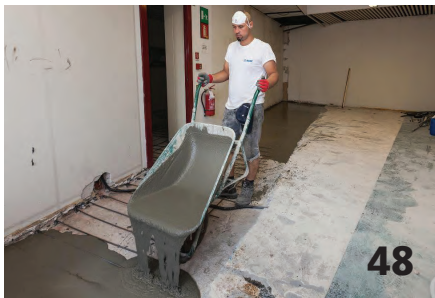
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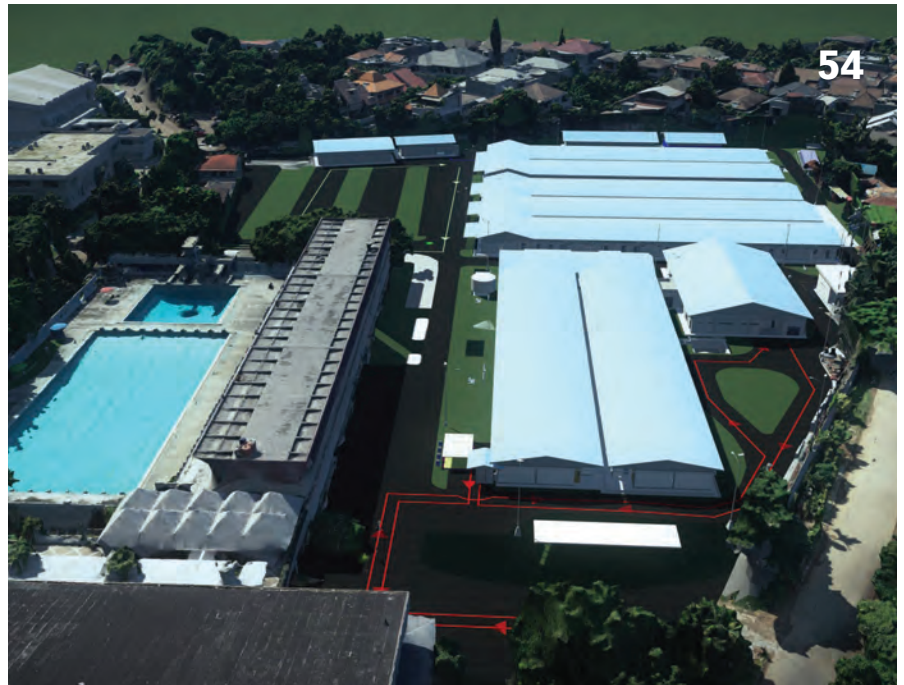
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 T. Asoshina/Shizuka Kondo, ECHO Japan Corporation  
 Grande Maison Rm 303, 2-2, Kudan-Kita 1-Chome, Chiyoda-ku, Tokyo 102, Japan  
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# Mitbana and Sinar Mas to develop TOD project in Indonesia

Mitbana, a joint venture company of Mitsubishi Corporation and Surbana Jurong, together with Sinar Mas Land (SML) through its subsidiary, PT Bumi Serpong Damai (BSDE), have announced that they will be jointly developing the first interconnected multi-modal transport complex in Greater Jakarta, Indonesia. This project is Mitbana's maiden undertaking in the country and is part of a growing partnership with SML.

The new transit-oriented development (TOD) is strategically located in the Intermoda district in Bumi Serpong Damai (BSD) City, BSDE's largest established and thriving satellite township in Greater Jakarta. Capitalising on existing facilities built by BSDE, the Intermoda TOD will offer unparalleled access to multiple public transportation options including road, rail, and park-and-ride facilities to enhance last-mile connectivity and reduce congestion from the BSD area to Central Jakarta.

A key feature of the Intermoda TOD will be its connection to the Cisauk train station, which is situated along the Kereta Rel Listrik (KRL) commuter line that connects directly to Jakarta's Sudirman central business district in under an hour. Refurbished by BSDE in 2019, the Cisauk station is connected by overhead walkways to various amenities including Pasar Modern, an urban marketplace offering fresh produce, groceries and fast-moving consumer goods, as well as an existing bus interchange which currently serves BSD City.

As part of the development of the new Intermoda TOD, the existing pedestrian connections from Cisauk station will be expanded and upgraded to include new retail and food & beverage offerings. When completed, the entire Intermoda TOD will cover a land area of approximately 6 ha. It will feature a new town centre with community facilities catering to young families, working professionals and students such as those from Atma Jaya Catholic University, situated 400 m from the development.

According to Mitbana and SML, their collaboration will also explore smart technologies to enhance bus services within BSD City and other surrounding townships. These enhancements will complement Cisauk train station's connection to the future Serpong-Balaraja (Serbaraja) toll road section 1A, which is expected to be operational by the end of 2021.

Gareth Wong, CEO of Mitbana commented, "Mitbana is excited to partner Sinar Mas Land in this rare opportunity to build a future-ready development that will cater to the growing needs of BSD City and provide greater connectivity for its residents. We see great potential in the Intermoda district and will leverage its unique attributes of being connected to an upgraded commuter rail station and an operational bus interchange.

"Our vision is to develop a new urban precinct with modern services conveniently located around the Intermoda TOD and to promote sustainable living by making public transport options even more accessible. We look forward to delivering affordable, quality housing that will cater to the mass market in BSD City."

Construction of the Intermoda TOD, which has a total development value of approximately S\$200 million, is expected to commence in phases starting from 2022. This project is part of Mitbana and SML's larger goal to transform over 100 ha of greenfield land in BSD City into TODs comprising residential apartments, commercial properties, lifestyle amenities and public transport nodes.

As the 60% majority shareholder of the joint venture, Mitbana



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ABOVE: An artist's impression of the Intermoda TOD Phase 1 development in Greater Jakarta.

LEFT: The Intermoda TOD is located near existing facilities with access to multiple public transportation options.

said it will also introduce best practices in urban development from Japan and Singapore and embrace new technologies to create future-ready TODs. "Mitbana will leverage Mitsubishi Corporation's experience in curating urban developments and Surbana Jurong's technical expertise in urban design to create a smart and high-quality TOD that is efficient and effective for its residents," explained Hidetoshi Suzuki, chief operating officer of Mitbana.

"Recognising the need to contextualise our development offerings to the local market, Mitbana will work with suitable partners to offer affordable best-in-class products and solutions. Together with Sinar Mas Land, we want to create a leading smart and sustainable development in BSD City and foster the building of an inclusive social community."

Mitbana and SML further highlighted that the formal sales launch of the Intermoda TOD will be unveiled at a later stage and tap on recent measures announced by Indonesia's central bank, Bank Indonesia, to boost the property sector. These measures include relaxation of loan-to-value ratios for property mortgages and easing of mortgage disbursements to accredited property developers, and are expected to improve overall affordability for local buyers and spur demand. As Mitbana's local partner in Indonesia, BSDE will play a critical role in advising on such matters and oversee the land preparation, infrastructure development and local stakeholder engagements.

"The Intermoda TOD will define the next generation of urban living in Greater Jakarta and set the stage for a sustainable community that we have envisioned in BSD City," said Michael Widjaja, group CEO of Indonesia's Sinar Mas Land. "The recent announcements by our government to promote foreign investment in Indonesia presents tremendous potential for property development in BSD City. With the Indonesia market on the cusp of a strong recovery, Sinar Mas Land and Mitbana are well-poised to implement our plans for the Intermoda TOD." ■



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# Construction of M+ museum building in HK completed

The M+ development in Hong Kong has reached an important milestone, marking the completion of the museum building. With the occupation permit for the museum building obtained on 24 December 2020, M+ is scheduled to open to the public at the end of 2021.

Designed by architecture firm Herzog & de Meuron in partnership with TFP Farrells and Arup, the M+ building is set to become the first global museum of contemporary visual culture in Asia dedicated to collecting, exhibiting, and interpreting visual art, design and architecture, moving image, and Hong Kong visual culture of the 20th and 21st centuries.

The M+ museum is located in Hong Kong's West Kowloon Cultural District on the Victoria Harbour waterfront. Beneath the building site lies the MTR Airport Express and Tung Chung Line. While the pre-existing site condition presents a challenge to design and construction, it has also become "a point of departure for the M+ building," said M+ and West Kowloon Cultural District Authority (WKCD) in their joint statement.

"The excavation around the railway tunnels produced a 'found space' that provides an anchor for the building for hosting dynamic and rotating installations. In a remarkable feat of engineering, five mega-trusses - large steel elements encased in concrete frameworks - help support the massive structure and prevent it from bearing down on the tunnels."

The 65,000-sq-m M+ building houses 17,000 sq m of exhibition space across 33 galleries. It also includes three cinemas, a Mediatheque, a Learning Hub, a research centre, museum shops, restaurants, a tea and coffee bar, a members lounge, and office spaces, plus a roof garden with views of Victoria Harbour.

The podium and tower are united as concrete structures clad in ceramic tiles that reflect the changing conditions of light and weather, standing out from nearby glass and steel skyscrapers, highlighted M+ and WKCD. "Ceramics also used to provide a localised environmental solution for the M+ building, to protect it from the long-term corrosive effects of heat, humidity, and wind.

"A lightwell inside the building, created by massive cutaways in the floor plates and the skylights, connects basement floors, the ground floor, and the podium



LEFT: The M+ building viewed from Victoria Harbour.

BELOW LEFT: The podium and tower are united as concrete structures clad in ceramic tiles.

BELOW: The 'found space' provides an anchor for the building for hosting dynamic and rotating installations.



level, while offering visitors an immersive experience of the architecture and the museum from above and below."

According to both partners, museum staff have moved into and started to activate the M+ building and the conservation and storage facility (CSF). Preparations including environmental stabilisation, space fit-outs, the move of permanent collections, and the installation of collection works and objects have also commenced.

Suhanya Raffel, museum director at M+ emphasises the importance of the completion of M+'s construction journey. "This is a major milestone for the museum. As we mark the building completion, our opening preparations are in full swing. We have moved into our permanent home, and I am thrilled to be able to say we can soon welcome visitors from Hong Kong and beyond to M+."

The M+ building is part of a campus that also includes the CSF and the WKCD Tower. The CSF is devoted to the conservation, restoration, archiving, and storage of the growing M+ collections. The WKCD Tower is a 16-storey building that will house the new head office of the West Kowloon Cultural District Authority as well as retail,

dining, and entertainment facilities.

Betty Fung, acting CEO of the West Kowloon Cultural District Authority, underscores the significance of the M+ building for both the district and Hong Kong. "I believe that M+ will become one of the most iconic architectural landmarks in Hong Kong and a must-visit cultural landmark for local residents and tourists in the future. The completion of M+, together with that of the Xiqu Centre, Freespace and the Art Park in 2019, marks an important milestone of the West Kowloon Cultural District project, which is moving into an exciting new phase of development."

The West Kowloon Cultural District is one of the largest and most ambitious cultural projects in the world. Its vision is to create a vibrant new cultural quarter for Hong Kong on 40 ha of reclaimed land located alongside Victoria Harbour. Featuring a varied mix of theatres, performance spaces, and museums, the development will produce and host world-class exhibitions, performances, and cultural events, providing 23 ha of public open space, including a 2-km waterfront promenade. ■

Photos courtesy of Herzog & de Meuron



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# First large-scale underground substation in SE Asia

SP Group (SP) is constructing a large-scale underground substation in Singapore, believed to be the first in Southeast Asia. Located in the Labrador area, this represents the company's effort to optimise space in land-scarce Singapore for urban growth and development.

"In our business of enabling a low carbon, smart energy future, we are building sustainable and resilient infrastructure. Taking a holistic approach, we are constructing this substation underground, freeing up space above for a 34-storey development," explained Stanley Huang, group CEO of SP Group.

He said this effort is in line with Singapore's urban renewal plans and SP Group's own SDG (United Nation's Sustainable Development Goals) of "ensuring access to reliable, sustainable and modern energy for all and tapping on innovation to build sustainable infrastructure."

The building contract for the 230-kV substation has been awarded to main contractor Hyundai Engineering & Construction Co Ltd.

Substations are part of essential infrastructure that power homes, offices, industries and public services. By freeing up prime land spaces for residential, commercial or recreational purposes, land use and resources can be optimised.

By going underground, the Labrador substation alone will free up 3 ha of prime land space, said SP. When in operation, the facility will serve the electricity needs of nearby towns such as Alexandra, Clementi, Keppel, Pasir Panjang, and the Science Park district.

"Typically, building a substation underground would be more resource-intensive and require specialised engineering capabilities as compared to above-ground. This is due to complexities in construction and the need to use materials and equipment that are suitable for subterranean environment. For example, detailed engineering studies and suitable construction methods are implemented to control the impact to the surrounding buildings and infrastructure," explained SP.

"In addition, the equipment in the substation must be of low-fire risk, with cooling systems installed to prevent the build-



© SP Group

**By going underground, the Labrador substation alone will free up 3 ha of prime land space.**

up of heat in the equipment. The long-term benefits of building substations underground outweigh the costs. Besides optimising land resources for other purposes, underground substations have a lower risk of being exposed and damaged. This will enhance asset and network security."

Mr Huang added, "Leveraging our extensive experience in constructing the underground electricity cable tunnels that span across Singapore, we will be able to deal with the complexities of building this underground substation. With the learnings and experience gathered from this project, we can explore the possibilities of housing more substations underground."

The Labrador underground substation is part of the Urban Redevelopment Authority's underground Master Plan 2019. The new electricity substation and the commercial building are scheduled for completion in 2024.

Based in Singapore, SP is a leading utilities group in the Asia Pacific, enabling a low-carbon, smart energy future for its customers. The company owns and operates electricity and gas transmission and distribution businesses in Singapore and Australia, and sustainable energy solutions in Singapore and China. ■

## Penta-Ocean wins contract for HKU redevelopment project

Japanese contractor Penta-Ocean Construction Co Ltd has secured a contract for the redevelopment of No.2 University Drive and IT building for the University of Hong Kong. Totalling approximately JPY 30.3 billion (HKD 2,211 million), the project includes construction of three new buildings, comprising two nine-storey laboratory buildings (section A and B) and an eight-storey IT building (section C).

Founded in 1911, the University of Hong Kong (HKU) is the city's first and oldest higher education institution. It is known worldwide as a research-intensive comprehensive university with 10 faculties, including the Faculties of Medicine, Engineering, Arts, Law, Science, Dentistry, Architecture, Business and Economics, Education, and Social Science. HKU is Asia's global university, with diverse students and faculty community and a vast network of academic exchanges with universities and institutions all over the world.

Located in the Pok Fu Lam area, the project covers a construction floor area (CFA) of about 45,000 sq m and is expected to be completed in 2024. According to Penta-Ocean, the

construction work will be challenging as it involves building on a slope with Victoria Peak in the background.

Penta-Ocean entered the Hong Kong market in 1986. Since then, the company has taken part in numerous large-scale projects in the city, including the MTR's new Victoria Harbour railway tunnel, ground improvement work for the Hong Kong International Airport Third-Runway System, as well as Hong Kong Government office buildings, data centres, and medical facilities.

The company has also been working on a number of education-related facility projects, such as the Chinese University of Hong Kong's Integrated Teaching Buildings, the Vocational Training Council's Hong Kong Design Institute, and the International Culinary Institute, in response to the demand for new school construction and rebuilding following the implementation of the 'New Education System' in fiscal 2009.

"We will continue to develop our business proactively in the future, with Hong Kong as an important market for our overseas business," stated Penta-Ocean. ■



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## SMEC wins key rail and metro projects in South Asia

Global design and engineering firm SMEC is expanding its rail and metro portfolio in South Asia, having been appointed by the Haryana Rail Infrastructure Development Corporation Limited (HRIDC) as general consultant for the Haryana Orbital Rail Corridor (HORC) project in India. SMEC has also been engaged to provide a feasibility study, engineering design and procurement support for the Dhaka Metro Line-5 South project in Bangladesh.

“Our technical expertise and vast rail and metro experience will enable us to support and advise our client to successfully deliver these essential infrastructure projects,” said Dr Janardhan Sundaram, SMEC’s executive director Bangladesh.

“We have an in-depth understanding of the transport sectors and environments in these countries, with a majority of services being delivered from our locally based offices and teams.”

In consortium with RITES Limited, SMEC will provide general consultancy services to HRIDC during the project implementation, construction and operations and maintenance phases of the HORC project, which is funded by the Asian Infrastructure Investment Bank. SMEC’s services include but are not limited to critical study of detailed project report, bid process management, project planning and management and construction supervision.

Once completed, the HORC will operate at a top speed of 160 km/hr and provide connectivity through 20 stations, of which 14 are new stations and six are connecting to existing IR/DFC stations.

“We have access to a global network of connected specialists with decades of combined technical experience in delivering major transport projects,” said Andrew McKune, SMEC executive director India. “This enables us to apply robust technologies and methodologies for sustainable, resilient, and quality infrastructure.”

In Bangladesh, SMEC along with partners Egis and Oriental Consultants Group have been appointed to consult on the Dhaka



The Haryana Orbital Rail Corridor (HORC) project was awarded by the Haryana Rail Infrastructure Development Corporation Limited (HRIDC).



The Dhaka Metro Line-5 South project was awarded by the Dhaka Metro Transit Company Ltd, under the Ministry of Road Transport and Bridges.

Metro Line-5 South project by the Dhaka Metro Transit Company Ltd, under the Ministry of Road Transport and Bridges. Funded by the Asian Development Bank, the project comprises 12.8 km of tunnels, 12 underground stations, 4.6 km of viaduct, four elevated stations, and a depot. SMEC and partners will consult on the feasibility study, engineering design and procurement support over a 36-month period.

These new appointments are in addition to rail and metro wins announced by SMEC in 2020, as well as other ongoing projects in South Asia. ■

## Masdar and Petronas to explore renewable energy projects in Asia

Masdar, a global leader in renewable energy and sustainable urban development headquartered in the UAE, has signed a Memorandum of Understanding (MoU) with Petronas, a Malaysia-based global energy and solutions company, to explore renewable energy opportunities across Asia and beyond.

The two partners have agreed to explore joint participation in a range of areas, with a focus on utility-scale renewable energy, including ground-mounted and floating solar projects, as well as offshore wind projects in Asia, and potentially other regions and other technologies. Apart from Malaysia, both partners are also interested in countries in the region that have pledged to accelerate the development of renewable energy, including Vietnam and Taiwan.

“This agreement marks an important step on Masdar’s journey to expand our presence in the Asian market, where we see tremendous potential given the region’s rapid economic growth and potential renewable energy resources,” said Mohamed Jameel Al Ramahi, CEO of Masdar. “We look forward to collaborating with Petronas, a world leader in the energy sector and a company committed to sustainable development, to meet the growing demand for renewable energy solutions across the region.”

Petronas’ president and group CEO Tengku Muhammad Taufik Tengku Aziz said, “Petronas’ MoU with Masdar marks another milestone in our existing partnership with Mubadala, which will now include a focus on renewables and green hydrogen. We are pleased to collaborate with Masdar which shares the same commitment towards a low-carbon agenda. In line with our Statement of Purpose, we look forward to powering more businesses with cleaner energy solutions, leveraging on our respective geographical and technological strengths to bring more sustainable energy projects to fruition.”

Petronas currently has over 1 GWp of solar capacity in operation and under development for commercial and industrial customers in India and Southeast Asia. In Malaysia, Petronas has embarked on solar rooftop solutions and has over 90 MWp of capacity under development for commercial and industrial customers.

Last year, Masdar made its first investment into Southeast Asia, signing a power purchase agreement with PLN, the state electricity company in Indonesia, for the first floating solar photovoltaic plant in the country. In December, it announced the formation of a joint venture company to develop the 145-MWac project. ■

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# Toyota breaks ground for Woven City project

Toyota Motor Corporation and Woven Planet Holdings, the Toyota Group company responsible for a wide range of mobility development projects, recently held the groundbreaking ceremony for Woven City. The event took place at the old vehicle yard adjacent to the former Higashi-Fuji Plant site of Toyota Motor East Japan (TMEJ).

“I would like to express my appreciation to the people of Susono City, Shizuoka Prefecture, and other local communities, as well as our construction partners, who have given us tremendous support for the Woven City project,” said Akio Toyoda, president of Toyota Motor Corporation. “Taking action as one has decided is never an easy task under the Covid-19 pandemic. I would like to extend my deepest gratitude to all those involved in the project for their hard efforts to make this happen.”

Mr Toyoda highlighted the three unwavering principles of Woven City: a human-centred city, a living laboratory, and an ever-evolving city. “Together with the support of our project partners, we will take on the challenge of creating a future where people of diverse backgrounds are able to live happily.”

Kazuhiro Miyauchi, president of TMEJ added, “I am deeply grateful for having had our Higashi-Fuji Plant operate here for 53 years with the support of the local community. The knowledge and expertise we acquired from all of the people who worked at the plant must be carried on into the next chapter.

“With the conviction that Woven City will stand not on mere empty land but where the history of the Higashi-Fuji Plant lies, I will offer the greatest possible collaboration in the future.”

To prepare for an era in which all ecosystems that support everyday life are connected with data, Toyota announced the development of Woven City at the CES exhibition in Las Vegas, the US, in January 2020. The project aims to continuously create advancements that will help better society by accelerating the cycle of technology and development of services.

In Toyota’s shift from an automobile manufacturer to a mobility company, Woven City will bring new technology to life



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**ABOVE: An artist’s impression of Woven City, located at the base of Mt. Fuji.**



**LEFT: The groundbreaking ceremony for the project took place on 23 February 2021.**

in a real-world environment across a wide range of areas, such as automated driving, personal mobility, robotics, and artificial intelligence (AI). The project is expected to provide a number of opportunities for businesses and researchers around the world.

Woven City will feature three types of streets interwoven with each other on the ground level: one dedicated to automated driving, one to pedestrians, and one to pedestrians with personal mobility vehicles. There will also be an underground road used to transport goods.

The community will start with roughly 360 residents, mainly senior citizens, families with young children, and inventors. It will eventually have a population of more than 2,000 individuals including Toyota employees. ■

## ‘Surge of Covid-19 infections threaten India’s promising 2021 recovery’

Following a collapse in construction activity in 2020 amid the Covid-19 pandemic, the Indian construction industry was forecast to recover in 2021. However, a recent surge in coronavirus infections may jeopardise a ‘return to normal’ for construction activity, thus dampening the outlook of the industry this year, according to data and analytics company GlobalData.

Based on GlobalData’s ‘Construction in India – Key Trends and Opportunities to 2025, Q1 2021 Update’ report, growth was set to return at a real rate of 13%.

India’s vaccination programme began on 16 January 2021 and the plateauing of daily case numbers in early March led some to hope the worst of the pandemic was over in India. However, the daily confirmed cases rose to 184,372 on 13 April, far exceeding the peak recorded in the first wave. At the centre of the epidemic is Maharashtra, accounting for 60,212 new cases, which is closing non-essential services and restricting non-emergency travel until 1 May.

Willis Rooney, economist at GlobalData said, “Containing the spread of the epidemic and preventing a return of the restrictions

and uncertainty seen in 2020 are vital to ensuring the recovery of both the construction industry and the wider economy.

“GlobalData estimates the Indian construction industry to contract by 12.4% in 2020, the largest fall in output in South Asia. The performance of the industry was severely hampered by the 68-day national lockdown in March, deteriorating business and investor confidence and financial constraints arising over the course of the pandemic.”

The residential construction sector was particularly impacted, contracting by 15.2%, with falling confidence and worsening household incomes compounding an existing shortage of liquidity in the sector.

Mr Rooney concluded, “Growth in the construction industry in 2021 is forecast to be strong, with output values across much of the industry expected to recover to their pre-pandemic levels by 2022 at the latest. However, as previously mentioned, if the spread of the epidemic is not contained, and its effects on income, uncertainty and confidence return, the outlook for the industry would look far less promising.” ■

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# Malaysia's GCU Consultants joins Aurecon

Global engineering, design and advisory company Aurecon has announced a strategic investment in Malaysia's GCU Consultants Sdn Bhd, a move that will strengthen the company's regional presence and expertise. This has taken effect since 1 April 2021.

William Cox, CEO of Aurecon, highlighted that the investment in GCU is an important step in the company's growth ambitions and creates a direct presence in one of Southeast Asia's most important economies. "There is strong alignment between our companies and when we first looked at GCU, we were impressed with its technical excellence, professionalism and success," he said.

"Malaysia will be one of Southeast Asia's most active markets in the years ahead and with GCU joining Aurecon, we will be able to expand our work in the country and lead the industry through innovative engineering solutions that solve complex challenges and bring ideas to life."

According to The Economist Intelligence Unit and the World Bank, Malaysia's GDP is projected to grow by 4.4% and 6.7% respectively, explained Aurecon. "Factors contributing to growth include the government's budgetary support of RM69 billion, which will accelerate new and ongoing infrastructure projects such as the Mass Rapid Transit Lines 2 and 3, East Coast Rail Link projects and other rail sector investment in the country. The Penang Transport Master Plan is another flagship infrastructure programme that will present significant infrastructure development opportunities for the engineering and construction sector."

## Expanding into Malaysia

With Malaysia's engineering sector expecting ongoing growth, Aurecon said it is now well placed to help the country "bring to life" its most ambitious engineering projects. In recent years, the company has completed some of Asia's most striking developments, including the Hong Kong West Kowloon Station; Vincom Landmark 81 Tower in Vietnam; the Shanghai Tower in China; Dau Tieng 1 and 2 PV Solar Power Plant Project in Vietnam; and the Mauritius Metro Express.

Stephane Asselin, chief executive for Asia at Aurecon, noted that GCU's specialist geotechnical expertise along with its track record of delivering innovative solutions



LEFT: Senior leaders at GCU Consultants including (L-R) Ir. Mohd Redzuan Bin Ahmad, Ir. EG Balakrishnan, Ir. Lee Kai Ming and Ir. Sharmeelee Subramaniam.

BELOW: With this latest expansion, Aurecon expects to see the company's growth accelerate through the increasing infrastructure opportunities in Malaysia.



to complex engineering challenges makes it a good fit with Aurecon. "This strategic investment enables Aurecon to have a direct presence in Malaysia and it enables us to broaden our offering with a truly multi-disciplinary practice," he said.

"Aurecon is an Asia Pacific firm that has been in Asia for over 40 years, and we stay committed to growing our business in the region. We are excited at the integration between GCU and Aurecon as it will allow us to accelerate our growth and pursue more opportunities in Malaysia and the Asia Pacific region."

GCU was established in 1998 and has a strong reputation for its market-leading geotechnical consultancy. The company also offers expert consultancy in civil and structural, and mechanical and electrical engineering disciplines. Its client base covers both public and private organisations, including government agencies, developers, turnkey contractors, highway concessionaries, general contractors, civil and structural engineering consultants and more.

Some of its high-profile projects of recent years include the Express Rail Link to

Kuala Lumpur International Airport (KLIA 1 & 2), Kuala Lumpur Mass Rapid Transit (KL MRT) Lines 1 and 2, Electrified Double Track Projects and a number of toll expressways such as the current West Coast Expressway, Cameron Highland hill road as well as the Pengerang RAPID.

With a team of 50, GCU has completed more than 500 projects during the last 23 years including roads, railways, airports, high-rise buildings, commercial and industrial buildings, oil and gas facilities, hospitals, ports, land reclamation and hill-site developments.

Ir. EG Balakrishnan, managing director of GCU, said that joining Aurecon will give his company the opportunity to secure bigger, more innovative projects. "We are very excited to be joining the Aurecon group. There is much to look forward to in Malaysia's engineering sector and being part of Aurecon will allow to us to offer additional resources and digital engineering tools that will enable us to take on larger and more challenging projects. We look forward to helping even more clients in Malaysia to bring their ideas to life." ■

# Keller cuts carbon emissions by more than 90% in Singapore project

Geotechnical contractor Keller has worked with oil giant ExxonMobil to construct more environment-friendly foundations for a major refinery expansion project in Jurong Island, Singapore.

ExxonMobil is expanding its operations with the construction of a major new refinery – the Chemical and Refining Integrated Singapore Project (CRISP) – that will increase production of cleaner fuels with lower sulphate content. Keller was awarded the design-build contract for the foundations for CRISP, working with the main contractor Técnicas Reunidas.

“The project had tanks and process plant structures such as pipe racks spread over an area of around 137,000 sq m and precast concrete spun piling would traditionally have been the choice for the foundations to satisfy the performance criteria,” explained Deepak Raj, managing director for Keller’s ASEAN business unit. “However, having established a strong, trusted relationship between ourselves with ExxonMobil over many years, they had enough confidence in us to ask if we could find a better, more innovative way to do the job.”

Based on the engineering requirements for the structures and the soil conditions, Keller proposed an alternative hybrid foundation solution of deep vibro compaction to densify the top sandy layers, along with vibro stone columns to reinforce the soft clayey strata underneath.

Not only are these methods together around 35-40% faster and more cost-effective than the traditional piling solution, but they’re also much more environment-friendly, said Keller.

“Piling contains rebar and concrete, so you need a lot of steel and cement – materials that use a lot of energy and produce high levels of CO2 emissions to manufacture,” highlighted Mr Raj. According to the International Energy Agency, the construction industry is responsible for around 40% of CO2 emissions, with about 8% coming from cement production.

Keller’s engineers used a universal carbon calculator devised by industry bodies the European Federation of Foundation Contractors and the Deep Foundations Institute to compare the piling proposal with Keller’s vibro solutions.

“The result includes everything from the diesel used to power machines and material production, right through to worker transportation and waste disposal and revealed a stark difference,” said Keller. “The piling option would have generated around 22,000 metric tonnes of carbon dioxide equivalent (tCO2e), while the vibro methods produced just 1,900 tCO2e – 92% lower, saving the equivalent of driving the average car around the earth 2,000 times.”

Notably, materials consumption accounted for only 96 tCO2e of the vibro carbon total, added Keller. “That’s because natural crushed stone is far less carbon intensive than manufactured materials, produces no waste and is lighter, reducing the number of trips needed to bring it to site.”

Most of the emissions – 1,369 tCO2e – came from the diesel used to power

Keller’s machines. But here too, Keller is minimising its impact. “The stone columns were installed with in-house designed and manufactured vibrocats, which are increasingly efficient and have lower fuel emissions compared to crane-hung rigs.” ■



Keller helps build a new refinery in Singapore.



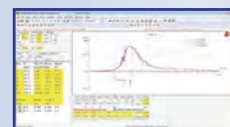
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# Liebherr invests in Ehingen facility

Liebherr is making a major investment in its Ehingen facility, Germany. Founded in 1969, Liebherr-Werk Ehingen GmbH manufactures various mobile and crawler cranes for the global market, with a factory area of around 900,000 sq m.

Called the 'plant development logistics' project, or WeLog Project in short, the investment includes building work at the Ehingen site, the restructuring of the material flows, a new repair centre in the Ehingen suburb of Berg, and the introduction of a new ERP system. This massive project is scheduled for completion in 2024.

According to Liebherr, the project - amounted to a sum in the high two-figure millions - aims to ensure that materials are stored and transported efficiently and smartly, while internal procedures will be simplified to ensure that production can continue without interruption in the future. This effort is expected to result in further improvements to the company's quality of mobile and crawler cranes.

"Currently around 2,000 mobile and crawler cranes leave our plant in Ehingen every year. That is an extremely high number, and represents almost a two-fold increase over the last 20 years," explained Liebherr's production director Ulrich Heusel. "Now there is an urgent necessity to adjust our structures and material flows at the plant accordingly.

"We produce at a high tempo, but we nonetheless have to remain flexible as some of our customers want short term modifications to their cranes – depending on the order content. And we can only guarantee this flexibility, whilst maintaining our high quality and assembly speed, by making these investments."

The Ehingen site currently has a workforce of over 3,500 people. Liebherr's CFO Daniel Pitzer emphasised that "the plant development logistics project will not threaten any jobs, and in fact it is more likely to create additional jobs in the long term."

## Construction of Ehingen site

Building work has already started on the Ehingen site. The existing main warehouse will be split into a warehouse for spare parts and a warehouse for standard production, involving the erection of several new buildings.

Construction of the new spare parts warehouse commenced in the second quarter of 2020. Extensive work on the foundation is required to create the highly modern complex, consisting of a truck gate, two-storey hall area, high-bay shelving warehouse and small parts warehouse.

Here, large drilling rigs from Liebherr's sister plant in Nenzing (Austria) drilled 465 holes for auger piles - which are anchored in the foundation soil at depths of between 18 m and 33 m. This will also make it possible to generate energy for the new building using geothermics. The new spare parts and shipment warehouse is due to be completed and fully operational by 2024.

The other warehouse, designed for parts required for the standard production of mobile and crawler cranes, will feature two buildings – the first one is a pallet warehouse, while the second one is to house a small parts warehouse and a 'goods supermarket'. The first parts from the existing warehouse are planned to be transferred to the new standard production warehouse before the end of 2021.

Besides constructing the new buildings, Liebherr has also had to make significant changes to the road system within the plant to access the work sites whilst maintaining all the current procedures.



ABOVE: Work on the Ehingen facility is currently underway.



LEFT: Liebherr is also building a new repair centre in the Ehingen suburb of Berg.

"When you look at everything going on at the plant at the moment, in terms of new buildings and processes, we can definitely say that we are making the Ehingen site fit for the future. And the Liebherr family is spending in the high two-figure millions for this purpose. This is a clear signal to the whole workforce and the town of Ehingen," said Mr Pitzer.

## New repair centre and ERP system

Earthwork has also commenced in the Ehingen suburb of Berg at the start of 2021, where the new repair centre is located. "By outsourcing the repair centre, we will be able to significantly improve the services we offer to our customers, particularly in southern Germany," said Christoph Kleiner, Liebherr's managing director sales.

"We are also expecting to be able to take on service orders, which in the past we were unable to accept due to restricted capacities. Furthermore, this will create some of the space we urgently require for the new warehouse building at the main factory site."

The relocation and commissioning of the new repair and administration building in Berg is scheduled for mid-2022.

In addition, Liebherr is working on the introduction of a new Enterprise Resource Planning (ERP) system, which is described as the heart of the company. It comprises a large number of inter-communicating IT systems or databases within a company. This highly complex production and planning system controls the whole business and also manages all the master data required for the task.

The new system, InforLN, will initially be introduced in the customer service section, which is scheduled for mid-2022. The new repair centre in southern Germany will also use this new software package as soon as it starts operations. By mid-2024, all the divisions that make up Liebherr-Werk Ehingen GmbH will have been migrated to the new InforLN software package. At the same time, InforLN will also be introduced at the Liebherr-Werk Ehingen GmbH subsidiaries based in Germany, Oberhausen and Alt-Bork. ■

# Tadano unveils new global strategy

Tadano has welcomed Toshiaki Ujiie as its new president, CEO and representative director, succeeding Koichi Tadano who has ended his tenure. Mr Tadano will continue to contribute to the company's growth in his new role as chairman of the board and representative director.

Along with this leadership transition, Tadano has also unveiled several operational moves in pursuit of its long-term strategic goals. In Europe, the company's two businesses - Tadano Faun and Tadano Demag - have undergone restructuring. At the same time, Tadano is reintroducing Japan-made rough terrain cranes for customers operating in the European market.

Offering more lifting solutions in Japan, Tadano is expanding sales of its all-terrain and lattice boom crawler cranes manufactured at the Tadano Faun and Tadano Demag factories in Germany.

In the Americas, Tadano has streamlined its business activities under a unified structure, the newly named Pan-American Operations. The company's commercial activities in North, Central, South American and the Caribbean are now coordinated by Tadano America Corporation.

Under this new structure in the Americas, Tadano Mantis Corporation will continue to be an engineering and manufacturing centre of excellence. Commercial operations – sales, marketing, service, and parts – for the telescopic boom crawler crane lineup will be coordinated through Tadano America Corporation. To keep up with demand for telescopic boom crawler cranes, production has also expanded beyond the factories in the US with the addition of a European-made model contributing to the portfolio.

## Single brand

In another significant move, Tadano plans to have a single, unified brand as part of its long-term global strategy. The company said the Tadano brand will be used for all cranes, replacing the Tadano (Faun) ATF and Demag AC all terrain cranes, Demag CC lattice boom crawler cranes, and Tadano Mantis telescopic boom crawler cranes branding.

With this change, Tadano will also harmonise product nomenclature for all terrain and crawler cranes. The model nomenclature will continue to use the well-known AC for all terrain and CC for lattice boom crawler cranes in combination with axle number, metric tonnage and a version number.

Tadano intends to finalise its rebranding effort with the introduction of the first jointly developed all terrain crane from the Zweibrücken and Lauf production sites in Germany later this year.

According to Tadano, unifying all models under the Tadano brand affords the company an opportunity to better leverage synergies, maximise economies of scale, and ultimately offer customers a more competitive full line of lifting equipment.

To carry out this new vision, Tadano is further aligning and improving operations in Zweibrücken and Lauf to implement even more efficient processes as part of the previously announced restructuring concept. Building on specific strengths, the company is establishing competence centre for carriers and superstructures in Lauf and Zweibrücken respectively to ensure better integration of production.

"We continue to transform the Tadano Group to more efficiently bring together the best equipment, technologies



Toshiaki Ujiie is now president and CEO of Tadano.

and support structure, so we are more competitive and can better contribute to our customers' success," said Mr Ujiie.

"Our current strategic initiatives allow us to improve innovation and significantly increase the number of new crane models introduced to the market over the next four years. In line with our core values of 'safety, quality and efficiency based on compliance', these moves will bring us closer to achieving our vision of becoming no. 1 worldwide in the lifting equipment industry." ■

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# HDB, A\*STAR partner for smart construction technologies

Singapore's Housing & Development Board (HDB) and Agency for Science, Technology and Research (A\*STAR) have inked two collaborations to develop and adopt 5G-enabled smart construction technologies, as well as to facilitate partnerships and commercialisation of the research outcomes developed by agencies under the Ministry of National Development (MND) for operational use.

The first collaboration, a research collaboration agreement (RCA) between HDB and A\*STAR's Institute for Infocomm Research (I2R), aims to enable smarter construction by developing and adopting 5G-enabled robotic, drone and artificial intelligence technologies that can help raise productivity and improve safety at construction sites.

The second collaboration is a Memorandum of Understanding (MOU) between HDB and A\*STAR to bring together the research community, agencies and industry partners to facilitate partnerships in technology transfer and translate R&D outcomes into commercially ready products.

HDB's CEO, Tan Meng Dui said, "As the master developer of public housing in Singapore, HDB constantly seeks to leverage innovative technologies and smart solutions that can help us deliver quality homes for Singaporeans. Through relentless research and innovation over the years, we have built up a wealth of knowledge in urban solutions for the built environment. We will continue to work closely with industry partners to accelerate technology transfer, so that the built environment sector can benefit from our R&D outcomes."

"A\*STAR is increasing its support of the Urban Solutions and Sustainability (USS) domain under Research-Innovation-Enterprise (RIE) 2025," said Frederick Chew, CEO of A\*STAR. "We are collaborating closely with HDB on introducing innovative technologies into the built environment sector, and catalysing more public sector collaboration with industry. We also aim to work with HDB to translate public sector R&D into positive impact on our society and economy, through such collaborations."

## Smarter construction technologies

In their joint statement, HDB and A\*STAR explained that the Covid-19 pandemic has affected the supply of building materials and manpower within the construction industry. This has put unprecedented pressure on the construction timelines of building projects across both the public and private sectors. There is thus a strong impetus for the industry to accelerate the adoption of advanced technologies and digitalisation to help build faster, safer and more efficiently.

With the impending roll-out of 5G network in Singapore, there is an opportunity for greater use of automation and robotics in the construction sector, leveraging on 5G technology, to enhance productivity and reduce labour dependency.

The collaboration between HDB and A\*STAR's I2R seeks to research and develop a system which will capture videos, images and data through the use of sensors on robots (legged and wheeled) and drones. Examples of how such information can be used to improve productivity include: scanning and mapping of the construction environment to develop an up to date as-built model (i.e. exact rendering of the construction project as it is built) using light detection and ranging (LiDAR) technology; and enhancing safety of the construction site through real-time video-streaming



Artificial intelligence (AI) and machine learning technologies will be applied to video feeds captured on drones and robotic systems to automatically identify safety lapses in real time.



ABOVE: By using drone fleets and robotics systems equipped with LiDAR laser scanning technology, a 3D model of the construction site can be progressively built up as construction progresses.

LEFT: HDB has also invented the floating solar system (FSS).

and surveillance of construction activities.

In addition, HDB will study the possibility of employing drone fleets and robotics systems equipped with LiDAR laser scanning technology, to automate the scanning of actual physical built environments into a 3D as-built site model. Currently, the development of as-built models in the construction industry, which typically takes place when construction is nearing completion, is manual and labour-intensive. By deploying a fleet of drones and robotics systems that can intelligently monitor various aspects of a construction site, the entire process can be automated to enable onsite scanning and mapping of the construction site into a 3D as-built model. This will bring about savings in manpower and time.

To allow the drones and robots to function smoothly, HDB will leverage 5G technology for its high data transmission rate and increased network capacity. A\*STAR will develop a 5G modem prototype module with low latency and robust communication link, to enable onsite scanning and mapping of the site as the project is built, and real-time monitoring of activities at construction sites.

According to both partners, most construction sites nowadays employ static CCTV systems to assist with site monitoring; however, as construction sites cover a large area, there may be spots which

are not covered by the scope of the CCTVs.

With that in mind, tapping on 5G technology, HDB will explore the deployment of cameras mounted on the drones and robotics systems, which would enable high-definition real-time videos of the site environment to be captured wirelessly. Artificial intelligence (AI) and machine learning technologies will be applied to the live video feeds, so that the system can automatically identify safety lapses and detect potentially unsafe behaviours and conditions at HDB construction sites in real time.

When such lapses are detected, alerts can be immediately sent to the relevant personnel so swift action can be taken to rectify the situation and resolve the issue. This acts as a mobile monitoring system to augment the manual supervision by safety officers on site.

To ascertain the performance of the system, trials will be conducted at a selected HDB construction site that has ready 5G coverage. The research study is expected to span 2.5 years. If the trials prove successful, HDB will consider extending the system to more construction sites.

### Facilitating partnerships in technology transfer

Over the years, HDB has pioneered new and innovative solutions to provide residents with a quality living environment. To safeguard these solutions for continued use in HDB projects, HDB has filed over 30 patents for its in-house developed innovations, including the prefabricated extensive green (PEG) roof tray system and the floating solar system (FSS).

The PEG roof tray system was developed to intensify HDB's

greening efforts on rooftops. Besides deploying the system in HDB's housing projects, HDB tied up with local firms, Eng Seng Tech Pte Ltd and Plantwerkz Pte Ltd, to commercialise the product in countries and cities such as China, Hong Kong and Malaysia.

In its push to generate more clean energy and accelerate solar adoption in Singapore, HDB has also invented the FSS which supports solar panels on water bodies to harness solar energy. The FSS was adapted from a modular floating system known as the floating wetland system that was earlier patented by HDB for cultivating wetland plants. Following the successful test-bedding of the FSS in Tengeh Reservoir in Tuas, HDB collaborated with a local company, ISO Landscape Pte Ltd to deploy 5 MegaWatt-peak (MWp) FSS off the coast of Woodlands.

The MOU between HDB and A\*STAR seeks to forge closer partnerships among the research community, government agencies and industry partners over the next three years, to facilitate technology transfer and translate R&D outcomes into impactful solutions for Singapore, and potentially for cities around the world.

With its prior experience in intellectual property (IP) management, HDB has been appointed as the lead agency for IP management and technology transfer, for the agencies under the MND. The MOU will tap on A\*STAR's expertise, connection with the industries and the local science and technology ecosystem, to facilitate collaborations to commercialise MND R&D outcomes and IPs. ■

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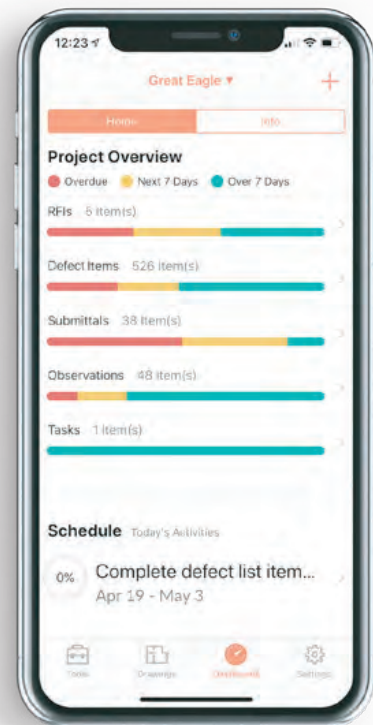
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# CALENDAR OF EVENTS

## // Events in Asia

### CICEE 2021

**19 to 22 May 2021**

Changsha International Convention & Exhibition Centre  
Changsha, China

Tel: +86 731 8696 9961

Email: csgcjxz@cicee.vip

Website: www.chinacicee.com

### BuildTech Asia 2021 (Digital Series)

**7 to 8 Jul 2021**

10 am -6 pm (Singapore Time, GMT 8+)

Tel: +65 6319 4024

Website: www.buildtechasia.com

### BCT Expo 2021

**1 to 3 Sept 2021**

Impact Exhibition and Convention Centre  
Bangkok, Thailand

Tel: +662 833 5315

Email: info@bct-construction.com

Website: www.bct-construction.com

### Cambuild 2021

**16 to 18 Sept 2021**

Diamond Island Exhibition & Convention Centre  
Phnom Penh, Cambodia

Tel: +855 023 901 579

Email: somaly@ambtarsus.com

Website: www.cambuildexpo.com

### Worldbex 2021

**23 to 26 Sept 2021**

World Trade Centre Metro Manila  
Metro Manila, The Philippines

Tel: +632 8656 9239

Email: inquire@worldbexevents.com

Website: www.worldbex.com

### OS+H Asia 2021

**29 Sept to 1 Oct 2021**

Marina Bay Sands

Singapore

Tel: +65 6332 9620

Email: osha@mda.com.sg

Website: www.osha-singapore.com

### MBAM Onebuild 2021

**20 to 22 Oct 2021**

Kuala Lumpur Convention Centre

Kuala Lumpur, Malaysia

Tel: +603 7981 0288

Email: info@mbamonebuild.com

Website: www.mbamonebuild.com

### Laobuild 2021

**28 to 30 Oct 2021**

National Convention Centre

Vientiane, Laos

Email: youthaxay@ambtarsus.com

Website: www.laobuild.com

### ASEAN Super 8

**9 to 11 Nov 2021**

Malaysia International Trade & Exhibition Centre

Kuala Lumpur, Malaysia

Tel: +603 9771 2688

Website: www.super8asean.com

### Trenchless Asia 2021

**16 to 17 Nov 2021**

Kuala Lumpur Convention Centre

Kuala Lumpur, Malaysia

Tel: +44 1923 723990

Email: pharwood@westrade.co.uk

Website: www.trenchlessasia.com

### bauma China 2022

**22 to 25 Nov 2022**

Shanghai New International Expo Centre  
Shanghai, China

Tel: +49 89 949 20252

Email: info@bauma-china.com

Website: www.bauma-china.com

## // Events outside Asia

### World of Concrete 2021

**8 to 10 Jun 2021**

Las Vegas Convention Centre

Las Vegas, Nevada, USA

Tel: +1 972 536 6368

Email: contactus@worldofconcrete.com

Website: www.worldofconcrete.com

### Hillhead 2022

**21 to 23 Jun 2022**

Hillhead Quarry

Derbyshire, England, United Kingdom

Tel: +44 115 945 4367

Email: hillhead@qmj.co.uk

Website: www.hillhead.com

### bauma 2022

**24 to 30 Oct 2022**

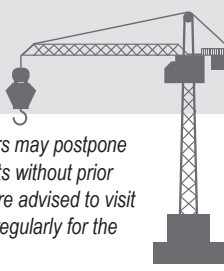
Munich Trade Fair Centre

Munich, Germany

Tel: +49 89 949 11348

Email: info@bauma.de

Website: www.bauma.de



**Note:** The organisers may postpone or cancel their events without prior notice, so readers are advised to visit the event websites regularly for the latest updates.

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# WOC receives approval for in-person event in June 2021

Informa Markets, the organiser of World of Concrete (WOC), has received approval from the Nevada Department of Business and Industry to move forward with its upcoming in-person edition. The event is scheduled to be held from 8 to 10 June 2021 at the Las Vegas Convention Centre. It will be the first large-scale trade show to return to the US market since the pandemic brought in-person meetings to a halt.

Following Nevada Governor Steve Sisolak's address on 12 March on the Las Vegas reopening plan, Informa Markets worked with the Las Vegas Convention Centre (LVCC) to submit a thorough health and safety plan to the Nevada Department of Business and Industry. The proposal outlined specific operational protocols and communication strategies surrounding the event. This was largely based on the framework of Informa AllSecure, a set of rigorous health and safety measures to prioritise guest safety at trade events, including mandatory face masks and temperature checks for all participants.

"We are thrilled to return to the show floor and confident in our evidenced ability to execute a safe event under Informa AllSecure with strong commercial outcomes for our customers," said Jackie James, group director for World of Concrete. "The Nevada Department of Business and Industry has taken a dutiful and cautious approach to re-opening, and we are honoured to be one of the first large-scale events to set the industry standard for safe and successful economic recovery. Our experienced team is excited to lead this charge."

Informa Markets said the company is taking a concerted customer-focused approach to its return to live events, in this case surveying past attendees via a third-party provider to ensure the decision to hold World of Concrete is a community-driven one. "Of those who responded, 80% were likely to attend in June and 97% viewed the decision as favourable to the industry."

The LVCC campus is also reportedly poised to welcome business travellers back with robust new offerings, including the 1.4 mil-sq-ft West Hall expansion that will debut in conjunction with World of Concrete. The US\$989 million addition joins the existing 3.2 mil sq ft campus. Finishing touches continue on the Convention Centre Loop, an underground tunnel system that will transport meeting attendees throughout the entire campus in Tesla vehicles, free of charge.

In addition, the Las Vegas Convention and Visitors Authority (LVCVA) recently acquired the Las Vegas Monorail, preserving this important transportation solution for meeting attendees. Both systems will be operational for events beginning in June and will adhere to strict health and safety protocols.

## Economic impact

"Not only are these platforms vital for the markets they serve, but the economic impact of holding World of Concrete is tremendous for Las Vegas," explained Kevin Thornton, VP of operations at Informa Markets. "Conventions bring an estimated US\$11 billion annually to Las Vegas, and those like World of Concrete create thousands of jobs supporting local hotels, restaurants, retailers, and entertainment, among others."

"We create platforms that re-build and re-invigorate industries and regions," added Nancy Walsh, president for North America at Informa Markets. "We are approaching 2021 with a hybrid model so interested participants can attend in the format that works best



ABOVE AND LEFT: World of Concrete 2020 concluded with a strong event, drawing approximately 54,000 registered professionals and 1,310 companies.

for them, but I am thrilled to return to the irreplaceable experience of an in-person trade show. Our platforms serve an important role in relationship building, in discovering innovation, and in revenue-driving for the communities they serve, especially when done in a safe and controlled way.

"The decision to return to the show floor comes with the commitment from the LVCVA to support our safety measures, as well as considerable feedback from customers that they are not just ready, but eager to return. Every industry has been impacted by the pandemic, and our customers, many of whom are small business owners, truly recognise these platforms are more critical than ever before."

Las Vegas relies heavily on the meetings and conventions industry, which represents US\$11.4 billion in economic impact to the destination, explained LVCVA in its statement. Trade show organisers like Informa Markets meaningfully support resorts and convention centres, as well as local small businesses and vendors including security providers, food and beverage outlets, transportation companies, graphic artists, printers, photographers, furniture companies, equipment rental services, florists, tour operators, and more.

The impact, however, does not solely benefit local economies such as Las Vegas, but facilitates growth and development of the global economies their platforms serve, from construction to fashion to health and nutrition, creating opportunities for economic recovery through networking and business. A 2018 study showed that globally trade shows bring an average of 303 million visitors to host cities each year, supporting 1.3 million jobs and generating US\$136.9 billion in business sales. ■

Website: [www.worldofconcrete.com](http://www.worldofconcrete.com)

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# SE Asian geospatial industry gathers at Geo Connect Asia

Geo Connect Asia (GCA) 2021, Southeast Asia's inaugural geospatial and location intelligence technology conference, has welcomed around 1,200 exhibitors, speakers, delegates and visitors from 24 to 25 March 2021, according to the event organiser, Montgomery Asia.

In-person attendees joined the event at the Sands Expo & Convention Centre, Marina Bay Sands, Singapore, which offered keynote speeches, plenary sessions and roundtables, among others; while about 700 professionals and media from across the global geospatial community participated virtually. Both physical and virtual attendees hailed from 55 countries, said Montgomery Asia.

GCA 2021, representing Singapore's first large-scale pilot hybrid event, also featured Digital Construction Asia 2021 (DCA21) and Unmanned Aerial Vehicle Asia 2021 (UAV21), which showcased a full range of geospatial and location intelligence applications for key government agencies and enterprises.

The Geo Suites at GCA 2021 - ballrooms converted into 'exhibition booths' - assumed the role of a typical trade show floor as the main mode of interaction and helped to minimise intermingling between cohorts of attendees. The Meeting Pods allowed 2-to-2 meetings to take place with the safety of a plexiglass divider as well as hand sanitisers and cleaning supplies.

Alvin Yap, exhibitor at GCA 2021, drone lead at YJP Surveyor said, "The event has shown our resilience in these tough times and represents our hope and optimism not only in the geospatial industry but also for Singapore and the region as well."

Singapore's Minister for Foreign Affairs and Minister-in-charge of the Smart Nation Initiative, Dr Vivian Balakrishnan, was the guest of honour at GCA 2021. Alvin Tan, Singapore's Minister of State for Trade & Industry and Culture, Community & Youth also participated at the event.

GCA 2021 was supported by several Singapore government agencies, namely the Ministry of Trade and Industry (MTI), Singapore Tourism Board (STB), Singapore Land Authority (SLA), Economic Development Board (EDB) and Infocomm Media Development Authority (IMDA).

The event was also supported by the Emerging Stronger Taskforce (EST) Alliance for Action (AfA) on Enabling Safe and Innovative Visitor Experiences. "Such pilot events facilitate progressive scaling up to larger events, and provide a crucial springboard to recovery and growth for both the ASEAN geospatial community and the wider MICE industry, overturning the assumption that larger international MICE events cannot be held safely," explained Montgomery Asia. "They are also a testbed for event organisers to refine the implementation of safe management measures and best practices for MICE events progressively."

Rupert Owen, co-founder of Geo Connect Asia said, "Two years in the making, Geo Connect Asia 2021 has navigated significant disruption and uncertainty before making our much-anticipated debut in Singapore this year. This was possible due in no small part to the strong support from our many like-minded partners from both the public and private spheres, with Singapore Land Authority's (SLA) and Singapore Tourism Board's (STB) support, in particular, proving instrumental in guiding the development of a world-leading hybrid platform for the geospatial and location intelligence markets in Asia.

"Equally important were our sponsors and other partners from across an array of industries, led by platinum sponsor Trimble, gold



ALL IMAGES: GCA 2021, representing Singapore's first large-scale pilot hybrid event, also featured Digital Construction Asia 2021 (DCA21) and Unmanned Aerial Vehicle Asia 2021 (UAV21).

sponsor Bentley Systems, silver sponsor UP42, and conference sponsors Planet Labs, Synspec, and Dassault Systèmes."

Geo Connect Asia is scheduled to return from 23 to 24 March 2022. ■

Website: [www.geoconnectasia.com](http://www.geoconnectasia.com)

# Hillhead exhibition postponed to June 2022

Following a review of the UK government roadmap to ease Covid-19 restrictions announced on 22 February 2021, The QMJ Group has made the decision to postpone Hillhead by 12 months.

Hillhead event director Richard Bradbury explained, "Under these guidelines, it is clear that the show will not be able to operate legally in June this year. Our priority is to provide the Hillhead experience that our exhibitors and visitors have come to expect but, with the continuing uncertainty around travel restrictions and social distancing measures, this is not achievable in 2021."

Hillhead is the UK's largest quarrying exhibition, targeted at professionals involved in the quarrying, construction and recycling industries. The show was due to take place from 22 to 24 June 2021.

"By delaying the show until June 2022, the full benefits of a completed vaccination programme will have filtered through, allowing us to deliver a safe and vibrant event," said Mr Bradbury.

"The team look forward to welcoming you back to Hillhead Quarry, Buxton, from 21–23 June 2022." ■

Website: [www.hillhead.com](http://www.hillhead.com)



FAR LEFT AND LEFT: The last edition of Hillhead took place in 2018.

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# IPAF extends Competent Assessed Person programme

The Competent Assessed Person (CAP) programme from the International Powered Access Federation (IPAF) has been adapted to suit those inspecting or maintaining mast climbing work platforms (MCWPs) and construction hoists, including goods hoists, transport platform hoists and passenger hoists.

During 2020 and early 2021, IPAF's training department has worked to adapt the course to suit those inspecting and maintaining MCWPs and hoists, in response to growing demand across the industry for a recognised programme to certify individuals as having the skills to inspect and examine the equipment as per the legal requirements of national and international safe-use standards.

Angel Ibáñez, IPAF's representative for MCWPs and related products said, "IPAF has worked to meet demand in our part of the access industry by modifying its well-recognised training for MEWP operators to certify operatives, installers and demonstrators of MCWPs and construction hoists, so it makes complete sense for us to also create a version of the CAP assessment that is also tailored to these machines."



"We're pleased to say that this has now been delivered and will be available via selected IPAF training centres, initially in both English and Spanish. We expect take-up for this new version of the IPAF CAP assessment will be strong from the outset." ■

## IPAF launches site assessment training to select correct MEWP for the job

A new course aimed at demonstrating how to perform a thorough site assessment and select the correct mobile elevating work platform (MEWP) to carry out the job in hand has been launched by IPAF.

Based on ongoing analysis of accident and near-miss incidents via IPAF's global reporting project, IPAF analysis often finds that the underlying causes can be traced back to poor planning, inadequate risk assessment, and incomplete understanding of the technical and safety demands of the task, or attempting the job using an incorrect machine or untrained operators and supervisors.

Brian Parker, IPAF's head of safety & technical said, "Selecting a MEWP can be complex and challenging, even for experienced site managers. Being confident and sufficiently knowledgeable to select the correct MEWP for the job directly reduces risk. Correct MEWP selection also improves the effectiveness of MEWP operations, reducing unnecessary costs and creating the ability to work to intended timescales."

"Having looked at the data around accidents and near-misses over the past few years, we felt we needed to add a course that would address this specific issue to the globally recognised IPAF training suite. We are very pleased with the course that our training experts and dedicated members have put together."

Paul Roddis, IPAF's training manager explained, "The new course is theory-based with an exam at the end. It is aimed at all those working for rental companies who need to determine which type of MEWP a client should hire from them for the work required, and anyone in any industry who wishes to gain the confidence and knowledge to make their own decisions about the type of MEWP to deploy for any task they are planning."

According to IPAF, all candidates must hold a valid PAL card certifying successful prior completion of IPAF operator training, IPAF MEWPs for Managers course or MEWPs Supervisor



qualification. The course duration is half a day, and may be taken either at an IPAF-approved training centre or online via eLearning – candidates work through the modules in their own time, at their own pace, at a location of their choosing.

All successful candidates will receive an IPAF certificate as evidence of training, and there is no expiration date on the certification. The course is offered initially in English, with other languages to follow this year.

Giles Councill, IPAF's director of operations added, "We'd like to thank all those who have helped by giving their valued input into the creation of this important new addition to IPAF's training suite; particularly members of IPAF's training committee, who have offered their time and expertise even during the ongoing pandemic to ensure IPAF has been able to meet its intended deadlines for rolling this new course out as well as achieve other key objectives."

"I urge anyone who plans, organises or oversees MEWP operations as part of their job to seriously consider undertaking this new course, and to get in touch with their nearest IPAF training centre to find out more." ■



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# Manitou unveils redesigned MRT rotating telehandlers

Manitou has introduced its fully redesigned MRT rotating telehandlers – the Vision and Vision+ ranges. Two new models have been added to the Vision range, the MRT 1645 and MRT 1845, offering a lifting height of 16 m and 18 m respectively with a load capacity of 4.5 t.

The Vision range has a wide selection of 14 models in total, featuring lifting heights ranging from 16 m to 25 m, for a load capacity of up to 4.5 t.

The higher capacities are grouped together in the Vision+ range, which provides 12 new models in total. This line has also been completely revamped with several new products: the MRT 2260, MRT 2660, MRT 3570 (also available in an electronic suspension version), MRT 2570 and MRT 3060.

With lifting heights ranging from 22 m to 35 m and an improved capacity of up to 7 t, the Vision+ range is ideal for the installation of structural steelwork, renovation of buildings and even demolition.

Both the Vision and Vision+ ranges are now available worldwide. They are expected to be delivered to the dealer network, rentals and key accounts by September 2021. According to Manitou, the machines will be powered by Stage IIIA engines in the Southeast Asian market.

New attachments accompany the launch of these two ranges. Two units of CAF 1030 (6 t and 7 t) and one CAF 1080 (7 t) floating fork carriages will benefit users needing to handle pallets or big-bags with optimum visibility. They are lighter and more robust, and are fitted with a fork locking system.

The performance of winches, jibs and cranes has been enhanced with a winch equipped with a new hydraulic motor suited to the new MRTs. With a capacity ranging from 600 kg to 2 t, they meet the requirements of the new MRT range.

A new 100% aluminium platform is also available across the whole Vision+ range. Weighing just 180 kg for a loading capacity of 365 kg, the new PSE 4200/365 is lighter than the previous range, allowing a greater outreach.

To increase visibility, a reinforced gridless roof, certified to ROPS/FOPS level 2, is available as an option for closely monitoring loading operations at height. Present on all Vision and Vision+ models, the pressurised cab guarantees a healthy working environment for the operator and additional sound insulation, for enhanced comfort.

Another highlight is a new, optional driving remote control for controlling the machine from the basket or when the operator is outside the machine. As a result, it is possible to move it safely without having to return to the driver's cab, saving a lot of time on site.

A new hydraulic pump is fitted on all of these new models. With a hydraulic flow of 116 l/min, the Vision range ensures an execution speed 50% quicker for simultaneous boom movements. This improvement rises to more than 30% for the 2260 and 2660 models in the Vision+ range, which are equipped with a pump that delivers a flow rate of 185 l/min.

The lifting capacities and load charts have also been significantly improved, most notably the capacity at maximum height by up to 100% and at maximum reach by up to 25%. The weight of these machines has been reduced by more than 5% while benefiting from an increase in their load capacity of up to 15%.

Five LED headlamps ensure full lighting all around the machine, plus two worklights on the boom head for visibility during loading



ALL IMAGES: The redesigned MRT rotating telehandlers from Manitou, comprising the Vision and Vision+ ranges, are available for the global market.

operations at height. A rear camera that sends images to the cab allows the machine to be manoeuvred in complete confidence.

Four accesses have been built into the chassis, on the left and right, and at the front and rear of the machine. This enables the operator to climb into and out of the machine easily regardless of which way the cab is rotated. The cab is fitted with a brand-new 8-in vertical touchscreen on the Vision range, and a 12.1-in XXL version on the Vision+ range.

The Vision and Vision+ ranges also feature hydrostatic transmission offering better driving flexibility and giving the operator a maximum speed of 40 km/hr, whatever the model.

The latest addition to the Vision+ range, the MRT 3570, allows the operator to carry out handling operations up to 35 m, the greatest height available from Manitou. For enhanced visibility at this height, Manitou has introduced a new electric seat that tilts by up to 18° to easily monitor deployment of the boom. This model is also available in an electronic suspension (ES) version. ■

Website: [www.manitoucenter.com.sg](http://www.manitoucenter.com.sg)

# Kleemann's Mobicat MC 110(i) EVO2 mobile jaw crusher

The new Mobicat MC 110(i) EVO2 mobile jaw crusher from Kleemann offers outputs of up to 400 t/hr, ideal for a wide range of quarry and recycling applications, especially where the emphasis is on effective coarse crushing.

According to Kleemann, compared with its predecessor, the transport height of the new crusher has been reduced by 20 cm to 3.40 m, and it can now be transported easily using semi low-loaders. The machine's start-up process takes only around 10 minutes, including set-up times for flaps, belts and feed hopper.

A highlight of the Mobicat MC 110(i) EVO2 is a new two-stage overload system. It is designed to prevent blockages and material bridging that can lead to unnecessary downtimes. If uncrushable material enters the crushing process, the CSS opens twice faster than with its predecessor or, as an option, even up to 40 times faster, claimed Kleemann. This increases the availability and in turn the overall output.

With the further development of Spective, Kleemann said it has set the standards for user interfaces in the sector even higher. This digital operating concept has an intuitive structure and revolutionises plant operation with its extensive features. The 12-in touch panel has been optimised in terms of user guidance and visualisation. In addition, new components such as a radio remote control and a small radio remote control have been integrated in the Spective world. The new digital solution, Spective Connect, sends all important plant data to the smartphone.

In the new Mobicat MC 110(i) EVO2, Kleemann has incorporated a series of new technologies and improvements. The continuous feed system (CFS) ensures a continuous crusher feed and thus a daily output of up to 10% more. The independent double-deck prescreen effectively separates fines before they reach the crushing process. This increases the total plant throughput and is gentle, for example, on downstream cone crushers in the second crushing stage. Improved feed behaviour is guaranteed by the extra-long articulated crusher jaw, whereas a flattened transition to the crushing chamber makes an optimum material flow possible. The accessibility for fast, safe and convenient maintenance has also been optimised.

What's more, the improved diesel-direct drive concept is characterised by the economic use of fuel, which minimises operating costs. The power fan helps to increase cooling capacity, operates only when required and reduces fuel consumption. ■

Website: [www.wirtgen-group.com](http://www.wirtgen-group.com)



ABOVE: The new Mobicat MC 110(i) EVO2 is designed for the first crushing stage and is used in medium-hard to hard natural stone and in recycling.



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# Haulotte introduces Sigma 16 electric articulating booms

Haulotte's new electric articulating booms, Sigma 16 and Sigma 16 Pro (Sigma 46 and Sigma 46 Pro in North America), have a working height of up to 16 m (46 ft platform height). They are suitable for both indoor and outdoor applications.

Featuring a high up-and-over clearance and an excellent outreach, the Sigma 16 booms can overcome obstacles easily to reach remote work sites. The jib with horizontal rotation ensures precise and safe approach without repositioning the machine. Such flexibility enables operators to save time with manoeuvres and access areas that are not accessible with a regular jib.

The Sigma 16 models provide two simultaneous movements and an ultra-fast elevation speed (90 seconds to full height). The booms can carry up to 230 kg of load or two operators without envelope restriction for maximum performance.

According to Haulotte, the booms can operate on all types of stabilised slab floors, thanks to their wide, solid, and notched tyres and high ground clearance (17 cm). The homogeneous tilt (4° regardless of the boom orientation) makes it easy to reach the work zone without machine repositioning and time lost.

With the booms' compact footprint and narrow turning radius, the operators are able to manoeuvre easily in confined spaces. The booms can be used without any risk of damaging the surrounding environment as the turret stays within the chassis footprint while rotating.

The Sigma 16 series can be equipped with both a front and lateral door for easy entry and a robust tool tray providing a large storage capacity. Driving safety is improved with the centred boom arm. For better safety and stability, the driving speed automatically adjusts during turns and on slopes.

The Haulotte Activ'Shield Bar anti-entrapment system is available on the Sigma 16 series. In case of entrapment, the operator is pushed towards the bar integrated into the upper box cover, and the machine stops automatically. The safety gap allows a large clearance, preventing driver entrapment.

The Haulotte Activ'Lighting System supports safe manoeuvres, especially in low light conditions. Ten low energy consumption LED spotlights are used to light up the machine controls and surrounding areas for easy loading and unloading operations.

The Haulotte Activ'Energy Management solution reduces the total cost of ownership by optimising the batteries' performance and lifespan. The integrated smart charger adapts the charging curve and have specific cycles dedicated to battery maintenance. To simplify maintenance and ensure an optimal battery health, customers can opt for a centralised waterfilling system.

To optimise power consumption and ensure the machine can handle daily work requirements, the Sigma 16 models feature gravity platform lowering and a precise charge indicator on the upper control box.

For easy maintenance, Haulotte has decided to separate the electric and hydraulic elements. Hose routing has also been carefully engineered to avoid the risks of friction and leakage. Plus, the AC motors do not require any regular maintenance.

Fitted with reinforced hoods with wide openings, the Sigma 16 series offers direct access to components, reducing downtimes. Haulotte said the machines have been subjected to rigorous endurance testing to guarantee their robustness.

The Haulotte Activ'Screen interface helps users with daily maintenance operations. This onboard diagnostic tool gives



ALL IMAGES: Haulotte's new electric articulating booms, Sigma 16 and Sigma 16 Pro, have a working height of up to 16 m.

access to machine settings and displays detailed troubleshooting procedures on a large screen. Technicians can access the same functions on their mobile devices using the Haulotte Diag app.

Connected to the machine's CAN bus architecture, the Sherpal module decodes the data transmitted by the various components on the machine. This telematics solution delivers accurate data to perform remote diagnostics, optimise technicians call-outs, adopt best 'energy' practices, and at a high level, make the right decisions at the right time. ■

Website: [www.haulotte.com](http://www.haulotte.com)

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# New brake assistant for Liebherr wheel loaders

Active personnel detection is an innovative assistance system for the Liebherr L 526 to L 586 XPower range of wheel loaders. To ensure maximum safety, the company has incorporated two extra functions - the brake assistant and incident map.

The brake assistant automatically slows the speed of the wheel loader to a standstill the moment the active personnel detection issues a warning signal. The incident map displays potential risk zones on the site using GPS data in LiDAT - Liebherr's in-house transfer and location system.

The active personnel detection visually alerts the machine operator via the display screen and sound acoustic signals if there is danger in the wheel loader's rear area. In order to provide a specific warning of imminent injury to people, the assistance system, using smart sensors, provides specific warning of people in the rear area of the wheel loader at a greater distance than for obstructions such as walls, columns or other vehicles. This means the assistance system avoids unnecessary signals, thus lessening the burden on the machine operator and causing fewer distractions.

The moment the active personnel detection system identifies a source of danger, the brake assistant slows the wheel loader down to a standstill. The braking process is therefore initiated at an earlier stage and quicker than in the case of traditional braking since, with the brake assistant, there is no delay caused by human reaction time. This leads to a significant reduction in the stopping distance, which in turn minimises the frequency and severity of accidents.

In the case of the brake assistant, the hydrostatic components of the drive train automatically reduce the speed. As such, the machine operator can continue to operate the wheel loader service brake as per normal and can do this in addition to the brake assistant.

The other new function for the active personnel detection at the rear is the incident map. Each time the assistance system detects a danger and a warning signal is issued, the system transmits a GPS signal to LiDAT. On the basis of this signal, and for each operator of a wheel loader with active personnel detection, Liebherr provides a Google map in LiDAT showing these GPS points.

The result is an incident map displaying the risk zones and potential sources of danger on the site. The operator can use this to implement measures to prevent accidents. For example, the operator might reroute footpaths, cordon off areas and alter dangerous work sequences. The head of operations can also use the incident map to train employees and make them aware of risky situations.

Liebherr offers several intelligent assistance systems for its mid-range and large wheel loader series. Besides active personnel detection, there are also adaptive working lighting, front space monitoring, the skyview 360° camera system, the tyre pressure monitoring system with sensor support and the new weighing device. All systems have been developed by Liebherr and fully integrated in the machine control. ■

Website: [www.liebherr.com](http://www.liebherr.com)



The Liebherr brake assistant automatically decelerates the wheel loader the moment the active personnel detection identifies a source of danger in the rear area.



Using the incident map, the Liebherr wheel loader operator can identify risk zones on the site and implement measures to avoid accidents.



RIGHT: Active personnel detection with brake assistant and incident map is also available for the new series of mid-range Liebherr wheel loaders.

## Snorkel telehandlers offer open cabs

The range of rough terrain telehandlers from Snorkel are now available with open cabs. These include several models, namely the SR626, SR1442, SR1745 and SR1065 (known as the SR5719, SR9244, SR1054 and SR1331 respectively in North America). Customers can choose from either an open cab, or a fully enclosed cab with heat and air conditioning.

On the full electric, lithium-ion battery powered compact rough terrain telehandler, the Snorkel SR626E (SR5719E in North America), the open cab is also now available, in addition to a fully enclosed cab with heat.

According to Snorkel, the open cab version features the same spacious design and layout as the enclosed version, and incorporates an adjustable suspension seat and adjustable steering column as standard, delivering unrivalled operator comfort. A mesh grid protects the operator while maintaining excellent visibility of the work area.

The open cab versions are available to order now, with select models in stock for immediate delivery, said Snorkel. ■

Website: [www.snorkellifts.com](http://www.snorkellifts.com)



RIGHT: Snorkel SR5719 with open cab.

## Sandvik jaw crushers now available as plug-and-play

Sandvik jaw crushers are now delivered with everything for plug-and-play installation, so that quarry and mine owners can easily install and run primary crushing applications in minimum time while ensuring maximum efficiency.

“We deliver our jaw crushers with everything a customer needs for plug-and-play primary crushing operations,” explained Mats Dahlberg, Sandvik’s vice president lifecycle service for stationary crushing and screening. “It’s just to choose what extra components they require. There’s also a wide range of jaw plates that can be mixed and reversed to ensure optimal, versatile crushing.”

“We use the highest quality materials and parts in our equipment, while including lifting tools, guarding retraction and a modular maintenance platform for safe operation and maintenance,” stated Sandvik. The company added that its jaw crushers are built for the circular economy, meaning that the complete machine – all the metal and rubber seals can be recycled.

All new Sandvik jaw crushers are available with the Sandvik ‘reliability and protection package’ to keep customers in control of costs and efficiency at all times. “To continue as a leading global supplier, we now include everything our customers need for a fast start-up and reliable operations. Together with easy and safe maintenance, our jaw crushers increase productivity, offer true reliability and excellent availability,” said Martin Johansson, Sandvik’s product manager for jaw crushers.

According to Sandvik, its jaw crushers can be delivered with



Sandvik jaw crushers are now delivered with everything for plug-and-play installation, so that quarry and mine owners can easily install and run primary crushing applications in minimum time.

a complete infrastructure including feed hopper, feed hopper interface, drive and subframe with V-belt guard and motor bracket, a unique guarding retraction arrangement and toggle plate stop. ■

Website: [www.rocktechnology.sandvik](http://www.rocktechnology.sandvik)

# Leica 3D reality capture solution for Spot robot

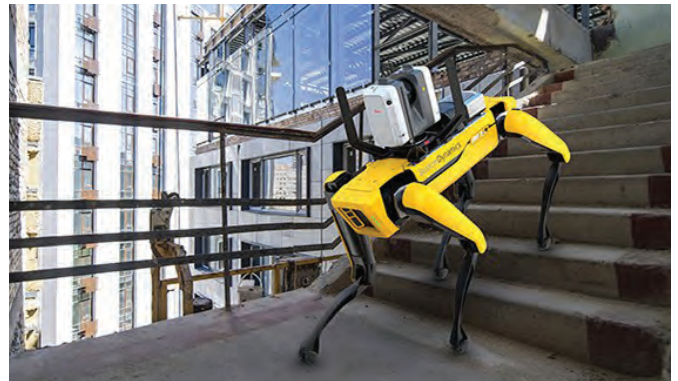
Leica Geosystems has introduced its reality capture solution for a variety of industries, including construction. By combining Boston Dynamics' Spot robot with the Leica RTC360 3D laser scanner, scanning time spent by human operators can be significantly reduced - by programming the devices to repeat automated scanning paths through sites.

"This requires minimal monitoring by the user, allowing for increased scanning efficiency, productivity, and flexibility when planning reality capture tasks," said Leica Geosystems. Professionals in many different industries with autonomous scanning needs, such as construction, can benefit from programmed scanning tasks, especially for locations that must be repeatedly scanned for up-to-date digital twins.

The company highlighted that "whenever accurate, reliable, and up-to-date 3D data is needed, the integration of the RTC360 technology onto the Spot mobile robot provides significant additional customer value in a variety of industries and jobsite scenarios where flexible and agile laser scanning workflows are required. Spot's ability to cover many types of terrain and the RTC360's VIS (visual inertial system) creates this solution."

While mounted atop Spot, the Leica RTC360's VIS technology uses five cameras to track the scanner's movement within the site between the scans, explained Leica Geosystems. The VIS system provides an unmatched level of accurate and automated in-field pre-registration to streamline the reality capture process. During scanning, the user only needs to trigger each scan remotely via mobile device while Spot and the RTC360 navigate the programmed scanning path.

"The RTC360's VIS technology creates an easier, faster scanning workflow," said Leica Geosystems. "For example, users can essentially 'walk' Spot through a site by using a mobile device to control the RTC360 scanner. This allows users to speed up routine as-built documentation tasks and capture data accurately, quickly,



Leica RTC360 on Boston Dynamics' Spot robot covering scans in rough terrains.

and frequently. It also automatically combines captured scan data from station to station as it knows its location in space, resulting in a completely pre-registered point cloud of the entire scanned site, which makes final data processing in the office much easier."

Leica Geosystems reiterated that "combining Spot with the RTC360 creates a mobile scanning solution that saves time, because Spot does the walking and stationing of individual scans instead of the user. Once Spot and the RTC360 learn a programmed scanning route through a location, they can more easily and quickly repeat that route for regular scanning. The remote control of the Leica RTC360 via a mobile device allows Spot's agility and mobility to cover terrain that may be difficult or hazardous for a human operator."

The new Leica RTC360 for Spot includes all needed installation accessories, a protection bar for the scanner cameras, and Leica Geosystems software ensuring that users can get started within minutes. ■

Website: [www.leica-geosystems.com](http://www.leica-geosystems.com)

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# Lintec plant keeps essential projects on track in Ningbo

A Lintec CSM4000HS20-SE asphalt batching plant, featuring a maximum output of 320 t/hr, has helped a major Chinese contractor meet the pressing demands of several prestigious projects over the past 18 months.

Based in China's eastern Zhejiang province, Ningbo Heng-Shun Traffic Engineering Co Ltd took delivery of the second-largest containerised asphalt plant in the Lintec line at the end of May 2019. By the middle of June, thanks to the ease with which its modular structure can be assembled, the plant was already in full-time operation, typically mixing over 3,000 t of asphalt during a standard 10-hour shift.

Materials from the plant are delivered to a host of the contractor's regional projects. This has included the phase four expansion project of Ningbo Lishe International Airport as well as numerous surrounding highways.

Ningbo Heng-Shun selected the Lintec plant back in 2019 after travelling to the construction site of the Hong Kong-Zuhai-Macau bridge, where another CSM4000 had just completed the job. Seeing the performance of the plant on this high-profile, heavy-duty project sealed the deal for Ningbo Heng-Shun's leadership.

The company's plant manager, He Gangfeng, said there were also several design features that really appealed to the organisation: "In terms of efficiency and consistency of the final product, the Lintec model has outperformed brands we've previously used. The operating system provides very precise weighing of the aggregate and bitumen ratio. This is a unique feature for us and has already saved us a significant amount of bitumen."

He added, "We also opted for corrosion resistant paint as an option, and that has really given us effective environmental protection against the humid and often harsh climate of the East China Sea coast. This saves us a lot of money as other plants would always require third-party cover."

The requirement for a plant capable of mixing an average of 300 t/hr wasn't the only persuading factor for Ningbo Heng-Shun. Environment-friendly performance was also crucial as the plant is based close to city centre areas. To meet these needs, Lintec's standard pollution control unit, which recycles dirt particles into reclaimed filler rather than emitting them into the air, has proved an essential feature.



The Lintec CSM4000HS20-SE asphalt plant has been used to deliver over 3,000 t of asphalt per day. Materials from the plant are delivered to a host of the contractor's regional projects, including the phase four expansion project of Ningbo Lishe International Airport as well as numerous surrounding highways.

Lintec's ISO-shipping container structural design provides further advantages for owners such as Ningbo Heng-Shun through its simple, low-cost transportation and assembly. In addition, the company's customer-centred commissioning process ensures work begins as soon as possible after delivery, according to Tony Liu, CEO of Lintec & Linnhoff China Ltd.

"Our CSM batching plants are easier to assemble than competing models, due in large part to their high level of factory pre-assembly," explained Mr Liu. "But we still ensure all our installations quickly reach maximum operating efficiency. Before delivery, we bring future operators to our factory to train them in T&E (Testing & Erection), before sending one of our own engineers to the jobsite for full supervision of erection and commissioning."

Once a plant has begun operation, a Lintec engineer offers on-site technical support to ensure optimum production, with full operator training also provided

(as was the case for Ningbo Heng-Shun). Lintec engineers are also able to log-in to the operating system of any unit, to provide 24/7 remote technical support. This allows them to make rapid diagnoses of any issues to ensure the plant continues to operate at maximum efficiency.

Ningbo Heng-Shun Traffic Engineering is one of the largest contractors in Zhejiang province. It works directly with a number of state-owned-enterprises in China, supporting major infrastructure and construction projects.

Lintec & Linnhoff is a global manufacturer and distributor of leading-edge solutions for the concrete and asphalt industries. Its products include asphalt batching plants, concrete batching plants, pavement related technologies and machinery, and specialist concrete cooling solutions. All its machines are engineered to the highest levels and exceed global standards for environmental impact, recyclability and reusability. ■

Website: [www.lintec-linnhoff.com](http://www.lintec-linnhoff.com)

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# Cat M315 excavator hard at work in the Philippines

A Cat M315 Next Generation wheeled excavator is hard at work in the Philippines, helping LamAsia Builders and Supply Corporation carry out various projects. Based in Tarlac, the civil construction company is owned and operated by Edward T. Asiaten, together with his wife Atty Ma. Alyssa Jeline A. Lamorena-Asiaten.

“We have been operating for three years in Region III in many sectors from construction of buildings and roads and flood control to all sorts of civil construction. We recently used the new Cat M315 on our civil sites. These projects are under DPWH (Department of Public Works and Highways) and other private companies,” shared Mr Asiaten.

“In the projects that we do, our clients expect efficient output. In our company, we define efficiency as on-time completion of quality projects within a set budget,” said Ms Lamorena-Asiaten.

As for working with the local Cat dealer, Mr Asiaten said, “We chose to work with Monark Cat because they were the first to believe in us when we were just starting out our business. When we bought our very first machine, they treated us like we owned a whole fleet of machines.”

“They welcomed us and gave us a chance to partner with them,” added Ms Lamorena-Asiaten.

“We have a great relationship with our dealer. We have been working with Monark Cat for two years now. From our first machine to our eighth unit, they were always there to support us. They have gone the extra mile with their service. That is why we still choose them today,” concluded Mr Asiaten.

LamAsia Builders’ project engineer, Ian Fernando C. Flores, is also pleased with the Cat M315. He is currently working on the Bilad Elementary School project, where the machine is being put to use.

“There are multiple benefits that we get with the Cat M315. Firstly, it accelerates our work with its ability to complete big volumes of load within the day. Secondly, it can be mobilised easily and doesn’t need to be loaded onto a truck to be transported to a jobsite,” he explained.

The Cat M315 wheeled excavator has an excellent performance with up to 14% more swing torque and technology options to boost productivity. The machine also offers up to 10% savings in maintenance costs, longer service intervals, and daily ground level maintenance.

With a Cat engine that meets US EPA Tier 3 and EU Stage IIIA emission standards, the Cat M315 can travel between sites easily with travel speeds of up to 37 km/hr. From dirt to asphalt, the excavator matches various needs to get the job done in a timely, efficient manner.

The machine’s advanced hydraulic system features the optimum balance of power and efficiency while giving users the control they need for precise working requirements. The dedicated swing pump delivers consistent power for better multitasking capabilities. In addition, auxiliary hydraulic options provide users with the versatility to use a wide range of Cat attachments. ■

Website: [www.cat.com](http://www.cat.com) / [www.monark-cat.com](http://www.monark-cat.com)



LamAsia Builders and Supply Corporation has used its Cat M315 machine on civil sites.



ABOVE AND BELOW: The Cat M315 excavator offers up to 14% more swing torque and technology options to boost productivity. The machine can travel between sites easily with travel speeds of up to 37 km/hr.



# Potain Hup 32-27 crane excels in Indonesian projects

Jakarta-based contractor PT Indonesia Pondasi Raya (Indopora) has deployed its Potain Hup 32-27 self-erecting crane on a variety of projects over the last three years. Launched at bauma 2016, this crane model has the ability to combine typical tower crane operations with replicating many of the tasks performed by smaller, mobile material handling equipment – reducing costs and eliminating excess traffic on jobsites.

Founded in 1977, Indopora had traditionally rented conventional tower cranes on larger projects and mobile cranes, rough-terrain forklifts or telehandlers on prefabricated housing projects. But in 2018 it pursued a new strategy, purchasing a Potain Hup 32-27 on the recommendation of Multicrane Perkasa, the local Potain dealer.

The crane proved an immediate hit, and it's easy to see why. It features an adjustable two-section mast with a third section that can telescope out from the second to increase working height from 21 m to 27 m, with the jib in the horizontal position.

With a maximum capacity of 4 t, or 1 t at its 32 m jib end, the crane provides even greater versatility with a choice of three luffing positions (10°, 20° and 30°) that increase the maximum under-hook height to 40 m. Folding back the jib to its alternate configurations of 23 m or 11 m is a swift and straightforward process. In total, over 20 separate crane configurations are possible.

The first opportunity for the Hup 32-27 to prove itself to Indopora came with the start of the Eco Home project, a five-storey apartment complex in Tangerang, West Java. “The crane was worked hard for a year, lifting precast concrete sections and handling other duties,” said Mr Wahyudi, owner of Indopora. “Its ability to work so well in such a confined location was extremely impressive.”

Key to this ability is the small rear slewing radius of just 2.25 m, enabling the crane to be positioned closer to existing structures. It also offers two compact footprint options of 4 m x 4 m or 3.5 m x 4.42 m. Its innovative, dynamic unfolding movement enables setup in congested areas, while its integrated levelling system compensates for height differentials of up to 25 cm, or gradients of up to 8%.

Next project after the completion of the Eco Home development was the Boxies Mall, another five-storey structure in western Bogor, 60 km south of Jakarta. This time the crane was used for about eight months, again lifting precast concrete and other materials.

For such a relatively large crane, the Hup 32-27 becomes surprisingly agile once folded for transportation, packing down to a single 4 m tall, 12 m long package, which again impressed Mr Wahyudi: “We were able to move it quickly from one location to another. It could then be reconfigured rapidly, so the minimal downtime and wider coverage is extremely appreciated.”

The quick setup time of the Hup 32-27 is made possible with Manitowoc's innovative radio remote control unit. Its Smart Set Up software delivers simplified step-by-step information to the operator via the large, easily navigated colour screen and, once setup is completed, provides three operating profiles that vary the working speed to suit the application.

“After three years of use, we are very pleased we made the switch to the Hup 32-27,” concluded Mr Wahyudi. “It has definitely boosted productivity and delivered cost savings, while simplifying the on-site logistics.”




The Potain Hup 32-27 self-erecting crane on a project site.

Other Indopora projects where the Hup has proved itself include the Jababeka Living Plaza Mall and the Indramayu Mall, both in West Java. ■

Website: [www.manitowoc.com](http://www.manitowoc.com)



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## Strengthening floor slabs made easy with Planitop HPC Floor

**W**ith Mapei's Planitop HPC Floor, strengthening floor slabs can now be performed easily without the need for additional tools, such as steel connectors or electro-welded mesh that are typically required for traditional floor slabs.

Planitop HPC Floor is a one-component, fibre-reinforced, shrinkage-compensated, high-strength fluid cementitious mortar designed to make structural screeds suitable for strengthening floor slabs. When mixed with water, the system forms a fluid mortar that can be cast into formwork in layers from 1- to 4-cm-thick without segregating, and without the need for electro-welded reinforcing mesh.

Once hardened, Planitop HPC Floor is highly ductile, impermeable to water and develops high resistance to cyclical loads and has very high flexural and compressive strength. It adheres well to old concrete and reinforcement rods. The system has been certified as R4-class structural mortars and complies with

EN 1504-9, EN 1504-3 and EN 1504-6 standards.

To allow expansion in the open air, Mapecure SRA may be added - a special admixture with the ability to reduce plastic and hydraulic shrinkage to ensure better curing of mortar. This admixture can minimise the water evaporation and encourage the hydration process. It acts as an internal curing agent, which reduces final shrinkage by 20% - 50%, resulting in lower risk of cracking.

Mapei's Planitop HPC Floor is ideal for repairing and strengthening reinforced concrete and horizontal structures where high-performance, free-flowing mortar is needed to integrate thick layers or fill complex areas. Such applications include strengthening the extrados of floor beams, repairing industrial floors, concrete floors of roads, airports and viaducts, and seismic upgrading of elements subjected to high stresses. ■

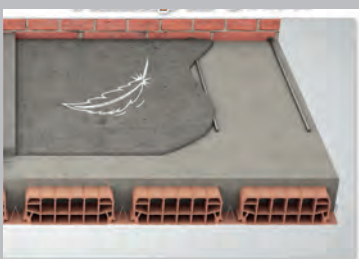
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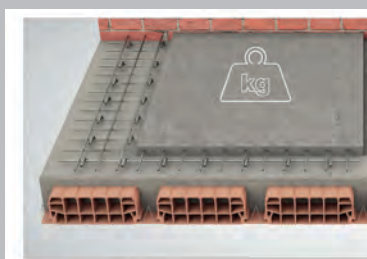
**Comparison of traditional and lightweight concrete against Planitop HPC Floor**

A. Lightweight system using Planitop HPC Floor

B. Traditional system



- NO** Steel connectors
- More compact layer**
- NO** Electro-welded mesh



- YES** Steel connectors  
At least 5 cm thick
- YES** Embedded electro-welded mesh



ABOVE: Mapei's Planitop HPC Floor is a high-strength fluid cementitious mortar designed to make structural screeds suitable for strengthening floor slabs.

OPPOSITE IMAGE AND TOP: When mixed with water, Planitop HPC Floor forms a fluid mortar that can be cast into formwork in layers from 1- to 4-cm-thick without segregating, and without the need for electro-welded reinforcing mesh.

**COMPACT AND LIGHTWEIGHT STRENGTHENING SYSTEM**

|                           | Thickness applied | Density                   | Overall weight of intervention |        |
|---------------------------|-------------------|---------------------------|--------------------------------|--------|
| Traditional concrete:     | 5 [cm]            | 2400 [kg/m <sup>3</sup> ] | 125 [kg/m <sup>2</sup> ]       |        |
| Lightweight concrete:     | 5 [cm]            | 1400 [kg/m <sup>3</sup> ] | 70 [kg/m <sup>2</sup> ]        | - 44 % |
| <b>Planitop HPC Floor</b> | 2.5 [cm]          | 2400 [kg/m <sup>3</sup> ] | 60 [kg/m <sup>2</sup> ]        | - 53 % |

Source: Mapei

# OFFSHORE WIND

## WHAT CAN ASIA LEARN FROM EUROPE?



“Outside China, Asia can gain a lot from adopting and improving European approaches, and from working with European contractors. After all, the European industry has pioneered offshore wind technology including large-scale turbines, subsea cabling, offshore foundations and installation vessels as well as commercial and finance systems,” explained Mr Thompson. “However, crucial geographical and cultural differences must be taken into account – and for some of these, there is no substitute for locally available expertise.”

### **Favourable policies for wind farm projects**

In late 2016, a change in Japan’s Ports and Harbour Law enabled

offshore wind farm developers to build in water zones close to existing ports. This led to the development of the country’s first ever large-scale commercial offshore wind farm close to the Akita and Noshiro Ports in the Akita prefecture.

“Arup’s local and international teams worked successfully with local EPC contractors and the local regulators, Class NK, to develop the designs of these initial offshore wind projects in the region, paving the way to establish accepted design processes that will be followed on all subsequent projects,” said Mr Thompson. “This is the first design to be approved by the local statutory checking authority in Japan, and expertise on the ground has proved vital in steering the project through this process.”

**EUROPE HAS SHOWN HOW OFFSHORE WIND CAN PROVIDE UTILITY-SCALE RENEWABLE ELECTRICITY AS CHEAPLY AS WELL-ESTABLISHED FORMS OF GENERATION SUCH AS COMBINED-CYCLE GAS TURBINES. CAN ASIA FOLLOW EUROPE'S LEAD TO FAST-TRACK ITS OFFSHORE WIND INSTALLATION? YES AND NO, SAID PETER THOMPSON, ENERGY BUSINESS LEADER FOR EAST ASIA AT ARUP.**



“The Japanese parliament passed further legislation in 2019 allowing the development of offshore wind in deep water and other areas outside ports and harbours. This has opened the market substantially as ports and harbours cover just 1.5% of Japan’s territorial waters.”

Mr Thompson revealed that Asia has learnt from, and improved on, the procurement approach taken in Europe. “Taiwan, Japan and Korea have moved more quickly than Europe did from feed-in tariff schemes to an auction process or renewable energy certification system to encourage more competitive supply chains.”

What about the companies in these supply chains? “The UK and Europe were in an open market, so local consultants, designers

and contractors developed supply chains through organic growth to carry out the work locally with minimal encroachment by non-European companies.

“Asia is in a more favourable situation, with the involvement of experienced European consultants and contractors enabling them to develop their own skills faster through technology transfer.”

#### **Opportunities and challenges in Asia**

“Taiwan, the first in the region to act on a commercial scale, encouraged many established European contractors to join its auctions independently,” shared Mr Thompson. “The aspiration has been to develop, through compulsory engagement with local

manufacturers and suppliers, a local supply chain which will be able to serve not only the Taiwanese markets but also the rest of Asia. Offering the best of both worlds, it's an approach that is proving very successful.

"Japan and Korea have well established contracting bases, with the necessary knowledge, experience and equipment to undertake large-scale infrastructure projects. However, they lack experience in offshore wind, having not been involved in the European projects. So, a pragmatic approach based on alliancing with established European contractors is seen as the best way to learn quickly. These alliances have been formed and are preparing for the initial auctions."

Mr Thompson further highlighted the technical challenges in Asia - including typhoons, high seismicity, soft marine deposits as well as hard volcanic and sedimentary rock seabeds - which are not usually encountered in Europe.

"Overcoming these challenges will require new methods of analysis and stronger structures. For example, monopiles, used for 90% of European developments, may not always be suitable in Asia. They have been the most commonly used foundation type in Europe due to their lower cost - thanks to their simplicity to fabricate and construct - and their ability to be hammered or vibrated deeply into the competent seabed stratum, typically consisting of either sand, silt, medium to hard clays - or a mixture.

"Many of the most promising areas in Asia do not share such conditions and have soft marine clays, hard volcanic and sedimentary rocks, deep faulting, seismic activity with liquefaction potential to deal with."

To that end, Mr Thompson pointed out that alternative foundation systems may therefore need to be found in certain situations, like piled jackets, suction buckets or even self-installing gravity-based structures. "Requiring no piles and no specialised installation vessels, gravity-based structures maximise the use of both local labour and materials. They could present an attractive option for many locations in Asia.

"In addition, the limited availability of shallow water depths less than 50 m could see the advent and rapid development of commercial scale floating offshore systems, especially in the waters around Japan, Korea and Taiwan."

According to Mr Thompson, floating wind is one area where we could see Asia's wind industry develop to compete with,



Both images © Arup

ABOVE: Peter Thompson, Arup's energy business leader for East Asia.

LEFT: Mr Thompson speaking at an Arup event in Manila, the Philippines.

## **Marrying the best of European experience with Asian opportunities and local expertise is the right approach to unlock a market expected to reach 100 GW of installed capacity by 2030.**

Estimated capacity for the top five markets in Asia for new installations:

1. China 52 GW
2. Taiwan 10.5 GW
3. Korea 7.9 GW
4. Japan 7.4 GW
5. Vietnam 5.2 GW

(Source: *Asia Pacific to Become Largest Offshore Wind Power Market by 2030*)

and even surpass, Europe. "The region has a track record, in areas such as automotive manufacturing, of producing technology that improves upon current solutions, making them cheaper and more efficient on a commercial scale - factors that are key to the successful development and adoption of floating offshore wind."

### **'Local expertise is key'**

Whatever the specific technology, local expertise will be key, stressed Mr Thompson. "At Arup, we're seeing clients across Asia looking for sophisticated engineering skills - including advanced soil-structure interaction analysis, hydrodynamic interaction analysis as well as seismic and extreme wind and wave assessments and modelling - for their offshore wind projects,

to cater for the local conditions.

"Seeing the rapid progression of the market, we've invested in building our capability locally, because we firmly believe that marrying the best of European experience with Asian opportunities and local expertise is the right approach to unlock a market expected to reach 100 GW of installed capacity by 2030."

Mr Thompson emphasised that "combining the benefits of Europe's experience and innovation with Asia's proven ability to develop and improve manufacturing approaches represents a tremendous opportunity for Asia to emerge as a powerhouse of offshore wind. And that can only be a good thing for the world as a whole!" ■

Website: [www.arup.com](http://www.arup.com)

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# Digital solutions help speed up hospital construction in Jakarta

Like many countries around the globe, Indonesia has faced soaring Covid-19 cases that have exceeded hospital bed capacity to treat the affected patients. To address this shortage, the Indonesian government initiated plans to construct 14 new hospitals. PT Wijaya Karya (Persero) Tbk (Wika) was tasked with building one of them on a 22,700-sq-m former football field in South Jakarta.

The US\$4 million hospital is a one-storey building with a capacity of 300 beds, 35 intensive care unit rooms, and 10 emergency rooms. It is a modern facility equipped with a negative pressure isolation system to prevent the flow of virus-contaminated air, eliminating the spread of infectious pathogens to the surrounding environment, and includes a robotic nurse and an integrated command centre to connect it to 65 other hospitals.

Given the critical pandemic situation, the government commissioned Wika to complete design and construction works, as well as have the hospital fully operating, in less than a month. Delivery also needed to be cost-effective and environmentally sustainable. To fulfil these requirements on an incredibly tight timeline, compounded by social distancing requirements, Wika needed innovative technology solutions to coordinate and accelerate engineering workflows and fast-track construction without sacrificing quality.

## Integrating modular construction with BIM

As a pioneer in modular construction in Indonesia, Wika strived to push the boundaries of design and construction through its innovative approach. This methodology would not only accelerate construction time to within just a few weeks, but also increase quality, safety, and sustainability by using offsite, factory-controlled processes and lightweight, mostly recycled materials. However, such

modular system is challenging to execute, requiring streamlined processes and complex decisions that make conventional design strategies insufficient to meet project deliverables. As a multidiscipline engineering project, Wika needed to coordinate structural, architectural, and mechanical, engineering, and plumbing (MEP) works to facilitate simultaneous design and construction, and meet the tight delivery schedule. To address these planning, collaboration, and management challenges amid a socially distanced team, Wika sought to integrate its modular construction standards with digital BIM application.

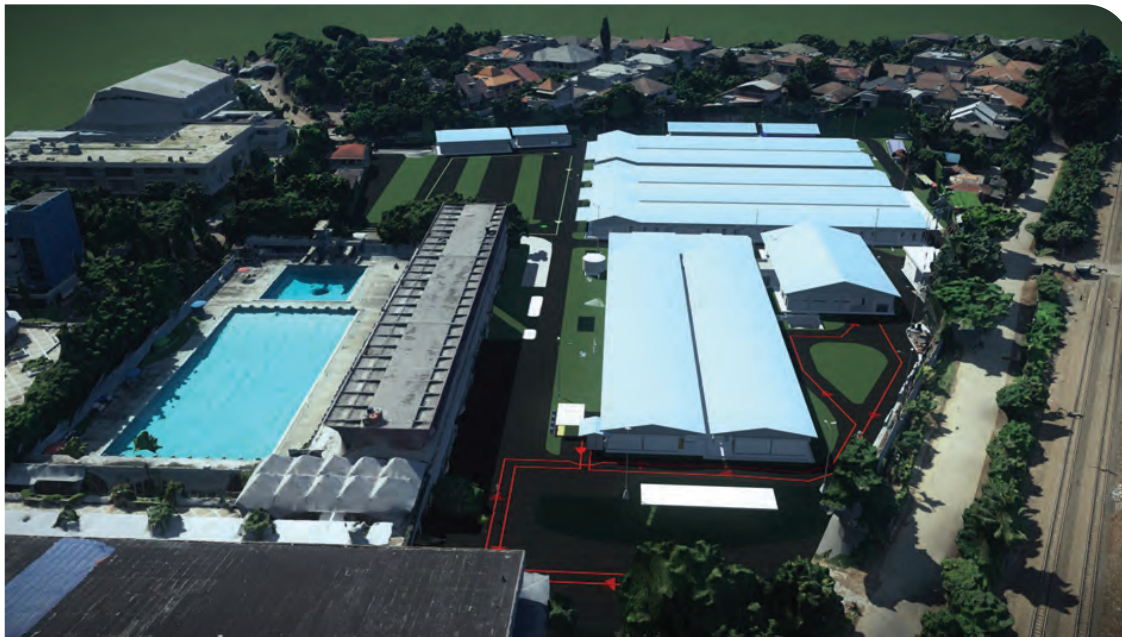
The company's goal was to accelerate the design review process, manage complexity of design changes during construction, and achieve efficiency in time, cost, and quality using BIM technology to digitally collaborate.

"BIM facilitates the creation of designs that are complex to the construction process, starting from initial digital design to manufacturing workflows in all lines of construction disciplines," explained Romi Ramadhan, BIM manager at Wika. To implement its BIM strategy, Wika needed interoperable modelling applications and a unified digital platform.

## Bentley's applications help speed up project delivery

Wika established a connected data environment using ProjectWise, and adopted Bentley's reality modelling and BIM methodology to carry out its modular approach. The company used a quadcopter drone and ContextCapture to capture and process images of the 2-ha project site, creating a reality model of the topographic area.

With OpenBuildings Designer, Wika generated a model of the entire hospital building, including structural, architectural, and MEP elements, as well as incorporated landscape and roadway



OPPOSITE IMAGE: To accommodate Covid-19 patients, the Indonesian government initiated plans to construct 14 new hospitals. Wika was tasked with building one of them on a 22,700-sq-m former football field in South Jakarta.

LEFT: Using Bentley applications, Wika successfully delivered the modular hospital design within 10 days. The ability to extract accurate material quantities from the 3D models helped save 10% of project costs.

BELOW: The new hospital built by Wika is a one-storey building with a capacity of 300 beds, 35 intensive care unit rooms, and 10 emergency rooms.

design with OpenRoads. To optimise design of the indoor airflow system to support patient recovery and prevent viral transmission, Wika used Hevacomp to perform airflow analysis and simulation within the building model, designing an HVAC system that complies with proper standards. The company integrated the 3D models with the construction schedule and costs using Synchro 4D while using LumenRT for visual animation, improving construction visualisation for better design verification.

Leveraging Bentley's interoperable applications, Wika implemented a collaborative BIM methodology, enabling immediate access to real-time data and 3D models without needing to be in the same room. The integrated digital modelling solution facilitated survey, design, simulation, and visualisation, allowing design and construction to occur simultaneously, identifying and resolving design clashes, and making virtual changes to avoid errors and costly rework on site.

ProjectWise and Navigator especially helped coordinate the various, geographically dispersed engineering disciplines resulting in faster decisions throughout the project lifecycle. "The end result is that Bentley Systems can cover the end-to-end processes both in terms of engineering and management," said Mr Ramadhan.

Working in a connected data environment, 13 multidiscipline BIM engineers collaborated from home, streamlining workflows and increasing productivity to keep the tight project schedule on track - all while following social distancing guidelines.

### Establishing industry benchmark

By developing and implementing digital BIM workflows, Wika completed 95 design revisions and resolved 62 clashes in three days to deliver the modular design in only 10 days, saving US\$ 400,000. The company used synchro 4D to perform construction simulation and manage the construction process, which reduced construction time by four days to complete construction within 16 days, 20% faster than targeted. This result was extremely important, as it was necessary to have this building completed as soon as possible to provide care to Covid-19 patients.

Working in a unified BIM platform provided complete insight into planning, costs, scheduling, and construction, improving cost efficiency by 18% while optimising quality. Integrating its modular approach with Bentley's BIM technology, Wika increased its return



on investment by 24% and accelerated hospital operations by two months. The ability to extract accurate material quantities from the 3D models - combined with the sustainability of the modular construction process - contributed to saving up to 3,000 cu m of material waste and 10% of project costs.

"Bentley technology has the capabilities and tools to make effective and efficient modular workflows, so we can optimise project costs and improve efficiency of the design process," said Rizky Yusuf Ramadhan, BIM coordinator at Wika. "We continue to build more and more modular hospitals using Bentley technology as quickly as possible to save more lives."

The connective data environment also improved visualisation and decision-making without everyone needing to be in the same room, important during the global pandemic. Bentley's BIM technology played a vital role in modular design and construction, which can slowly shift the world of construction from conventional to digital and industrialise construction project delivery.

Moving forward, Wika plans to expand BIM application and develop a digital twin for lifecycle management of the modular facility, serving as a benchmark for future developments within the industry. ■

Website: [www.bentley.com](http://www.bentley.com)



# Paving the way for better runways at Cambodia airports



**ABOVE:** The Lintec CSD 2500B asphalt plant has been used on airport projects in Cambodia, helping to produce a steady supply of hot mix asphalt during construction and maintenance work.

**RIGHT:** The plant has an innovative double screen drum technology, and offers a maximum production capacity of 160 t/hr with a 2.5 t mixer.



**A** Lintec CSD 2500B containerised asphalt plant has been used on airport projects in Cambodia, helping to produce a steady supply of hot mix asphalt during construction and maintenance work. Most recently, the plant completed a runway extension and rehabilitation project at Sihanouk International Airport, including the renovation of a 2.5 km existing runway and construction of an 800 m extension. Prior to this, it was employed on projects at Phnom Penh International Airport.

“With planes constantly taking off and landing, a key challenge on runway projects is only having a few hours each day when asphalt works can take place. This means the hot mix asphalt has to be produced efficiently and quickly, with limited room for error. The precision and reliability of the CSD 2500B make it a perfect choice, helping projects stay on schedule,” said Lee Yen Meng, CEO of Lintec & Linnhoff Asphalt Pte Ltd.

The Lintec CSD 2500B features a maximum production capacity of 160 t/hr with a 2.5 t mixer. With its innovative double screen drum technology, there is no need for a hot elevator or vibrating screens in the Lintec design, resulting in easier maintenance, lower power consumption and better environmental performance. Its modular construction, meanwhile, makes for easy and quick installation which is a useful feature for customers, such as this Cambodian contractor that needs to move the plant from project to project.

The enclosed structure gives the plant a smart appearance, while its reduced noise and dust levels mean disruption to the local community is kept to a minimum. Each Lintec unit undergoes a rigorous testing routine prior to shipping, while a host of customisation options means users can specify a design that meets their exact needs.

Thanks to the efficient and productive performance of the Lintec CSD 2500B at Sihanouk International Airport, the site can now accommodate larger (Code E) aircraft, such as the Boeing 787 Dreamliner or the Airbus A350-1000. In 2019 the airport welcomed 1.6 million passengers and over 17,000 flights. ■

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**BRIDGING**

*The Gap*



**C**onstruction work is currently underway on the 8.5-km Cebu-Cordova Link Expressway (CCLEX) in the Philippines. As of March 2021, the project's overall engineering, procurement and construction (EPC) contract is at 72.73% while construction progress alone is at 66.89%, according to the latest statement by Cebu Cordova Link Expressway Corporation (CCLEC), a subsidiary of Metro Pacific Tollways Corporation (MPTC). The project is expected to be substantially completed by December 2021.

CCLEX is being implemented by CCLEC under a joint venture agreement with the local governments of Cebu City and Municipality of Cordova. The PHP30 billion project spans the Mactan Channel, linking mainland Cebu from Cebu City with the town across the channel, notably Cordova in Mactan island.



ABOVE: An artist's impression of Cebu-Cordova Link Expressway (CCLEX).

TOP: Spanning the Mactan Channel, the bridge is currently under construction. It is expected to be substantially completed by December 2021.



CCLEC broke ground on the CCLEX project in March 2017, with civil works started in July 2018. The design and build contract was awarded to Cebu Link Joint Venture (CLJV) – a consortium of Spanish company Acciona Construccion SA and Filipino companies First Balfour and D.M. Consunji Inc.

CCLEC also engaged the services of COWI A/S of Denmark with the Philippines’ DCCD Engineering Corporation, as its sub-consultant, to be the project’s technical advisor (owner’s engineer). Norconsult, a Norwegian consultancy firm, has been commissioned as the project’s independent consultant.

Set to become a new landmark in the country, CCLEX provides two lanes in each direction that will offer a safe, quick and scenic passage for approximately 50,000 vehicles daily, easing the traffic in the existing Marcelo Fernan Bridge and Mandaue-Mactan Bridge. The project has a design speed of 80 km/hr and a navigational clearance (height) of 51 m to allow large vessels to pass underneath the bridge.

“Despite the constructional challenges because of the health and safety protocols being observed due to Covid-19, our team is doing their best to complete this most anticipated infrastructure project in Cebu and the rest of the Visayas region as soon as possible,” said Allan G. Alfon, president and general manager of CCLEC.

“From the beginning, we have always known the socio-economic impact of CCLEX on the entire Visayan region,” added



**IMAGES ON THIS PAGE: CCLEX provides two lanes in each direction that will offer a safe, quick and scenic passage for approximately 50,000 vehicles daily. It has a design speed of 80 km/hr and a navigational clearance (height) of 51 m to allow large vessels to pass underneath the bridge.**



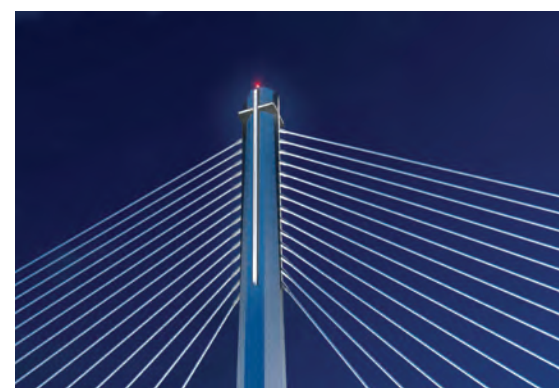
Manuel ‘Manny’ V. Pangilinan, chairman of MPTC.

Among the iconic features of the project is the 40-m-high crosses on top of the bridge pylons. They are installed on all four sides of each of the twin towers.

The crosses were blessed and illuminated on 15 April 2021 as part of a landmark event celebrating 500 years of Christianity in the Philippines.

“The crosses on top of CCLEX’s main bridge pylons are inspired by the cross planted by Portuguese explorer Ferdinand Magellan 500 years ago in Cebu and a tribute to Cebu being a cradle of Christianity in the region,” said CCLEC.

MPTC, the toll road arm of Metro Pacific Investments Corporation (MPIC), is the largest toll road concessionaire and operator in the Philippines. The company’s expansion goals include establishing toll operations in the Visayas, other parts of the Philippines, and in neighbouring countries such as Vietnam and Indonesia.



IMAGES ON THIS PAGE: CCLEX is set to become a new landmark in the Philippines, easing the traffic in the existing Marcelo Fernan Bridge and Mandaue-Mactan Bridge. Among the iconic features of the project is the 40-m-high crosses on top of the bridge pylons (seen above and left), installed on all four sides of each of the twin towers.

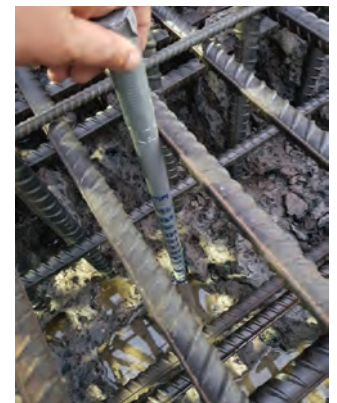
# INNOVATIVE ROBOTIC SOLUTION FOR CCLEX



**FAR LEFT:** The uneven, muddy terrain at the jobsite presented no problems for the self-propelled Aqua Cutter hydrodemolition robot. This minimised necessary site preparations and helped accelerate repairs.

**LEFT:** The hydrodemolition process uses high-pressure water jets as powerful as 40,000 psi manipulated by an automated robot to remove layers of deteriorated and damaged concrete.

**BELOW AND BELOW LEFT:** In this project, Asia Waterjet Equipment used a hydrodemolition robot operating at 15,000 psi to remove 10 cu m of poor-quality concrete at a depth of 150-250 mm.



## Deteriorated concrete

As expected, the construction of CCLEX relies on a carefully choreographed plan of simultaneous operations to meet strict deadlines. Expert logistics allow crews to avoid many hurdles; however, unforeseen challenges can still arise. When a bad batch of concrete threatened to derail progress on one of the bridge's first piers, project managers needed a creative solution that could quickly remove the poor-quality concrete without damaging the rebar or putting the project behind schedule. Hydrodemolition was considered the only process with the precision and productivity to keep the project on track.

Cebu Link Joint Venture (CLJV) contacted Singapore-based Asia Waterjet Equipment, the region's premier hydrodemolition expert. With the clock ticking and monsoon season in full swing, the team arrived on site with an Aquajet Aqua Cutter 710V hydrodemolition robot and Jetstream HP waterjetting pump.

"Working with CLJV, there were a number of challenges we had to overcome to keep the project on track. Hydrodemolition was the best solution and Aquajet was the best tool for the job," said Chris Parkhill, sales director for Southeast Asia at Asia Waterjet Equipment.

Asia Waterjet Equipment offers innovative cutting and cleaning solutions for hazardous areas or difficult to pump products in petrochemical, wastewater, mining, construction and other

industries. The company also supplies a range of robotic solutions. Headquartered in Dubai, UAE, Asia Waterjet Equipment has offices in Abu Dhabi (UAE), Saudi Arabia, Bahrain, and Singapore.

"Our focus has always been providing the cutting-edge tools to make challenging applications safer and more efficient," said Mr Parkhill. "From the very beginning, we've been involved in some of the most hazardous operations out there. We understand the demands and dangers, which is why we partner with industry-leading equipment manufacturers for robust solutions that maximise safety and productivity."

## Troubled waters

Access was the primary problem. CLJV was conducting construction on several bridge piers simultaneously. To minimise disruptions to the local community, the project's primary staging area, as well as the initial pier, were only accessible from the coast. This meant the concrete had to be mixed 2.5 km down the coast then transported by barge to the jobsite. From there, the barge was grounded, and the trucks disembarked directly onto the beach. The pier was 30 m inland.

Overall, the transportation delay had no negative impacts on the concrete, and the 16-by-14-m pier quickly grew to 4 m tall. However, a complication with a single delivery threatened to throw the entire project behind schedule and over budget.

Crews knew there was a problem immediately. The concrete was already setting as they pumped. Vibrating and other correctional methods failed, and the pour was ultimately unsuccessful. Even worse, the concrete fell 350 mm short, leaving a mesh of exposed rebar.

For CLJV and Asia Waterjet Equipment, the challenges were adding up, making for a very difficult repair. The pilon was nearly complete. While CLJV had budgeted time and money for small complications, it could not afford to demolish the whole pilon and start over.

Crews with handheld breakers or excavators could remove the poor-quality concrete, but only by destroying the rebar. They would have to cut the exposed rebar at the top of the pilon to access the concrete a foot below. More rebar would be damaged as the poor-quality concrete was removed, and microfractures from the vibration of jackhammers or excavators would weaken the remaining concrete, jeopardizing the pilon's integrity.

"There was no option; the rebar and existing good concrete had to be protected," explained Mr Parkhill. "If CLJV went with traditional demolition methods, they'd have to open, pry apart where possible or cut the rebar and manually jack hammer out the bad concrete. There's no guarantee a man using a jack hammer could gauge what's good and what's bad, so they'd end up removing extra. Then they'd have to bend the rebar back into place without breaking it, or weld or cut new threads and join with it threaded couplers. It would add weeks to the project and a significant cost to the budget."

Asia Waterjet Equipment knew hydrodemolition was the only solution. The non-intrusive method uses high-pressure water jets as powerful as 40,000 psi manipulated by an automated robot to remove layers of deteriorated and damaged concrete. The high-pressure water exceeds the strength of the concrete to widen existing pores and microcracks, breaking it apart in a controlled manner. Unlike other mechanical methods, hydrodemolition is impact free, eliminating the vibrations that cause microfractures.

Additionally, the method meets European Standards EN 1504 and provides a superior bonding surface for new concrete. The Aqua Cutter 710V's high-pressure water jet leaves a rough, irregular profile after removing the initial layer of concrete that results in a better bonding strength. The robot also cleans and descales the exposed rebar and removes non-visible contaminants such as dirt, mud, foundation mud, salts, chlorides and sulfates.

### Self-propelled hydrodemolition robot

Productivity was also a concern. With simultaneous construction continuing on several other pilons in the area, crews needed to remove the poor-quality concrete and complete repairs quickly - with minimal labour.

With the ability to complete concrete removal tasks up to 25 times faster than a hand lance, the Aqua Cutter provided the necessary solution to keep the project on schedule. Asia Waterjet Equipment brought in Aquajet special application manager Kjell Isaksson to support the operation.

Like the cement trucks, the Aqua Cutter and all support equipment, including a high-pressure waterjet power pack with a 4200 series Jetstream pump, had to access the site from the Mactan Channel. Proximity to the water and the frequent, heavy rains of monsoon season made ground conditions difficult. However, since the Aqua Cutter is self-propelled with tracks, the uneven, muddy terrain presented no problems for Asia Waterjet Equipment. This minimised necessary site preparations and helped accelerate repairs.



ABOVE AND BELOW: **With the ability to complete concrete removal tasks up to 25 times faster than a hand lance, the Aquajet Aqua Cutter provided the necessary solution to keep the project on schedule.**



This mobility was also necessary for tackling the demolition itself. Once lifted 4 m onto the pile cap by a crane, the Aqua Cutter was able to easily manoeuvre over the rebar. The high-pressure pump was set up 7 m away and connected to the hydrodemolition robot by a high-pressure hose.

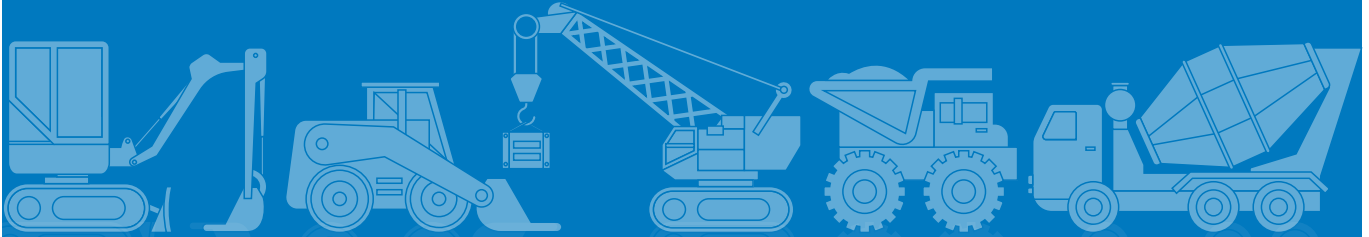
To help reduce cost and increase production, Asia Waterjet Equipment opted to use seawater for the majority of the demolition rather than bring in fresh water. The company continually filled two 20-cu-m night tanks directly from the Mactan Channel. Fresh water was only used during the last two days of the project to remove salt and other impurities that could impact bonding.

Using the hydrodemolition robot, operating at 15,000 psi (1,000 bar), and two employees, Asia Waterjet Equipment removed 10 cu m of poor-quality concrete at a depth of 150-250 mm in days.

"With the Aquajet Aqua Cutter, we increased productivity to a point where construction was back on schedule," said Mr Parkhill. "Without hydrodemolition, there's no way CLJV would have been able to do that." ■

All images on pages 62-63 © Aquajet

For more information on the CCELEX project (pages 58-61): [www.ccllex.com.ph](http://www.ccllex.com.ph)  
For more information on the hydrodemolition robot (pages 62-63): [www.aquajet.se](http://www.aquajet.se)







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# Zero Turn for Mobility



[info@gomaco.com](mailto:info@gomaco.com) | [www.gomaco.com](http://www.gomaco.com)



Long, straight runs are nice. But many of you have curb and gutter projects with short runs, radii, and corners in parking lots or tight locations. GOMACO's Xtreme curb and gutter machines have Zero-Turn capabilities for maneuverability.

You'll be able to place more curb than ever before and move your machine in ways you have never moved before. You'll be able to pour a tight radius that you could only dream of before. GOMACO's proprietary G+ controls makes your concrete paver smoother and easier to operate.

Have fun paving curb and gutter with your new Zero-Turn GOMACO paver. Our worldwide distributor network and our corporate team always stand ready to serve and assist you.

CONCRETE STREETS AND HIGHWAYS | AIRPORT RUNWAYS | CURB AND GUTTER | SIDEWALKS  
RECREATIONAL TRAILS | SAFETY BARRIER | BRIDGE PARAPET | BRIDGE DECKS | IRRIGATION CANALS  
GOMACO CORPORATION IN IDA GROVE, IOWA, USA | 712-364-3347

