

SOUTHEAST • ASIA CONSTRUCTION

SEPTEMBER - OCTOBER 2020



Cover Story:

Modular integrated construction project
in Hong Kong

Features:

Potato Head Studios, Bali

Comansa upgrades 11LC Series tower cranes

Surbana Jurong: Digital Twins or Triplets

A large teal Kobelco excavator is shown in a mining environment, working on a steep, rocky slope. The excavator's arm is extended upwards, and its body is positioned on a pile of dark, jagged rocks. The background shows a cloudy sky. The overall scene conveys the power and capability of the machine in a demanding industrial setting.

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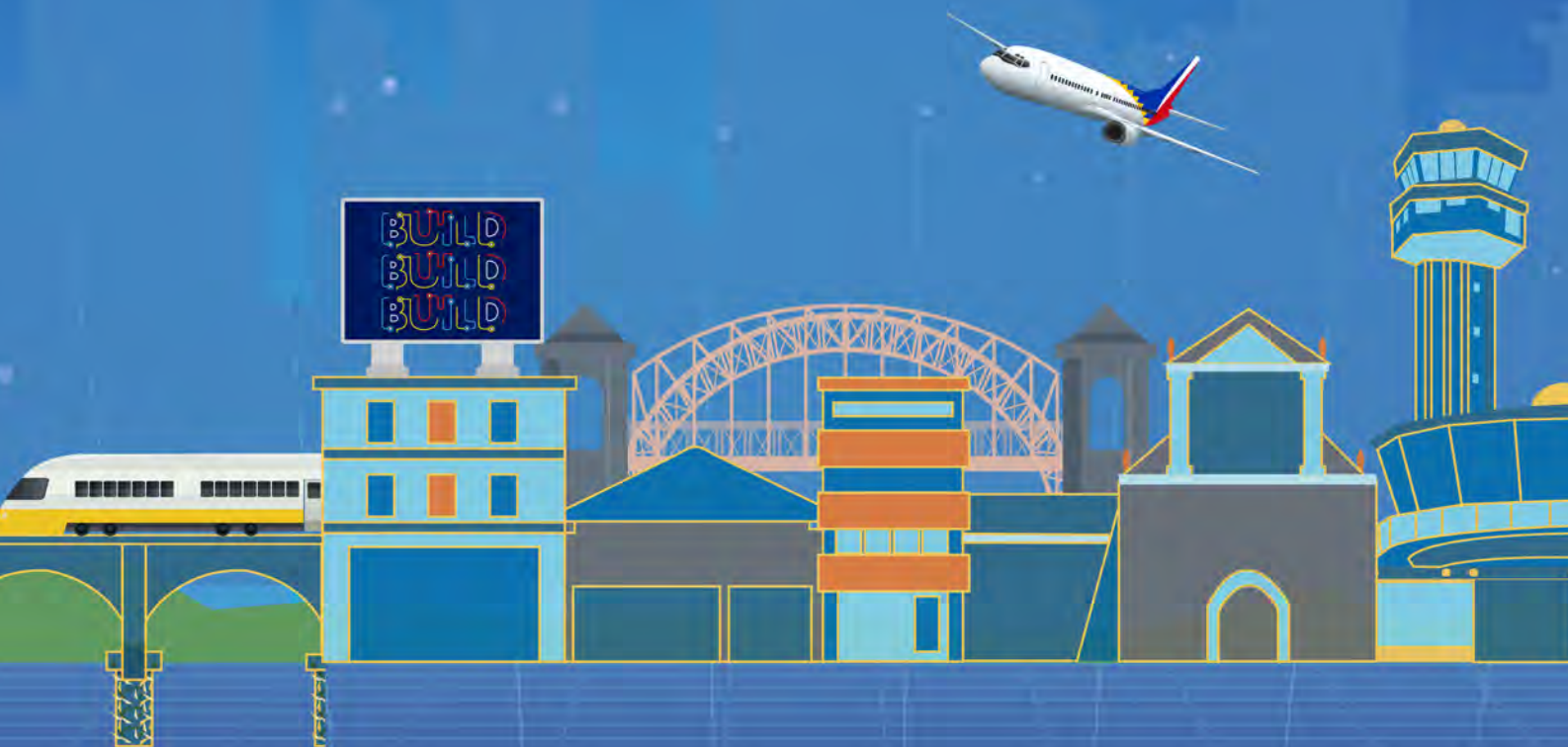
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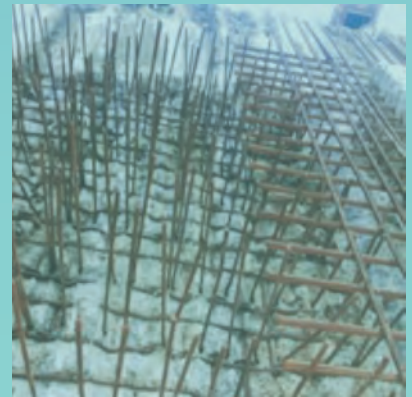
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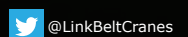
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Johor Bahru – Singapore RTS Link project resumes

Singapore and Malaysia held a bilateral ceremony on 30 July 2020 to mark the official resumption of the Johor Bahru – Singapore Rapid Transit System (RTS) Link project. Due to Covid-19 travel restrictions, the event took place at the Causeway (Singapore-Malaysia border crossing).

The RTS Link project has been suspended since 1 April 2019 at Malaysia's request, to allow some time for the country to review the project. Both sides have now discussed and agreed on some key changes to the project, according to the joint statement by Singapore and Malaysia.

First, the RTS Link will be a standalone Light Rail Transit (LRT) system, instead of leveraging Singapore's Thomson-East Coast Line (TEL) Mass Rapid Transit (MRT) system. The RTS Link's capacity remains unchanged at up to 10,000 passengers per hour each way. Also, the RTS Link will no longer use the existing TEL Mandai Depot in Singapore. For this, a new depot will be constructed in Wadi Hana, Johor Bahru.

In addition, each government separately appointed an infrastructure company (InfraCo) to fund, build, own, maintain and renew the civil infrastructure and stations in its territory up to the international boundary. Malaysia has changed its InfraCo from Prasarana Malaysia Berhad to Malaysia Rapid Transit System Sdn Bhd, a wholly-owned subsidiary of Mass Rapid Transit Corporation Sdn Bhd. The Land Transport Authority of Singapore remains as Singapore's InfraCo.

Lastly, arising from the suspension of the project and the above changes, the targeted passenger service commencement date will be deferred from end 2024 to end 2026.

The joint statement further mentioned, "The RTS Link will continue to feature co-location of customs, immigration and

quarantine (CIQ) facilities, so that passengers undergo CIQ clearance only once at their point of departure. Both countries have reaffirmed their commitment to ensuring that the RTS Link stations will be well integrated with the local transport networks in each country. The fare levels will continue to be set by the operating company (OpCo), and will be determined closer to the date of passenger service commencement."

Three key agreements to resume the project have also been concluded, added the joint statement. These include: an agreement to amend the RTS Link Bilateral Agreement between the governments of Singapore and Malaysia; a joint venture agreement between Singapore's SMRT RTS Pte Ltd, a wholly-owned subsidiary of SMRT Corporation Limited, and Malaysia's Prasarana RTS Operations Sdn Bhd, a wholly-owned subsidiary of Prasarana Malaysia Berhad, to constitute RTS Operations Pte Ltd; and a concession agreement for the government of Malaysia and the Land Transport Authority of Singapore to appoint RTS Operations Pte Ltd as the OpCo for the first 30-year concession period.

"Today's event marks the culmination of several months of hard work, during which officials on both sides worked closely to find a common way forward on this project, despite the challenges faced during the unprecedented Covid-19 pandemic," said the joint statement. "The successful resumption of the RTS Link project underscores the deep and enduring bilateral relationship between both countries, and the collective desire to strengthen our win-win partnership. When completed, the RTS Link will ease Causeway congestion, improve connectivity, foster people-to-people ties and generate shared economic and social benefits." ■

Hyundai Construction Equipment to offer financial products in Asia

Hyundai Construction Equipment has established a partnership with South-Korea based DGB Financial Group to offer financial products for customers in Asia, which they can use to purchase construction equipment.

Both companies recently signed a Memorandum of Understanding on global financial businesses, attended by Kwon Ki-hyeong, executive vice president and CFO of Hyundai Construction Equipment; Oh Sung-ho, head of group strategy at DGB Financial Group; and Suh Jung-dong, CEO of DGB Capital. The signing ceremony was held at the DGB Financial Centre in Jung-gu, Seoul, South Korea.

Construction equipment is normally high-priced, with the average price of an excavator going close to 100 million won, explained Hyundai, and therefore many customers depend on financial products such as leases and installment payments.

Based on the agreement, the two companies plan to launch their first construction equipment leasing financial product in Cambodia soon this year, and expand related businesses throughout Asia.

According to Hyundai, the company aims to increase sales in the Asian market where financial programmes are not yet advanced by linking the financial products to be developed jointly



Hyundai Construction Equipment teams up with DGB Financial Group to develop financial products for the Asian market.

with DGB to equipment sales.

DGB Financial Group, which has been making efforts to expand its share of the Asian market, starting with Laos in 2016, and then Cambodia, Myanmar and Vietnam, also expects the agreement to further strengthen its business portfolio in Asia. ■

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SMEC wins hydropower projects in South Asia

Global design and engineering firm SMEC has been engaged by contractor Megha Engineering & Infrastructures Limited (MEIL) to provide detailed engineering and project management services for the 500 MW (4 x 125 MW) Kundah Pumped Storage Hydroelectric Project in India. The state agency - Tamil Nadu Generation and Distribution Corporation Ltd - is the project proponent and asset owner.

As a pumped storage scheme located in the Nilgiris hills of the Tamil Nadu state, the project will provide peaking benefits by utilising the existing reservoir at Porthimund as the upper reservoir and Emerald as the lower reservoir.

"This project is one of the largest pumped storage electricity generating schemes in Tamil Nadu," said Neeta Arora, director of SMEC Design Centre (India). "The Indian government has committed to a significant increase in power system flexibility, ensuring grid stability and avoiding power shortages. This provides a great opportunity for further hydropower development in the region, an area where SMEC has many decades of experience and a broad project portfolio."

She added, "Sometimes referred to as the world's 'water battery', pumped hydropower storage provides a more



Located in the Nilgiris hills, India's Kundah Pumped Storage Hydroelectric Project is set to be one of the largest pumped storage electricity generating schemes in Tamil Nadu.

sustainable source of renewable energy and increasingly supports the needs of changing power systems. Pumped storage projects currently account for 94% of installed global energy storage capacity."

In Nepal, SMEC has been appointed by the Department of Electricity Development to undertake the feasibility study and environmental impact assessment (EIA) for the 844-MW Kaligandaki Hydropower Project. Located along the border between Parbat and Myagdi, this multipurpose storage hydropower project will utilise river discharge flowing into the Kaligandaki River.

The planned location of the proposed project is 1- to 2-km upstream from the confluence of Kaligandaki and Seti Rivers, with elevation of around 530 m



Both images © SMEC

The Kaligandaki Hydropower Project in Nepal will utilise river discharge flowing into the Kaligandaki River (pictured).

and inundation up to around 750 m. The reservoir volume has been calculated to approximately 2,043 cu mm.

This appointment in Nepal follows SMEC's assignment in late 2019 for the proposed 70.34-MW Simbuwa Khola Hydroelectric Project in the Taplejung district by Remit Hydro Ltd, utilising the flow of Simbuwa Khola, a tributary of Arun River. SMEC's services include updating the feasibility study, detailed engineering surveys and design and preparation of tender documents. The project aims to generate 378.96 GWh of electricity annually, which will be evacuated through the Koshi Corridor Transmission Line. ■

Final TBM breakthrough for Malaysia's MRT Putrajaya Line

The MRT Putrajaya Line (previously known as the MRT Sungai Buloh-Serdang-Putrajaya Line) recently saw its final tunnel boring machine (TBM) breakthrough at the Ampang Park MRT Station site, marking a major milestone for the project.

The TBM, codenamed TBM 774, was launched in September 2019 from Conlay MRT Station site and excavated a section of the MRT tunnel beneath Jalan Stonor, Persiaran KLCC, Jalan Binjai and Jalan Ampang as well as the LRT Kelana Jaya Line tunnels to the Ampang Park MRT Station site, a distance of 917 m.

"We congratulate MMC Gamuda for the TBM breakthrough today. This is a major milestone for the project," said Datuk Mohd Zarif Hashim, the newly appointed CEO of Mass Rapid Transit Corporation Sdn Bhd (MRT Corp), who witnessed the breakthrough on 17 July 2020. MMC Gamuda is the turnkey contractor for the construction of the MRT Putrajaya Line.

According to MRT Corp, with this latest TBM breakthrough, tunnel excavation for the MRT Putrajaya Line has reached 98% completion. Less than 400 m of tunnelling distance is left, and is expected to be completed in August 2020.

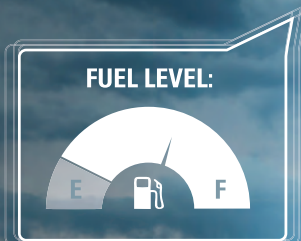
"Tunnelling works have been challenging as we had to excavate through three types of geological conditions, namely

karstic limestone, granite and the Kenny Hill Formation. The karstic limestone condition is among the most challenging type of formation for tunnellers," explained Dato' Amiruddin Ma'aris, MRT Corp's project director for MRT Putrajaya Line.

On the Covid-19 pandemic situation, he said, "All necessary approvals from the authorities were obtained before we allowed work to be resumed. All workers who work at our sites undergo the Covid-19 test and this has ensured that our workers remain healthy and construction work proceeding smoothly."

The underground section of the MRT Putrajaya Line is 13.5 km in length. To construct the twin tunnels for this section, 12 TBMs were used - eight of them were previously used for the MRT Kajang Line (previously known as MRT Sungai Buloh-Kajang Line) and underwent refurbishment in a plant in Pusing, Perak, before being redeployed for the MRT Putrajaya Line. MRT Corp added that the TBMs also underwent improvements and upgrading, such as being able to be controlled autonomously with the use of artificial intelligence algorithms to optimise performance.

The MRT Putrajaya Line will have 36 stations, of which nine are underground stations. The entire alignment is 56.2 km long, running from Kwasa Damansara to Putrajaya Sentral. ■



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Aurecon joins new marine facility project in Singapore

JTC Corporation intends to build the Offshore Marine Centre 2 along Singapore's Tuas western coast. For this, the company has appointed Aurecon to conduct the feasibility study and conceptual layout design for the development.

The new shared facility will support offshore module and equipment fabrication, as well as associated activities. These include: construction and assembly of topside modules and offshore structures; manufacture of oilfield equipment such as wellheads, manifolds and pipelines; fabrication of mooring equipment like anchors and winches; rig conversion, modification or maintenance, repair and overhaul activities; a fabrication of offshore renewable energy structures; and offshore project logistics.

The Offshore Marine Centre 2 will complement the existing Offshore Marine Centre with higher specifications, including heavier floor loading and a deeper draft, to support the fabrication and assembly of larger offshore modules and equipment.

According to Aurecon, undertaking the conceptual layout design for this envisioned state-of-the-art marine facility was no easy task. The Offshore Marine Centre 2 needs to be able to accommodate larger vessels and integration-type activities for more complex and heavier topside process modules.

Aurecon's work began by engaging with companies and specialists in the offshore and marine industry to understand several key elements, such as size and weight of vessels in the future; future mechanical and electrical requirements of seafaring structures in the resources industry; ground bearing capacity that the yards would have to accommodate; use and frequency of vessels through international ports; value that stakeholders see in Singapore's marine ports; as well as expectations that clients and industry have for international ports.

The feedback was consolidated into a multi-criteria analysis by Aurecon to determine the demand and requirements of clients



© JTC Corporation

An artist's impression of the Offshore Marine Centre 2.

and industry for an international facility such as Offshore Marine Centre 2.

Aurecon said the challenge in the conceptual layout design stage was balancing the industry demand with the engineering design and financial investment. "It is important that Offshore Marine Centre 2 is a competitive, relevant and accessible facility so its clients can access the waterfront infrastructure well into the future," emphasised the company.

Aurecon's role covered civil and structure engineering; building information modelling; offshore and marine engineering; safety in design; and employer's designer.

The waterfront infrastructure will be a heavy-duty platform to accommodate the vessels of offshore and marine companies in a safe, efficient and cost-effective manner. With a site size of approximately 7.5 ha, Aurecon explored, planned and developed conceptual layouts to maximise the placement of facilities within the project site. The company will continue to support the construction, and to oversee the design throughout the entire construction period. ■

Aurecon appoints new structures leader in Thailand



Aurecon has appointed Dr Praween Chusilp (left) as its structures practice leader in Thailand. He will work closely with local clients to create smart engineering solutions and play a key role in collaborating with Aurecon's global experts to bring best-in-class expertise that supports the clients' projects in Thailand.

Dr Praween joins Aurecon from Meinhardt Thailand where he was associate director. In his new role, Dr Praween will also be responsible for leading capability development within the practice, nurturing the next generation of structural engineers for Aurecon in Thailand.

Dr Praween has more than 16 years of experience in structural engineering and operations management, encompassing a broad spectrum of structures, including super tall buildings, precast buildings, factories and petrochemical plants. Specialising in earthquake engineering, he has delivered

a large number of projects in Asia, including one of the tallest buildings in Thailand and a large mixed-use development in Bangkok's central business district, Dusit Central Park.

"Thai developers have a strong global reputation for quality and innovative design that attracts discerning investors, which will serve them well in the long-term," explained Sakorn Kruemai, managing director of Aurecon in Thailand. "Dr Praween brings an innovation mindset and a unique blend of local and international experience with complex designs and new technologies. In this regard, Dr Praween is a perfect fit for our team as he shares our desire to help our clients bring their boldest designs to life."

"I am excited to join Aurecon, as I share Aurecon's passion for innovative design and thinking," said Dr Praween. "I look forward to working with clients to make a positive and tangible impact on their businesses. As engineers, I believe our insights would be invaluable in helping them maximise value throughout their asset's entire lifespan and address challenges in creating smart and sustainable buildings of the future." ■

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Nippon Koei and Surbana Jurong form partnership

Nippon Koei and Surbana Jurong have signed a Memorandum of Understanding (MOU) committing to deliver sustainable and resilient solutions for urban and infrastructure development projects worldwide. This is part of the firms' joint action on climate change mitigation and resiliency, stated the partners in their joint announcement.

Under the MOU, the two firms will harness their combined knowledge and experience in climate change adaptation, resilience enhancement and smart technologies. Nippon Koei has proven capabilities in disaster preparedness in Japan and government-funded projects in other countries, including Official Development Assistance for world-class engineering design projects. Surbana Jurong has a track record in delivering innovative and smart solutions for sustainability and resiliency in master planning, urban, residential and industrial development, coastal protection and reclamation around the world.

Both consulting firms have been collaborating on sustainability and resiliency since 2018. A notable project is the 9,460-ha New Clark City in the Philippines. Slated for completion in 2065, it is set to be the country's first smart, green and disaster-resilient metropolis. Building on strong ties, Nippon Koei and Surbana Jurong said they will identify sustainable project opportunities globally, especially in Asia where public-private partnerships can encourage the adoption of smart technologies to scale up urban initiatives and solutions. This approach will contribute towards the shared vision of building sustainable and liveable cities.

"The strategic partnership will integrate and enhance the development of the relevant research, planning, designing and implementation fields. It will also help nurture more local talent in multiple disciplines in the pursuit of real-world challenges and practical application for sustainable urban developments over the world," said Ryuichi Arimoto, representative director and president of Nippon Koei.



LEFT: Both companies have also worked on the New Clark City project in the Philippines.

BELOW: Wong Heang Fine, group CEO of Surbana Jurong (on the left) and Ryuichi Arimoto, president of Nippon Koei.



All images © Surbana Jurong

"A variety of 'smart solutions' in line with the needs and economic viability can be provided as part of our services by utilising advanced analysis technologies. It can also facilitate designing and implementing the solution to cater for regions of different taste and style, which in turn leads to a personalised and sustainable development."

Wong Heang Fine, group CEO of Surbana Jurong added, "Surbana Jurong has forged strong ties with Nippon Koei through several landmark projects over the years, including the recent 'Study of Cooperation for Infrastructure Projects' that will facilitate closer cooperation between Singapore and Japanese companies on infrastructure projects across Asia.

"These successes reflect our complementary capabilities for the built environment. Surbana Jurong is pleased to renew our partnership with Nippon Koei, extending our expertise in smart solutions to jointly tackle new and complex urban challenges and advance sustainable development." ■

Construction of Malolos-Clark Railway Project to start soon

The Philippines' Department of Transportation has signed two civil works contracts totalling nearly Php 38 billion (US\$728 million) for the flagship Malolos-Clark Railway Project, which is financed by the Asian Development Bank (ADB).

The project aims to construct a safe, affordable, reliable, and environment-friendly railway connecting the northern provinces and the capital, Metro Manila. The contract signing will jumpstart the construction phase of the project, create much-needed jobs, and boost local economic activity, said ADB in its statement.

A milestone for the Philippine government's landmark Build, Build, Build infrastructure development programme, the Malolos-Clark railway is expected to be completed by 2024. This project, part of the 163-km North-South Commuter Railway Project, will ease road congestion in the capital and nearby provinces and reduce annual traffic-related economic costs, which total US\$18 billion in Metro Manila alone, revealed ADB. It will help push economic activity to regional growth centre like Clark in Pampanga province.

The new railway line is intended to cut the travel time between Clark and Manila from two to three hours by bus to one hour by

train, while reducing greenhouse gas emissions by more than 60,000 t per year. In addition, the project is expected to create about 24,000 local construction jobs in the next three years and 14,000 more jobs related to the railway system's operation. ADB said it will lead to larger, indirect employment and economic benefits to local businesses, such as suppliers of raw materials, which in turn will create more jobs.

One of the contracts, which was awarded to the joint venture of Spain's Acciona Construction Philippines and EEI Corporation, will build about 6.3 km of main railway lines and 1.6 km of depot access line, including an underground railway station at Clark International Airport.

The other contract, which was awarded to South Korea's Posco Engineering and Construction Co Ltd, will erect a 33-ha depot and a railway operations control centre in Mabalacat, Pampanga. According to ADB, three more contracts for civil works are set to be awarded later this year.

The Japan International Cooperation Agency (JICA), which is co-financing the project, will provide up to US\$2 billion in additional funding for the rolling stock and railway systems. ■

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Taking 'concrete' steps for safe construction site practices

Singapore-based cement and ready-mix concrete supplier, Pan-United Corporation Ltd, has introduced several initiatives to minimise physical interactions and improve productivity at construction worksites. The company said that "as Singapore enters Phase 2 of its reopening, concrete innovations and digitalisation can play a major role in enhancing safe distancing at worksites."

One of these initiatives is the PanU New Generation Self-Compacting Concrete (PanU NewGen SCC). The company has enhanced its product mix design of a specialised rheologic concrete that flows easily to reach hard-to-fill corners.

Unlike regular concrete, which requires several concreting workers to manually vibrate and compact the material into place, the PanU NewGen SCC only needs a single worker to guide the concrete pumping pipe. It allows workers to better keep a safe distance from each other during concreting work.

Besides reducing the manual labour required, the PanU NewGen SCC can also improve productivity by 75% and reduce casting time by 40%, according to Pan-United, resulting in faster construction completion. Previous generations of SCC have been used to build skyscrapers in densely populated areas, including Tanjong Pagar Centre - Singapore's tallest building - and HDB projects (Singapore's public housing).

Another initiative from Pan-United is AiM (Artificial Intelligence Mixing) in-transit concrete management system. The company's concrete mixer trucks have been equipped with this system, which calibrates each truck's concrete consistency during the journey from the batching plant to the project site. If changes in concrete consistency are detected, the system will remotely adjust the concrete mix, maintaining the specified concrete properties by the time the mixer truck reaches its destination.

The AiM system eradicates the need for quality assessors and product technicians to be physically present at the worksite to test and approve the concrete quality from each mixer truck. Apart from minimising the number of workers and employees on-site, the system also increases product quality consistency and minimises the risks of project delays.

Lastly, Pan-United has developed AiR (Artificial Intelligence for Ready-Mix Concrete) optimisation platform, which allows the digitalisation of concrete operations across the entire supply chain. It enables the automation of back-end processes such as delivery orders and invoices.

Pan-United issues electronic delivery orders (eDOs) and electronic customer invoices (e-invoices) that make it far easier



Both images © Pan-United Corporation

ABOVE: With PanU NewGen SCC, only one worker is needed to guide the concrete pumping pipe around the slab area.



LEFT: Pan-United's AiM in-transit concrete management system helps to minimise the number of workers and employees required on-site.

for the customers' employees to work from home, and save them time and costs from not having to logistically collate and despatch physical documents around everyday. This minimises physical contact among employees at its premises, and between employees and customers or workers at construction sites.

May Ng, CEO of Pan-United said, "As the leader in concrete and logistics technologies, we have always looked for new and effective ways to address our customers' pain-points and improve project efficiency. Amid the Covid-19 outbreak, we recognise that additional measures are necessary for the safe restart of construction projects. By enhancing our products and using IoT (Internet of Things) to improve service delivery, Pan-United hopes to play our part in ensuring that construction work can be carried out safely and seamlessly, mitigating risks of construction delays."

She concluded, "There is a heightened need to be innovative and accelerate digitalisation. We are excited about other new solutions we intend to introduce to support safe distancing requirements at construction sites and enhance operational efficiency for our customers." ■

Jacobs awarded solar photovoltaic power plant contract in Malaysia

Jacobs has been appointed by Hanwha Energy Corporation to deliver owner's engineer services to support the design, engineering, procurement, construction, installation, testing and commissioning of a new 100 MW alternating current (MWac) solar photovoltaic power plant in Pekan, Pahang, Malaysia.

When completed, the project will be connected to the electricity transmission system operated by utility provider Tenaga Nasional. It is expected to begin commercial operation in 2021.

The facility is one of five projects selected in a national Large-Scale Solar (LSS) third procurement programme led by Suruhanjaya

Tenaga, Malaysia's Energy Commission. The LSS programme aims to diversify Malaysia's power generation mix and increase the country's renewable resources from 2% to 20% by 2030.

Jacobs was also actively involved in both the first (LSS1) and second (LSS2) phase of the LSS scheme, fulfilling owner's engineer, independent engineer and lender technical advisor roles for numerous projects procured under the programme, including a 49 MWac project in Sungai Siput, Perak under LSS1, and three 30 MWac projects in Pahang, Negeri Sembilan and Kedah under LSS2. ■

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KTP engineers net positive energy building for RSAF

The Republic of Singapore Air Force (RSAF) has unveiled its A330 multi-role tanker transport (MRTT) hangar. The construction of the facility took two years and it was completed in March 2020. This is the RSAF's first net positive energy building, which can generate 30% more electricity than consumed.

KTP Consultants, a member of Surbana Jurong, was appointed as civil & structural (C&S) engineer on the project. The company employed an innovative, robust structural system to build this sustainable facility.

To achieve a clear span of up to 90 m and commit to the lower tonnage of the roof, KTP adopted a modular steel truss system supported on laced strut columns. This enabled a large column-free span without compromising the robustness of the building.

During the erection, working space and height were constrained by adjacent buildings as well as restrictions by the Civil Aviation Authority of Singapore (CAAS). As it was not feasible to mobilise the tower crane, KTP worked closely with the main contractor and jacking specialist to use their proprietary strand jacking system to lift the entire roof from 3 m above ground to its final height of about 30 m in less than two days.

The hangar also comes with a panelled fabric door installed with translucent material that allows sunlight to permeate through, reducing the need for excessive lighting. The large front opening to accommodate the fabric door support posed a challenge to the lateral stability on the building's minor axis. KTP had to work around the available space within the fabric door support to employ a truss rigid enough to resist the lateral force.

KTP's engineering solutions contributed to the project attaining the Green Mark Platinum (Positive Energy) Award by Singapore's Building and Construction Authority (BCA).

Sustainable features

Solar panels installed on its roof will generate 1,225,000 kWh of electricity a year - enough to power 273 four-room HDB flats (Singapore's public housing). The additional energy will be directed to other facilities within Changi Air Base (East) where the hangar is located.

The building is positioned in a north-south orientation to optimise airflow for natural ventilation. The building was also



Both images © Mindef, Singapore



ABOVE: The RSAF's A330 MRTT hangar can generate 30% more electricity than consumed.

LEFT: Large-span louvres allow for natural ventilation.

designed to maximise natural ventilation to create a cool working environment for the maintenance crew. This was achieved by the large front door opening with panelled vertical lift fabric door, and large-span louvres at the rear of the hangar. This means the hangar does not need to have as many fans, reducing the energy it consumes.

The office annex attached to the hangar also has a green roof with carpet grass that insulates the building against heat. The moist soil under the grass acts as an insulation layer against the heat, reducing the need for excessive air-conditioning in the rooms. The LED lighting and air-conditioning used are also energy efficient.

Rainwater is harvested and recycled for general washing, flushing of toilets and auto-irrigation of the hangar's green roof. Singapore's Ministry of Defence (Mindef) estimates that, together with water-efficient fittings, the building will save an amount of water equivalent to the consumption of 28 four-room HDB households each year. ■

Terex to manufacture cranes in India

Terex has announced that its Terex Cranes and Franna businesses will start manufacturing their product lines in Hosur, India, from 2021. Terex Cranes, whose portfolio includes tower and rough terrain cranes, is based in Fontanafredda and Crespellano, Italy; while Franna, a global provider of mobile pick and carry cranes, is based in Brisbane, Australia.

Terex already has a strong manufacturing presence in India, having first entered the market in 2009. Today, the company employs 600 staff across the country, which comprises an R&D unit of over 150 engineers.

"This is an exciting investment for Terex as we continue to promote and grow the Franna brand globally," said Danny Black, general manager of Franna. "We have already had very good experience in the Indian market. Now, we have the ability to directly

bring our market-leading Franna technology with local homologation to improve safety and performance for the Indian market.

"This expansion will allow us to support our growth plans without causing any disruption to our production capacity in Australia, and will allow us to be a valued competitor in India. Given our proven manufacturing capabilities with the success of other Terex brands in India, such as Powerscreen and Terex Finlay, we are confident this decision will provide a positive outcome for Franna."

Marco Gentilini, VP of Terex Cranes added, "It is a thrilling opportunity for Terex Cranes to build on the experience and knowledge of the team at Hosur. We have been monitoring the market and we believe it is time to start a new journey that will give us a boost in the important Indian domestic market, but also reinforce our presence in the region." ■

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Arup and Swire create AI-enabled building in HK

The artificial intelligence (AI) smart platform 'Neuron' is a collaboration between Arup and Swire Properties to create the first AI-enabled building in Hong Kong. Both partners have won Silver at the 2019 Hong Kong Green Innovations Awards (HKGIA) for this work, which transforms building operations and drive sustainable development and innovation in the industry.

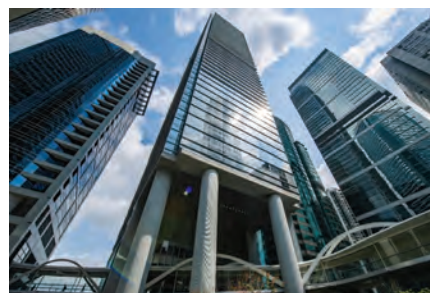
Tested and implemented at Swire Properties' newest triple Grade-A office tower, One Taikoo Place, the Arup-developed technology is a pioneering AI and Internet of Things (IoT)-enabled central analytic platform that serves as the 'digital brain' of the building.

Combining the computational power of AI with machine learning, Neuron transforms building operations by analysing and learning from large historical data sets to automatically discover trends and perform energy forecasts, optimise building systems, detect faults and allow predictive maintenance.

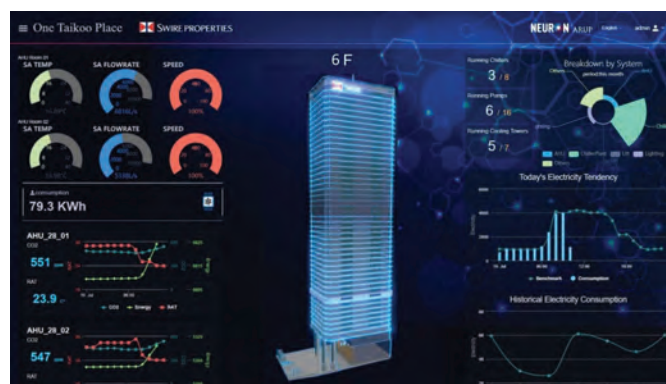
"Neuron puts the concept of smart buildings on a new level: it will change the way buildings are designed and constructed, operated and maintained. We're keen to further explore and develop this data-driven approach in shaping a more sustainable world," said Michael Kwok, East Asia region chair at Arup.

Completed in September 2018, One Taikoo Place was designed with the highest green building and wellness standards in mind. The 1-mil-sq-ft office tower has already won multiple accolades and international green certifications. Besides being the first commercial building in Asia to achieve WELL Core & Shell Final Platinum, it is also the first commercial building in Hong Kong to obtain a triple Platinum rating (WELL, BEAM Plus and LEED Final Platinum certification). It also won the 'Pioneer Award - Green Building Leadership' at the Green Building Award 2019, organised by the Hong Kong Green Building Council.

Don Taylor, director for office at Swire Properties said, "Neuron,



The AI smart platform 'Neuron' (below) provides a more comprehensive picture of energy usage, occupancy and system conditions, and monitoring, via interactive and responsive dashboards. The technology has been tested and implemented at One Taikoo Place (left).



Both images © Arup

and our partnership with Arup, is part of our greater placemaking efforts to use game-changing technology to drive efficiency in our operations, reduce our carbon footprint and promote wellness all at the same time. Physical buildings are a key part of building vibrant sustainable communities and we will continue to explore technology that mitigates our impact on the environment and creates smarter ecosystems that help people and businesses perform better." ■

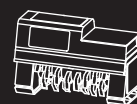
JP Nelson 'achieves sales milestone' for Sunward excavators

Following its success with Sunward drilling rigs, JP Nelson announced it has achieved a sales milestone for Sunward hydraulic excavators (pictured). According to the company, it has delivered around 10 units of excavators this year to renowned main contractors and sub-contractors in Singapore.

JP Nelson mentioned that the company is also keeping stocks in its premises to cater for local needs. "All vital components such as engines and hydraulic systems are imported from Japan or USA (for the large capacity)," said JP Nelson. "Sunward excavators are versatile and suitable for the local market, with our stocks ranging from 3.0 t to 50 t. We are looking into more product expansions with Sunward moving forward." ■



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Singapore's fourth desalination plant starts operations

The Keppel Marina East Desalination Plant (KMEDP) – Singapore's fourth desalination plant – begun its commercial operations on 29 June 2020, as announced by the national water agency PUB and Keppel Corporation in their joint statement. The facility is operated by Marina East Water Pte Ltd, a wholly-owned subsidiary of Keppel Infrastructure Holdings Pte Ltd – which is a wholly owned subsidiary of Keppel Corporation Limited.

Under the design, build, own and operate (DBOO) arrangement with PUB, Marina East Water will undertake plant operations for a 25-year concession period from 2020 to 2045. KMEDP – Singapore's first large-scale, dual-mode desalination plant – is capable of producing 137,000 cu m of fresh drinking water per day. It is the second water plant developed and operated by Keppel under the DBOO arrangement, the first being the Keppel Seghers Ulu Pandan NEWater Plant.

KMEDP's location in Marina East gives it the ability to treat either seawater or freshwater drawn from the Marina Reservoir, depending on the prevailing weather conditions. This will strengthen Singapore's water supply resilience in the face of increasingly dry weather conditions caused by climate change. In dry weather, KMEDP will draw water from the sea to produce desalinated water. When it rains, the plant will utilise rainwater collected in the reservoir to produce potable water, which requires less energy and fewer steps in the treatment process compared to desalination.

Ng Joo Hee, chief executive of PUB explained, "Seawater desalination is one of Singapore's 'four national taps'. Unlike the other three taps – imports, rainfall and recycled water – it is a practically limitless source. The ocean is almost infinite. It is also weather-resistant and always available, rain or shine, as a source of life-giving water. The availability of desalination makes Singapore's water supply immensely resilient."

Dr Ong Tiong Guan, CEO of Keppel Infrastructure commented, "We are pleased to have commenced operations for the iconic KMEDP. Completing the final lap of testing and commissioning during the Covid-19 pandemic brought about some inevitable challenges, due to the reduced manpower. The commencement



The innovative design of the Keppel Marina East Desalination Plant integrates the plant with surrounding greenery by situating the treatment facility underground, making it an iconic architecture that the public can enjoy.

of operations is testament to Keppel's can-do spirit and resilience, as we worked closely with PUB and our contractors to overcome these challenges and deliver a successful project."

The plant is set against the backdrop of Singapore's central business district skyline, along the cyclist-friendly Eastern Coastal Park Connector Network that bridges the recreational spaces of East Coast Park and Gardens by the Bay East. It also incorporates environment-friendly elements within its landscaping, such as rainwater harvesting ponds and stormwater management systems, to retain rainwater for reuse in irrigation and the facility's water features.

In October 2019, KMEDP became the first industrial plant in Singapore to be awarded the ABC Waters Certification (Gold) by PUB in recognition of its outstanding design features and exceptional Active, Beautiful, Clean (ABC) standards. The plant was recognised for its sleek, modern design that breaks away from those of conventional water treatment plants and is the first industrial plant to achieve such seamless integration with the surrounding greenery. It innovatively achieves multiple land uses by situating treatment facilities underground, viewable via a private viewing gallery, which frees up nearly 20,000 sq m of open green rooftop space for community activity and recreation. This green roof also reduces the urban heat island effect. ■

Manitowoc appoints new Grove crane dealer in Indonesia

Manitowoc has appointed PT Berlian Cranserco Indonesia (Cranserco) as its new Grove rough terrain crane dealer in Indonesia. The Balikpapan, Kalimantan-based company is now responsible for the sales and aftermarket services of Grove cranes in the country. Due to the Covid-19 situation, the dealer agreement signing between both companies was held virtually.

"Cranserco's business strategy has always been to provide customers with world-class products and support. The new relationship with Manitowoc is a great opportunity to further expand this strategy, for our customers and also to increase our business footprint in Indonesia," said James Hoyt, director of Cranserco. "The range of Grove rough terrain and crawler cranes is extensive, and we are excited to be able to compete in the 50-t rough terrain market here."

Established in 2011, Cranserco has six offices around Indonesia to provide world-class service and parts support for customers. They are located in Balikpapan, Kalimantan; Jakarta; Pekanbaru;



James Hoyt, director of Cranserco (left) and Marco Zucchet, sales director for mobile and tower cranes at Manitowoc.

Surabaya; Batu Hijau, Sumbawa; and Freeport, Irian Jaya.

"We noticed there are a lot of commonality between our companies: dedication to customers, servicing them and helping them to get the best of Manitowoc's products," said Marco Zucchet, sales director for mobile and tower cranes at Manitowoc. "We are honoured to have Cranserco join our global dealer network." ■

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Tall wind turbines with 3D-printed concrete bases

COBOD, a global 3D construction printing company, has teamed up with GE Renewable Energy and LafargeHolcim to co-develop wind turbines with optimised 3D-printed concrete bases, reaching record heights up to 200 m. The three partners will undertake a multi-year collaboration to develop this innovative solution, which aims to increase renewable energy production while lowering the levelized cost of energy (LCOE) and optimising construction costs.

The partners will produce ultimately a wind turbine prototype with a printed pedestal, and a production ready printer and materials range to scale up production. The first prototype, a 10-m-high tower pedestal, was already printed in October 2019 in Copenhagen, Denmark. By exploring ways to economically develop taller towers that capture stronger winds, the three partners plan to generate more renewable energy per turbine.

Building on the expertise of each partner, this collaboration intends to accelerate the access and use of renewable energy worldwide. GE Renewable Energy will provide expertise related to the design, manufacture and commercialisation of wind turbines; COBOD will focus on the robotics automation and 3D printing; and LafargeHolcim will design the tailor-made concrete material, its processing and application.

"Concrete 3D printing is a very promising technology for us, as its



Both images © COBOD/GE/LafargeHolcim

LEFT AND RIGHT: The first prototype, a 10-m high tower pedestal, was printed in October 2019.

incredible design flexibility expands the realm of construction possibilities. Being both a user and promoter of clean energy, we are delighted to be putting our material and design expertise to work in this groundbreaking project, enabling cost efficient construction of tall wind turbine towers and accelerating access to renewable energy," said Edelio Bermejo, head of R&D at LafargeHolcim.

Henrik Lund-Nielsen, founder of COBOD International A/S added, "With our groundbreaking 3D printing technology combined with the competence and resources of our partners, we are convinced that this disruptive move within the wind turbines industry will help drive lower costs and faster execution times, to benefit customers and lower the CO2 footprint from the production of energy."

Matteo Bellucci, advanced manufacturing technology leader at GE Renewable Energy commented, "3D

printing is in GE's DNA and we believe that large format additive manufacturing will bring disruptive potential to the wind industry. Concrete printing has advanced significantly over the last five years, and we believe is getting closer to have real application in the industrial world."

The partners pointed out that wind turbine towers have typically been limited to a height of under 100 m (traditionally built in steel or precast concrete), as the width of the base cannot exceed the 4.5-m diameter that can be transported by road, without excessive additional costs. Printing a variable height base directly on-site with 3D-printed concrete technology will enable the construction of towers up to 150 to 200 m tall, explained the partners. A 5 MW turbine at 80 m normally generates 15.1 GWh per year; in comparison, the same turbine at 160 m would generate 20.2 GWh, or more than 33% extra power. ■

Caterpillar acquires robotic expertise

Caterpillar has acquired select assets and hired employees from robot and autonomy technology solutions company, Marble Robot, based in San Francisco, California, the US. This acquisition is part of Caterpillar's automation and autonomy strategy, demonstrating the company's commitment to the next generation of jobsite solutions.

Building on its leadership in autonomous mining, Caterpillar plans to leverage the deep expertise of the new team to bring scalable solutions to meet the changing needs of construction, quarry, industrial and waste industries. The new team is comprised of leading roboticists with a deep background in the robotics industry. Caterpillar intends to leverage the team's fully integrated on-board autonomy technology – including perception, localisation and planning – to continue delivering smart, safe, more productive and cost-effective solutions to customers.

"We're excited to join the autonomy team at Caterpillar," said Kevin Peterson, former Marble CEO, now Caterpillar technologist. "In many ways, this completes a full circle for me. I had the privilege of working with Caterpillar early in my career at Carnegie Mellon,

where they sponsored the development of the first generation of self-driving vehicle software. Now, with the acquisition of the Marble team, together we will drive the next generation of autonomy solutions for Caterpillar customers in the construction, quarry, industrial and waste industries."

Caterpillar is well-positioned to grow services based on its large installed base of connected equipment, outstanding field technology and decades of product, service and application expertise to turn that experience into useful insights for our customers. The company will continue to make investments in emerging technologies, like automation and autonomy, in order to bring innovative solutions to meet the industries' challenges.

"Our customers need the best solutions for running an effective jobsite, with improved operator productivity, lower operating costs, and greater efficiency brought by autonomous solutions," said Karl Weiss, chief technology officer of Caterpillar. "That's why we're continuing to invest in the areas of automation, remote control and autonomy." ■

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SR Construction uses Opti-Clean Cube to fight Covid-19

Las Vegas-based general contractor, SR Construction, is leading the fight against Covid-19 with the world's first deployment of the Xtreme Opti-Clean Cube – which is designed to be used at the entrances and exits to project sites.

Produced by Xtreme Cubes Corporation, an American manufacturer of modular buildings based in Henderson, Nevada, the Xtreme Opti-Clean Cube (XOCC) is a modular walk-through station aimed to combat the spread of Covid-19, bacteria and other viruses.

Partnering with Proguardeum Corporation, an environmental technology company, and Maddox Defense, providing human decontamination solutions, Xtreme Cubes has built the first mobile walk-through structure produced in the US with an unobtrusive dry mist system of the Proguardeum solution that is safe on skin, clothing and requires no protective equipment to be worn.

SR Construction ordered three Xtreme Opti-Clean Cubes when the concept was previewed to the company in May 2020. The first unit was delivered to SR Construction on 13 July 2020, and has been deployed immediately at the entrance to a construction site at the 262-bed Centennial Hills Hospital Medical Centre in Las Vegas, where the company is building a new five-storey patient tower. SR Construction's employees, trade partners and site visitors will walk through the XOCC as they enter and exit the jobsite, helping to minimise the risk of infection on the project.

Bret Loughridge, president of SR Construction said, "The health and safety of our employees, sub-contractors and community is the top priority at SR Construction. We have served the Las Vegas valley since 1991, and we are proud to be working with other Las Vegas businesses to lead the way in combatting Covid-19 and other viruses and bacteria.

"We are the first company in the world to deploy the Xtreme Opti-Clean Cube solution, and look forward to introducing the cubes onto our jobsites, as well as leading the construction sector in utilising this technology to keep our industry safe."

According to Xtreme Cubes, using proprietary and patented technologies to safely deliver an EPA and FDA approved hypochlorous solution (HOCL), the Proguardeum solution is produced at its highest purity in the form of hypochlorous



LEFT: SR Construction's employees walk through the Xtreme Opti-Clean Cube (XOCC).

BELOW LEFT: The first XOCC delivered to SR Construction.

BELOW AND BOTTOM: Inside the XOCC, Proguardeum dry mist is sprayed from the walls and floor.

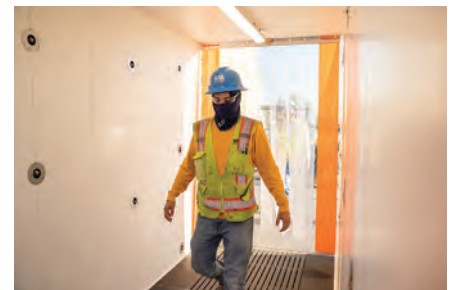


(HOCL) without any contaminants, offering superior efficacy to inactivate 99.999%, a 5 log reduction, of known pathogens including Covid-19, and a long-standing stability for storage. Proguardeum contains no additives, buffers or preservatives, and is pH neutral and is non-toxic and non-hazardous to people and surfaces. This eco-friendly solution helps to eliminate the spread of infectious surface and airborne pathogens.

Equipped with motion sensors, the Proguardeum solution is applied as a person walks through the Xtreme Opti-Clean Cube. Measuring 2.43-m-wide by 3.6-m-long, each XOCC is equipped with forklift pockets – meaning they can be relocatable or become a permanent addition to existing buildings and facilities. The customisable structure includes options such as a thermal vision camera system.

"We have been able to leverage our existing relationship with the Proguardeum team to create a perfect partnership, right here in the Las Vegas valley, to help develop a revolutionary solution that will not only benefit our local community but communities all across the world," said Brandon Main, CEO of Xtreme Cubes.

"The combination of Proguardeum's expertise in disinfecting and our ability to rapidly design and engineer custom



All images © Nico Poblete 2020

structures has been a winning formula, and I am delighted to deliver the first Xtreme Opti-Clean Cube to SR Construction, a long-standing and highly regarded Las Vegas general contractor."

The XOCC is ideal for use at healthcare facilities, public buildings and events, such as casinos, retail stores, shopping malls, stadiums, entertainment and sporting venues, construction jobsites, offices, manufacturing facilities, and more. It was unveiled at the Xtreme Cubes corporate headquarters in Henderson, Nevada on 3 June 2020, and is now in full production.

Xtreme Cubes said the XOCC is currently available in North America, but the company is open to discuss export opportunities with interested parties. ■

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Hilti and Ottobock to develop exoskeleton systems

The construction technology group Hilti and the medical technology company Ottobock have formed a partnership to develop exoskeletal systems. Such solutions open new possibilities in terms of health protection and productivity and represent a future market in the construction industry, said the partners. They plan to cooperate in the area of research and development in the future.

“Exoskeletons provide relief for physically demanding tasks, such as those performed on construction sites every day,” explained Johannes Wilfried Huber, head of Hilti’s Diamond Systems Business Unit. “In Ottobock, we have the ideal partner to combine our user protection and ergonomics knowledge with 100 years of biomechanical expertise. Our technology partnership will serve as the basis for the development of additional innovative and customer-oriented systems.”

Dr Sönke Rössing, head of Ottobock Industrials said, “We are delighted to be opening up a new area of application together with Hilti. We are building on our experience gained from more than 500 successful exoskeleton projects, including in the automotive industry and various trades. There is a great deal of potential for solutions that reduce the physical strain on



The Hilti EXO-O1 provides relief for the worker when carrying out serial screwing applications performed above the shoulders or overhead.

workers in the construction industry. We want to jointly expand this pillar in the coming years.”

Hilti aims to launch the first joint product, the EXO-O1, in the second half of 2020. It is a passive model that does not require an energy supply. The weight of the arms is transferred to the hips via the forearm supports using mechanical cable pulling technology. Independent studies and Ottobock research have shown that this reduces the peak load on the muscles and relieves shoulders by up to 47%.

Exoskeletons can therefore make a significant contribution to health protection, particularly regarding work performed above shoulder level and

overhead work. In terms of the construction industry, this targets serial or continuous activities. Fatigue is also reduced. As a result, this type of work can be carried out over a longer period of time with much greater productivity.

In the longer term, preventive relief can help reduce work-related musculoskeletal disorders in the shoulder area. These are some of the most common causes of worker disability in the construction industry, and thus pose a significant cost factor for companies and health care systems. ■

Lintec & Linnhoff unveils new market expansion plans

Lintec & Linnhoff has announced that its new manufacturing facility in Malaysia will be completed by the fourth quarter of 2020, further expanding its production capacity by an additional 282,000 sq ft. This plan is part of the group’s global business expansion strategy to support the continuous growth of its sales and manufacturing activities.

“In recent years, our customer base has grown sustainably. We believe with our continued investment in R&D, people and manufacturing capabilities, we will be able to provide better products at a much faster speed to the global market,” said Jan Czojor, division head of sales for Europe and Latin America. “As the world starts to open up cautiously, many governments are already actively looking at ways to reinvigorate the local economy. Our expansion plan is carefully crafted to suit these challenging times, in tandem with the advancing of infrastructure projects, targeting a more strategic mid-term growth.”

Since the acquisition of the trademarks and IP rights of the Lintec and Linnhoff brands from its previous partners (Lintec GmbH & Co KG) in late 2017, the new executive committee has led the group through significant business transformation, notably its successful rebranding exercise which consolidated the corporate and brand identities with a reinvigorated brand identity system.

The new brand signature incorporates its strategic visions with its rich German heritage, creating a stronger brand identity. In less than three years, the group had further expanded its sales

distribution network to 20 more countries across Asia, Middle East and Latin America, beyond its strong traditional markets in Southeast Asia, Russia, Eastern Europe and China. New satellite offices have also been set up in Lebanon and Brazil to support this growth. Today, Lintec & Linnhoff operates across a comprehensive network in more than 80 countries and is actively seeking and inviting new potential partners as it expands its market share.

The group’s business expansion plans include: addition of a new manufacturing facility in Malaysia, set to be in operation later this year; a new service centre planned to be established by 2021 in Panama, providing a better and faster reach for its Latin American customers; potential new business investment in India with partnership in manufacturing; and expansion of Lintec product portfolio to serve more customer segments - notably, the Lintec LEA ice plant and the Lintec containerised CSE asphalt plant that were both debuted at bauma 2019. The group has also recently added the new CDP series - Lintec continuous asphalt mixing plant - to its product portfolio, which is suited for emerging markets in Latin America, Southeast Asia and Africa.

Lintec & Linnhoff is a global manufacturer and distributor of leading-edge solutions for production of asphalt and concrete materials. Such solutions include asphalt mixing plants, concrete batching plants, and specialist concrete cooling solutions (i.e. ice plants) that meet or support industry standards for environmental impact, recyclability and reusability. ■



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Manitowoc names new president and CEO



Manitowoc has appointed Aaron H. Ravenscroft (left) as its new president and CEO, and also a member of the board of directors, with effect from 5 August 2020. He was most recently the company's executive vice president of cranes.

Mr Ravenscroft succeeds Barry L. Pennypacker, who is stepping down from his role as president and CEO and as a member of the board. Mr Pennypacker will continue to serve Manitowoc in an advisory role until 31 December 2020, to ensure a smooth transition.

Mr Ravenscroft joined Manitowoc in March 2016 and has been responsible for the company's cranes business globally, including mobile and tower cranes. In his role as executive vice president of cranes, Mr Ravenscroft led the efforts to improve product quality and customer service, and enhance operational efficiency and profitability. He brings more than 17 years of extensive operational, sales and marketing, and international leadership experience in the industrial and engineered equipment products space, to the position of CEO.

Prior to joining Manitowoc, Mr Ravenscroft served as a regional managing director at Weir Group, a British engineering provider focused on mining, oil and gas, and power solutions, for three years. From 2011 to 2013, he served as president of the Process Flow Control Group at Robbins & Myers. Mr Ravenscroft also served as regional vice president of the Industrial Products Group for Gardner Denver from 2008 to 2011 and a series of positions with increasing responsibility at Wabtec from 2003 to 2008.

Kenneth W. Krueger, chairman of the board said, "With his mix of skills, experience, and knowledge of the company, the board is confident that Aaron is the right person to not only continue

to lead Manitowoc through this unprecedented global crisis, but toward a global market recovery and a new phase of growth and development. He is a firm believer in The Manitowoc Way, and has a deep appreciation for our mission and culture."

Mr Krueger added, "On behalf of the entire board, I would like to thank Barry for his service to Manitowoc, and his passion for its potential. Under his stewardship, the company has expanded the breadth of its product portfolio, significantly enhanced its profitability, and solidified a foundation for compelling growth over the long-term. Succession planning has always been a top priority for our board of directors and we look forward to an orderly leadership transition."

Mr Ravenscroft said, "Manitowoc has established itself as a global manufacturing leader of cranes and lifting solutions, and it is an honour to assume the role of CEO during this important time in its history. We have the financial flexibility to continue to weather this difficult period, and at the same time, we are taking the steps necessary to ensure we can achieve further margin expansion and profitability as global markets recover. I look forward to continuing to work closely with our experienced leadership team, board, and all of our team members to advance our strategic priorities, create a stronger company for our customers and employees, and deliver long-term value for our shareholders."

Mr Pennypacker commented, "It has been a privilege to lead Manitowoc for the past five years, and especially during the past several months, when our remarkable employees continued to deliver essential parts and services to our customers in a time of essential need. I am incredibly proud of what our team has achieved together, including recommitting to the 'Voice of the Customer' and strategically positioning the company for long-term growth. Aaron and I have worked closely together for over 17 years across several companies, and I share the board's confidence in him." ■

Metso Outotec begins operations in July 2020

Metso Minerals and Outotec Oyj have completed their merger, forming a new company named Metso Outotec – which began its operations on 1 July 2020. It is headquartered in Finland, employing over 15,000 professionals in more than 50 countries and its illustrative combined sales for 2019 were about €4.2 billion.

Metso Outotec supplies crushing and screening equipment for the production of aggregates as well as equipment and solutions for minerals processing, metals refining, chemical processing, and metal and waste recycling. The company's service capabilities and global network are complemented with a comprehensive range of spare and wear parts, refurbishments and professional services.

Metso Outotec brings together a long history of technological leadership, customer focus and excellence in



services, leveraging the strengths of both companies. Such a combination results in many benefits for the customers, including full offering that ranges from ore body to metal; extensive global services network; and significant investment in R&D, allowing the company to create sustainable technologies.

According to Metso Outotec, the growing interest towards the environment

and the impacts of climate change, urbanisation, decreasing ore grades and electrification are forcing traditional industries like aggregates, minerals processing and metals refining to redefine their license to operate. The company expects to drive these industries towards a responsible use of the world's natural resources.

"It is our core expertise to help our customers transform the industry. We offer sustainable technologies and services that reduce the consumption of energy and water by increasing process efficiency, recycling and reprocessing of tailings and waste. Our extensive offering and expertise help our customers improve their business and lower their risks. We are their partner for positive change," said Pekka Vauramo, president and CEO of Metso Outotec. ■



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Date	Events in Asia	Organiser & Contact
17 Oct 2020	Royal Institution of Chartered Surveyors (RICS) digital conference, in collaboration with Philippine Institute of Certified Quantity Surveyors (PICQS).	RICS - PICQS Website: www.rics.org/FPCP Enquiries should be made online.
21 to 23 Oct 2020	Konstruksi Indonesia 2020 Jakarta International Expo (JIExpo) Jakarta Indonesia	Tarsus Southeast Asia Email: sales@indonesiainfrastructreweek.com Website: www.constructionindonesia.com
5 to 11 Nov 2020	Philconstruct VX Online The Philippines	Philippine Constructors Association Tel: +632 8893 7973 Email: info@philconstructevents.com Website: www.philconstructvx.philconstructevents.com
24 to 27 Nov 2020	bauma China 2020 Shanghai New International Expo Centre Shanghai China	Messe München Tel: +49 89 949 20251 Email: info@bauma-china.com Website: www.bauma-china.com
9 to 11 Dec 2020	OS+H Asia 2020 Marina Bay Sands Singapore	Messe Duesseldorf Asia Tel: +65 6332 9620 Email: osha@mda.com.sg Website: www.osha-singapore.com
9 to 11 Dec 2020	World of Concrete Asia 2020 Shanghai New International Expo Centre Shanghai China	Shanghai Yingye Exhibitions Co Ltd Tel: +86 21 6157 7250 Email: info@wocasias.com Website: www.wocasias.cn
10 to 12 Dec 2020	Myanbuild 2020 Myanmar Expo Hall Yangon Myanmar	AMB Tarsus Events Group Tel: +959 4244 09886 Email: ei@ambtarsus.com Website: www.myanbuild.net
23 to 26 Feb 2021	bauma Conexpo India 2021 Huda Ground Gurgaon, New Delhi India	Messe München Tel: +49 89 949 20251 Email: info@bcindia.com Website: www.bcindia.com
10 to 12 Mar 2021	BuildTech Asia 2021 Singapore Expo Singapore	Sphere Exhibits Pte Ltd Tel: +65 6319 4021 Email: buildtechasia@sph.com.sg Website: www.buildtechasia.com
24 to 25 Mar 2021	Geo Connect Asia 2021 Suntec Convention and Exhibition Centre Singapore	Montgomery Asia Email: effie@montgomeryasia.com Website: www.geoconnectasia.com
30 Jun to 1 Jul 2021	Trenchless Asia 2021 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	Westrade Group Ltd Tel: +44 1923 723990 Email: pharwood@westrade.co.uk Website: www.trenchlessasia.com
Date	Events outside Asia	Organiser & Contact
19 to 22 Jan 2021	World of Concrete 2021 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6368 Email: contactus@worldofconcrete.com Website: www.worldofconcrete.com
22 to 24 Jun 2021	Hillhead 2021 Hillhead Quarry Buxton, Derbyshire, England United Kingdom	The QMJ Group Ltd Tel: +44 115 945 4367 Email: hillhead@qmj.co.uk Website: www.hillhead.com

Note: The show organisers may change the dates of the event or postpone/cancel it without prior notice, so readers are advised to visit the show websites regularly for the latest updates.

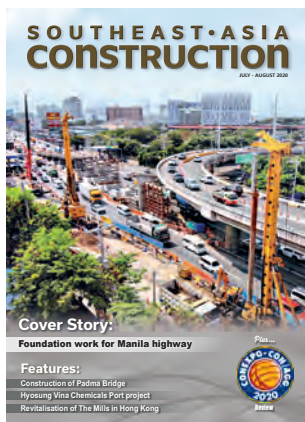
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bauma China 2020 to go ahead in November as planned

The 10th edition of bauma China is set to take place as scheduled from 24 to 27 November 2020, as announced by Messe München, the show organiser. The exhibition will be held at the Shanghai New International Expo Centre (SNIEC), with more than 3,000 exhibitors expected to attend on an exhibition area of 300,000 sq m.

In its statement, Messe München said, "China's economy is recovering apparently from the coronavirus shutdowns, and trade fairs are key to rebuilding economies."

"China unveiled a series of economic stimulus policies and the investment in infrastructure is expected to increase by 10%. Thanks to this, it is estimated that the growth rate of China's construction machinery industry will reach 10% this year." The organiser said these figures were published by the Shanghai Securities Co Ltd.

Messe München further highlighted the preventive measures it will implement during the show. "The health and safety of exhibitors, visitors and partners will continue to be top priority. The notice and guidelines of preventing and controlling the epidemic on organising exhibitions published by Shanghai Municipal Commission of Commerce and Shanghai Convention & Exhibition Industries Association will be strictly followed during the show, and the various prevention and controlling security measures will be effectively implemented to ensure the safety and orderliness of the exhibition. This includes besides the insurance of venue sanitary and provision of on-site medical services also the full online registration of all participants."



bauma China 2020 is expected to draw more than 3,000 exhibitors on an exhibition area of 300,000 sq m.

According to Messe München, several country pavilions have confirmed their participation at bauma China 2020. These comprise: Germany, Italy, Spain, United Kingdom, Turkey, South Korea and a European Pavilion. Furthermore, a number of companies - such as Bosch Rexroth, China Railway, Lingong Group, Sany, Volvo and ZF Friedrichshafen - have also applied to join bauma China 2020. ■

Website: www.bauma-china.com

bauma Conexpo India rescheduled to February 2021

Originally scheduled from 3 to 6 November 2020, bauma Conexpo India will now be held from 23 to 26 February 2021 in Gurugram, New Delhi. This decision was made due to the escalating pandemic as well as domestic and international travel restrictions imposed by the Indian government, said the show organiser, bC Expo India Pvt.

"We have arrived at the decision to postpone bauma Conexpo India after thorough market assessment and consultation with our key stakeholders," said Bhupinder Singh, CEO of bC Expo India Pvt. "The postponement is in the best interest of the exhibitors and visitors."

The decision is supported by Arvind K. Garg, chairman of bauma Conexpo India – task force and also executive vice president and head of construction and mining machinery business at Larsen & Toubro Ltd. "We are in an unprecedented situation that has affected our industry significantly. This decision to reschedule bauma Conexpo India is in accordance with the feedback we received from both our important stakeholders - exhibitors and customers."

Sandeep Singh, president of ICEMA and managing director of Tata Hitachi Construction Machinery Company Private Limited added, "The pandemic has had a deep impact globally and in India, both in human and economic costs. The postponement of bauma Conexpo India give the Indian industry time and resources to enable exhibitors to participate in the 2021 edition."



The next bauma Conexpo India will take place from 23 to 26 February 2021.

Mu Moahan, president of Builders Association of India (BAI) further commented, "Rescheduling bauma Conexpo India 2020 will enable exhibitors and visitors from across the country to participate in the trade fair without any complications. The postponement is although more welcome, as BAI national members meet can be planned alongside with bauma Conexpo India 2021 with maximum participation from pan India." ■

Website: www.bcindia.com

Geo Connect Asia prepares for inaugural event in 2021

Southeast Asia's inaugural geospatial services and location intelligence event, Geo Connect Asia, will take place from 24 to 25 March 2021 at Suntec Singapore. Themed 'Global Solutions for Asia's Geospatial & Location Intelligence Markets', it will be a focal point for the ASEAN geospatial industry. The event is set to draw over 80 international exhibitors and 2,500 professional visitors from the region and beyond, offering a two-day conference, forum, technical seminars, and a product exhibition.

The rapid and ongoing digitalisation of the global economy has reportedly led to a similar acceleration in demand for geospatial intelligence. In what has been dubbed 'the smart revolution', the growing ubiquity of smart technologies and big data across many industries has given the geospatial industry an integral role in future economic development, as both businesses and governments demand increasing volumes of geospatial data and more accurate location intelligence.

According to the event organiser, Montgomery Asia, a report by location intelligence platform CARTO found that 94% of C-suite respondents noted that their organisations collect and/or store location data, while a third of the same respondents also said that obtaining up-to-date and accurate location data and possessing the most advanced analytical tools are important challenges for their organisations. The Covid-19 pandemic has also highlighted the importance of actionable geospatial intelligence for public health, as governments and public health authorities worldwide have scrambled to contain the pandemic through contact tracing and restriction of movement.

A variety of programmes

Geo Connect Asia 2021 will have the two-day GCA21 conference themed 'Mapping the data-driven future economy', a half-day forum titled 'The Connected Mine Forum' and themed 'How to put the Digital into Mining', as well as a two-day Tech Talk and a Product Showcase.

In addition, Montgomery Asia will be featuring two complementary industry profiles under the umbrella of the main Geo Connect Asia event. They will each provide visitors with a forum devoted to industry verticals that are seeing accelerating demand for geospatial technologies and location intelligence.

Digital Construction Asia (DCA) 2021 is themed 'Delivering digital solutions to the built environment', and will focus on the use of geospatial technologies to build smarter, greener and with integrated solutions; these will introduce best practices and solutions to address growing demand for an increasingly digitalised building and construction industry.

Unmanned Aerial Vehicle (UAV) Asia 2021 will focus on the commercial applications of drones and unmanned aerial vehicles for specific markets where improvements in geospatial data collection, location intelligence, and imagery will enable enhancements in resource management and local, regional and national decision-making.

Furthermore, Geo Connect Asia 2021 has established key partnerships in both the public and private sectors. Knowledge partners include the Singapore Land Authority (SLA) and the UK's national mapping agency Ordnance Survey. Supporting partners consist of GeoWorks, Asia Prop Tech, the Open Geospatial Consortium (OGC), the Singapore Institute of

Building Limited (SIBL), the Singapore Institute of Surveyors and Valuers (SISV), and the Thai Electrical and Mechanical Contractors Association.

Led by platinum sponsor Trimble, exhibitors at Geo Connect Asia 2021 already comprise a strong list of international companies, including Fatos, Blue Marble Geographics, Changzhou Futian, the Geospatial Intelligence Centre, Hunan Bynav, ImpulseRadar, Shanghai Merrypal, Space Will, Suzhou Geoleni, Tianjin Setl, Tianjin Wiseman, and Vexcel Imaging.

Thought leaders and industry experts from the geospatial sector will be in attendance, sharing insights, trends and challenges from around the region. These industry ambassadors include Ady Ruchiatan, vice president of the Association of Surveying and Mapping Enterprises for Geospatial Information, Indonesia; Dan Schirren, head of business development for Asia Pacific at Ordnance Survey; Jan Schoderer, sales director for APAC at Vexcel Imaging GmbH; John Whitehead, director of sales and distribution for APAC at Trimble Inc; Lanita Idrus, publisher of the Asia Miner & director of the Djakarta Mining Club and Coal Club Indonesia; and Ng Siau Yong, director of the geospatial and data division and chief data officer at SLA. ■

Website: www.geoconnectasia.com

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IPAF appoints head of safety & technical



Brian Parker (left) has been appointed as head of safety & technical for the International Powered Access Federation (IPAF). He joins from AFI-Uplift Ltd and takes up the post on 2 October 2020, reporting to Peter Douglas, IPAF CEO and managing director.

Most recently, Mr Parker was group business development manager-technical support at AFI and brings 24 years' experience working in the powered access sector to the role. He previously held roles as national specialist training manager for HSS, and was group health and safety manager and before that training manager at AFI.

Prior to that, Mr Parker served for seven years in the Royal Engineers as an operator of heavy equipment. He is a certified IPAF, PASMA and CITB instructor, holds a diploma from NEBOSH and is

a graduate member of IOSH, and a Mental Health First Aid tutor.

"Brian's key responsibility is to ensure IPAF's resources are effectively used to raise safety standards in the powered access industry worldwide. He is the perfect fit for this role and is well known to all of us at IPAF, having served on the UK Country Council and Training Committee. He has a huge amount of experience and, as anyone who has met him knows, he is very passionate about safety," said Mr Douglas.

Mr Parker commented, "I'm delighted to be taking up this important role for our industry. I hope to be able to use my experience and interpersonal skills to lend renewed impetus to the many safety initiatives and projects at IPAF. Key priorities will include driving forward IPAF's global accident reporting project, delivering technical guidance and developing Andy Access safety posters and Toolbox Talks to help keep powered access operations safe. I can't wait to get started." ■

IPAF Summit & IAPAs event moved to 2021

The IPAF Summit & IAPAs 2020, scheduled to be held in London, the UK, has been postponed to 18 March 2021. It will take place at the original venue, the Millennium Gloucester Hotel in Kensington, London.

The event was initially rescheduled to 8 October 2020, owing to the worldwide coronavirus outbreak. The organisers IPAF and KHL have now announced they will hold the events over until 2021, which would allow attendees to plan with greater certainty and minimise disruptions that might prevent people from travelling.

Peter Douglas, IPAF CEO and managing director said, "While we hope that by October coronavirus is under control, it's fair to assume there may still be restrictions on large gatherings and international travel. It therefore makes sense to postpone until 2021, when hopefully there will be more clarity about how to manage the risk from this virus.

"Economies and companies around the world are starting to open up again, but it will not be an immediate return to business as usual. To ensure everyone hoping to attend the IPAF Summit &

IAPAs can plan with maximum certainty, we've made this decision and hope the event will be a great success in 2021. We trust that attendees understand why IPAF and our event partners KHL have decided to postpone until next year.

"Anyone who booked to join us will have their reservations honoured on the alternative date in 2021; a full refund will be offered to anyone who is unable to attend the rescheduled event or who wishes to cancel. Anyone who has booked accommodation is advised to contact the Millennium Gloucester Hotel directly to reconfirm.

"The annual IPAF Summit & IAPAs is a highlight of the worldwide powered access events calendar. We sincerely hope that those planning to attend an event that was already close to capacity will be able to rearrange their plans, in order to join us for this popular event as it returns to the UK for the first time since 2017."

According to IPAF, there will inevitably be amendments to the speaker programme and/or powered access site visits, and these will be communicated once confirmed. ■

IPAF's MEWPs for Managers course delivered by remote instruction

In response to new safety requirements due to coronavirus, and following guidance given to all IPAF training centres, IPAF member firm Nationwide Platforms has successfully completed an online instructor-led MEWPs for Managers course for major contractor Skanska.

This instructor-led option is in addition to the individual eLearning MEWPs for Managers course, which IPAF training centres can also offer and represents a new mode of remote delivery of IPAF instruction.

The course has the same safety advantages of the eLearning, but allows the



instructor to replicate all elements of the face-to-face course that would normally be carried out in the classroom for multiple candidates at the same time.

The instructor is able to interact with the delegates and answer any questions

or queries they might have, as well as provide feedback specific to their learning. This new method of training delivery also facilitates group discussions, and can even accommodate smaller breakout sessions if required.

Paul Roddis, IPAF's training manager said, "Candidates were actively involved with the instructor-led discussions and were encouraged to ask questions whenever they wanted additional clarification. It was very clear that the candidates on the course found the interaction very useful and enjoyable." ■



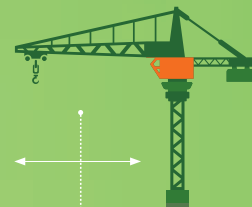
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Manitowoc launches Potain MCT 275 flat-top crane

The new Potain MCT 275 is the latest launch from Manitowoc, expanding the company's popular MCT range of topless cranes built in China. This new model has been designed for easier transport and assembly, plus high efficiency and reliability on construction projects.

The crane was launched on 29 July 2020 during a virtual launch event at Manitowoc's factory in Zhangjiagang, China, where the 10 t version of the MCT 275 was displayed with its full 70 m jib. This model has taken advantage of the advances and innovation Manitowoc made with the introduction of the MCT 325 and was largely been inspired by it.

"With the increasing popularity of precast concrete construction, topless cranes like the MCT 275 are becoming the go-to solution for the speed and simplicity they bring to jobsites," said Kwong-Joon Leong, regional product manager for tower cranes at Manitowoc. "The topless design allows multiple units to overlap on site and with the MCT 275 we're giving customers a new choice in the 10 t and 12 t range. With its standout 70 m jib, we believe this crane will appeal to a wide range of companies and projects."

Available in two versions, the MCT 275 features jib length configurations from 30 m up to 70 m, in increments of 5 m. At its 70 m jib end, the MCT 275 can handle 2.3 t for the 10 t version and 2.2 t for the 12 t version, making it an excellent performer for long-distance lifting.

According to Manitowoc, the MCT 275 can be set up within 1.5 days on a well-prepared site, with the full jib and counter-jib erected in four lifts. The complete upper part of the crane can be transported in six containers.

The MCT 275 is designed to work with the 2 m x 2 m L68 mast systems and can be utilised with fixing angles on a regular high-rise construction project. Users can also assemble the crane in an internal climbing configuration or mounted on a chassis, for maximum versatility.

In addition, customers have a variety of options for the hoisting, slewing and trolley mechanisms. The 10 t version offers the 60 LVF25 as standard and the 75 HPL25 as option, while the 12 t version offers the 75 LVFC30 as standard and the 75 HPL30 as option.

The 60 LVF 25 is a 45 kW-rated hoist that has a rope capacity of 500 m and can



Available in two versions (10 t and 12 t), the new MCT 275 features jib length configurations from 30 m up to 70 m, in increments of 5 m. At its 70 m jib end, the crane can handle 2.3 t for the 10 t version and 2.2 t for the 12 t version.



The MCT 275 is excellent for long-distance lifting. It can be set up within 1.5 days on a well-prepared site, with the full jib and counter-jib erected in four lifts. The complete upper part of the crane can be transported in six containers.

lift 2.5 t at up to 88 m/min. The 75 HPL25 is a 55 kW-rated hoist that features a rope capacity of 834 m and can lift 0.35 t at up to 215 m/min. The 75 LVFC30 is a 55 kW-rated hoist that provides a rope capacity of 766 m and can lift 1.5 t at up to 114 m/min. The 75 HPL30 is a 55 kW-rated hoist that has a rope capacity of 845 m and can lift 0.2 t at up to 220 m/min.

In 2014, Manitowoc launched its

first Potain topless crane from the Zhangjiagang factory, the MCT 385. Over the years, the company has continued to innovate and added the MCT 205, MCT 85, MCT 325, MCT 565 and now the MCT 275 to complement the range. Manitowoc said the MCT 275 will ultimately replace its popular hammerhead top-slewing crane model, the MC 235. ■

Website: www.manitowoc.com

Snorkel introduces 'mega' scissor lifts

Snorkel is bringing a new family of large deck construction scissor lifts to the market, with a focus on ultra-high lifting capacities. Designed to lift more materials to the working area, the new family consists of four models ranging from the S9031RT-HC, which has a maximum working height of 11.4 m and lifting capacity of 1,587 kg, to the S9070RT-HC with a maximum working height of 23.3 m and a lifting capacity of 907 kg.

Equipped with dual powered extension decks and four hydraulic stabilisers with automatic levelling as standard, the new family delivers a high specification lift to handle the heaviest duty applications. Offering a maximum platform size of 8.23 m x 2.28 m when fully extended, the new lifts provide a vast working area and help to reduce the number of times the operator needs to lower and elevate the lift.

The smaller S9031RT-HC and S9043RT-HC models can both be driven at full height, and the larger S9056RT-HC and S9070RT-HC can be driven at height up to 13.1 m. With 50% gradeability, all four lifts are powered by a Kubota diesel engine and have superb four-wheel drive capabilities with large 0.91 m high grip foam-filled tyres for handling rough terrain.

With material loading in mind, this scissor lift family was designed with an integrated double material loading gate on the platform to allow a full-size pallet to be placed directly onto the deck. This makes the loading of materials onto the lift both safer and more efficient, as the correct material handling equipment can be used.

Featuring weights ranging from 6,803 to 11,566 kg, the high-capacity Snorkel scissor lift family has been designed to provide a long-working life. The dual-shear scissor stack has been constructed from high strength steel for durability and lighter overall weight.

From a service perspective, the new lifts share many common parts with other Snorkel lifts, including the same drive system as



The S9070RT-HC scissor lift has a maximum working height of 23.3 m and a lifting capacity of 907 kg.

the Snorkel mid-size telescopic boom lift family and on-board diagnostics system for operator and service engineer familiarity. A side mounted engine with swing-out tray makes light work of engine maintenance.

Snorkel expects that this family will enter full production in late 2020. ■

Website: www.snorkellifts.com

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Cat 966 GC medium wheel loader for higher versatility

The new Cat 966 GC from Caterpillar is the latest version of the Cat GC series, offering greater versatility and capability. This new design fits a wide range of budgets and is built on the performance of its predecessors.

Launched worldwide, the 966 GC is fitted with the Cat 9.3B engine delivering a maximum gross power rating of 239 kW and meeting Tier 3/Stage IIIA emission standards. The engine features a new common rail fuel injection system, as well as an electronically controlled and a hydraulically driven variable speed cooling fan. When combined with the Cat engine idle management system, this results in lower fuel consumption along with lower sound levels. An automatic reversing fan can be optioned to assist in cleaning cooling cores in high debris environments.

The new Cat 966 GC uses a 4F/4R electronically controlled, planetary powershift transmission, designed and built by Caterpillar. It has an electronic clutch, with a pressure-compensated, single clutch shifting system for smooth, efficient gear changes in all operating situations.

Sharing its Z bar linkage design with the legacy Cat 966H, the new loader delivers strong digging capabilities and powerful breakout forces. Combining Cat Performance Series buckets with the load sensing implement hydraulic system - which is designed to continuously control the flow and pressure to precisely match the requirements of the operating situation - will help reduce both the load on the hydraulic pump and overall fuel burn.

With the Performance Series buckets, which are notable for a long floor, wide opening and curved side plates, operators of all experience levels can routinely meet 10% higher bucket fill factors when compared to previous bucket designs. This ultimately improves cycle times and reduces fuel consumption.

Cat Fusion quick coupler and controls are available, allowing the 966 GC to use a range of Cat work tools across multiple applications for added versatility. A variety of pin-on and coupler attachments are also available for 966 GC applications.

The cabin ROPS is a one-piece hydroformed tube design adapted from the M Series design. Simple and easy to operate, the intuitive, ergonomic 966 GC controls have been designed with the operator in mind. The interface panel



LEFT AND BELOW: Launched worldwide, the new Cat 966 GC wheel loader is the latest version of the Cat GC series.

display contains five analogue-like gauges, coloured indicator lights and an LCD screen. All these features are designed to be within easy view of the operator, so they can quickly monitor machine systems.

The ergonomic cabin interior design flows into the low-effort, pilot-operated implement controls, which feature a remote kick-down switch for comfort and convenience. The intuitive control system and simple monitoring of the machine performance lends itself to quick learning of the loader operation. It means operators with only a few hours experience in the 966 GC will be able to access the suite of clever control and performance systems that are a signature of Cat machines.

Inclined ladders and integrated handrails are located on both sides of the machine to provide safe access to the spacious cab and to service the engine air filter from a platform. The large roof-to-floor, distortion-free flat glass front windscreen, standard rear-view camera and exterior mirrors with integrated spot mirrors provide all around visibility. Standard air conditioning with 10 louvered vents will maintain the operator's comfort in a range of worksite and environmental conditions.

Ground level access to grouped service points will help reduce maintenance times. The 966 GC has large gull-wing engine hood side panels and a tilt-up rear grill to offer the operator or service personnel unrestricted access to daily service points, greasing points, filters and fluid sampling ports. Furthermore, grease fittings for difficult-to-reach components are conveniently grouped and there is always the option of fitting a Cat Autolube greasing system to cut into maintenance times and ensure correct lubrication of critical points.

To enhance the machine's operating efficiency and assist with loader preventive



maintenance and servicing, owners can tap into Cat technology such as Cat Product Link telematics. Integrated into 966 GC systems, Product Link allows remote monitoring using VisionLink and the machine can also be configured with the optional rear-view camera and Cat Production Measurement systems to further enhance operator performance and productivity. The standard rear-vision camera enhances jobsite awareness, and means operators can work with greater confidence and at the same time keep people and assets safe.

Product Link will help fleet owners track location, machine hours, fuel consumption, idle time, events and diagnostic codes with remote reporting via the VisionLink user interface, and the optional dealer installed Cat Production Measurement delivers on-the-go payload weighing through the new next gen monitor mounted beneath the rear-view monitor.

With options such as Autolube and the auto reversing cooling fan, the new 966 GC can be fitted with a ride control system, secondary steering and limited slip differentials if required. A third auxiliary hydraulic function can be factory or in-field fitted providing another remote valve, which adds to the machine's impressive capabilities for additional work tools use. ■

Website: www.cat.com



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Jaso unveils J800.48 'low top' tower crane

Jaso has introduced the latest addition to its portfolio, the J800.48 – it is currently the second largest tower crane from the company after the J1400. The new model has been designed to meet the current market needs that call for high-capacity tower cranes.

The J800.48 is suitable for loads with 18-21 t capacities at 40 m, using jibs of around 60 m in length. The crane is also excellent for PPVC (prefabricated prefinished volumetric construction) projects, which normally require loads of 35 - 40 t with shorter jibs, to carry out heavy-duty jobs.

According to Jaso, the new crane is another 'low top' model, which is a fraction of the height of a true hammerhead, and it has the same benefits as flat-top cranes in the same range.

Designed with a strong jib pendant, the problems generated by the deflection have been overcome while flat-top booms typically need to add more steel to achieve the same, explained Jaso. During the erection, the section with the pendant attached is lifted in one piece with the first two sections, to form the extremely short 23 m boom.

The rest of the jib can be assembled in 2.5 m sections reaching the full 80 m boom, section by section. These 2.5 m boom intervals give the J800.48 a great versatility, making it attractive when several cranes operate at the same time on a job site.

The short swing radius, the minimum of which is 18.6 m, can be achieved using only one of the four modular counter jib configurations. With longer jibs, more modules can be easily added, reaching the longest 28 m counter jib when a 80 m boom is mounted.

The new J800.48 has a freestanding height of 73.6 m, working with single reeving and offering a standard 2.16 x 2.16 m tower system - which is in 5.6 m long tower sections. Taking the stronger and sturdy TSP20-5.6 section, which has the same 2.16 m x 2.16 m dimension, maximum hook heights of 101.7 m can be achieved with the minimum 23 m boom and 90.5 m with the maximum 80 m boom.

A new feature of the J800.48 has to do with the load chart; it can mount a trolley working with single reeving (ST-SR) - maximum capacity of 24 t and 4.1 t at 80 m - or double reeving (ST-DR) - maximum capacity of 48 t and 3.3 t at 80 m. It also



TOP AND ABOVE: The new J800.48 is currently the second largest tower crane from Jaso. It is a 'low top' model, suitable for heavy-duty jobs such as PPVC (prefabricated prefinished volumetric construction) projects, which typically require loads of 35 - 40 t with shorter jibs.

allows to assemble a special trolley to exclusively work with simple reeving (SR), offering a higher load capacity at the end both with all intermediate boom lengths or with the full boom length assembled, providing a maximum capacity of 24 t and 5.1 t at 80 m.

The standard hoist motor is 150 hp, while the optional 180 hp motor unit delivers a maximum speed of up to 150 m/min. In addition, the hoist winch comes with a 'Lebus' grooved drum specially designed for Jaso. It allows enough rope for a 455 m hook height when working with

simple reeving, and up to a 277 m hook height when double reeved.

The complete crane can be transported in standard 40-ft containers, without the need for open top or flat rack units, said Jaso. Maximum component weights are kept low, ensuring the assembly can be optimised by using a smaller mobile crane and possible transport weight restrictions due to the maximum axle weight limits can be avoided. For extra safety, a secondary clamp type brake is available on hoist and trolley. ■

Website: www.jasogroup.com

Sandvik offers 'My Rock Tools Analyze' for rock tools customers

Digitalisation has been one of the most significant developments in the construction and mining industries for decades. To this end, Sandvik Rock Tools has launched a new solution, My Rock Tools Analyze. It is a mobile application specifically designed to conduct failure and discard analysis, and also to provide advice and guidance in a customer report – all remotely.

The aim of My Rock Tools Analyze is to determine the root cause of the failure or discard reason of the rock tool, which would prevent it from happening again and in turn help to improve future performance.

"Sandvik Rock Tools suite of digital solutions serves our customers in a number of ways, and we are now very happy to be able to add My Rock Tools Analyze in order to offer easy-to-use remote support for failure and discard analysis. With it, customers can ultimately increase productivity and profitability by using the analysis results to improve their drilling operations," said Charles Macfadyen, digital solutions, Rock Tools Division, Sandvik Mining and Rock Technology.

The application is easy to use: customers receive an invitation from Sandvik to log in, download the app (available both for iOS and Android), provide some key product information, take a few photos of their worn out tool and then send it to Sandvik for analysis and feedback.

"A big part of Sandvik's DNA is continuous improvement in close collaboration with our customers, and My Rock Tools Analyze does precisely that, in a user friendly, fast and remote way. We truly believe that this will help our customers and us both in the short and long term," added Mr Macfadyen.

The My Rock Tools Analyze application is available for all Sandvik Rock Tools customers and can now be downloaded in App Store and Google Play Store. ■

Website: www.rocktechnology.sandvik



ABOVE: Sandvik's My Rock Tools Analyze is a mobile application designed to help customers improve their rock tools through analysing failure and discard reasons.

LEFT: This digital solution aims to determine the root cause of the failure or discard reason of the rock tool, in order to prevent it from happening again and in turn help to improve future performance.

Thermal Integrity Profiler (TIP)

The TIP system evaluates the integrity of the entire cross-section and the full length of the shaft measuring the heat generated by the curing concrete. Thermal Wire® Cables are installed along the length of the rebar cage and are cast into the shaft. The TAP-Edge and TAG data loggers send collected thermal data to a secure Cloud server, allowing engineers real time access from their office.

To learn more about TIP, visit www.pile.com.

Pile Dynamics, Inc.

Super 1600 and Super 1603 pavers from Vögele

The Super 1600 tracked and Super 1603 wheeled pavers are part of Vögele's Classic Line family, featuring pave widths from 2.55 to 6.3 m. These Universal Class models, with their robust equipment and intuitive operating concept, are suitable for small and large construction projects run on a tight schedule.

Both pavers are equipped with the intuitive ErgoBasic operating system and the Niveltronic Basic system for automated grade and slope control. Offering a compact design, powerful 116-kW diesel engines and laydown rates of up to 600 t/h, the Super 1600 and Super 1603 are also efficient, robust and versatile, whether they are working on confined urban job sites or constructing rural roads and motorways.

In combination with the AB 480 extending screed and the tamper and vibrator (TV) compacting systems, the two pavers achieve pave widths from 2.55 to 4.8 m. The additional bolt-on extensions allow them to expand to a maximum pave width of 6.3 m.

Vögele's Classic Line pavers are controlled via the ErgoBasic operating system, which provides users with the key functions they need to deliver high-quality paving. Among them include clearly structured function and status indicators, the control of different operating modes, glare-free backlighting for night-time jobs and simple steering via a rotary controller or, in the case of the wheeled paver, a steering wheel. ■

Website: www.wirtgen-group.com



The Super 1603 wheeled (above) and Super 1600 tracked pavers are part of Vögele's Classic Line family, suitable for small and large construction projects run on a tight schedule.



LEFT: The ErgoBasic operating system offers users the key functions they need for high-quality paving.

ABOVE: The ErgoBasic remote control units for the screed (on the left) and for Niveltronic Basic support precision steering and grade and slope control when operating the pavers.

Compact Carmix 3.5 TT mobile concrete batching plant

The 3.5 TT is the first model designed by Carmix and the best seller in over 40 years of the company's history. Easy to operate, the machine offers excellent agility on construction sites. This small mobile batching plant is highly compact, featuring a length of just over 5 m with the front loader raised, making it suitable for use in restricted areas. It is capable of rotating the barrel at 300° to load from over 2 m of height on all four sides of the machine. This way, the concrete jet can be directed with high precision.

Carmix said the 3.5 TT is able to climb slopes up to 30%, even when fully loaded. The machine also has a concrete mixer with a capacity of 3.5 cu m, double mixing blade, as well as a 600-l loader - controllable with the Joymix - with a hydraulic command opening to unload directly into the sand or gravel barrel.

In addition, the Carmix 3.5 TT is equipped with a Load Cell weighing system for perfect control of mix design. There are four load cell sensors, managed by an on-board programmable computer, placed at the bottom of the drum in order to work as weight sensors precisely where the mixing takes place (RMC Plant standard level technology). According to Carmix, compared



The Carmix 3.5 TT features a compact design, ideal for use in restricted areas.

with systems using pressure sensors on the shovel, the Load Cell system ensures direct control of elements where the mix is made, higher accuracy and 3 to 5% weight deviation like in the most sophisticated concrete plants and the verification of finished product. ■

Website: www.carmix.com

POWERFULLY electrifying

Delivering powerful endurance, the zero emission **Snorkel SL30RTE** electric Speed Level tackles all terrains. Capable of automatic self-levelling on gradients up to 50%, this lift is designed to work at height on sloped ground and rough terrain thanks to its powerful 4-wheel drive. It can be driven up to 0.8km/h at full height and has a maximum stowed drive speed of 5.4km/h. Lithium-ion batteries maximize working hours for long-lasting performance, and a spacious, high grip aluminium deck offers a safe load capacity up to 590kg.

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Lightweight and large hammers from Indeco

Two lightweights in the Indeco small hammer range - the HP 400 FS and HP 550 FS - have been upgraded with more powerful features. Starting with energy class, it rises to 550 joule for the HP 400 FS and 750 joule for the HP 550 FS. The hammers' blows per minute also increase to 540-1,670 and 780-1,720 respectively, as well as their tool diameter (65 mm and 75 mm respectively) - which is an increase of approximately 10 mm for both.

This improvement has not changed the hammer size and design in either model, said Indeco. The units are ideal for use with excavators between 2.5 and 5 t for the HP 400 FS, and 3.5 - 6.5 t for the HP 550 FS.

In addition, the larger Indeco HP 6000 FS hammer takes up a position midway between the HP 5000 and HP 7000. With a working weight of 3,600 kg, energy class of 9,000 joule, and a steel diameter of 170 mm, this model is an ideal fit for excavators in the 35 - 45 t range, especially given its excellent power-to-weight ratio. According to Indeco, the HP 6000 FS also features Hardox inserts in the lower part of the casing, which enable it to withstand even the toughest jobs. ■

Website: www.indeco.it



FROM LEFT: Indeco's HP 400 FS, HP 550 FS and HP 6000 FS hammers.

Hardox 500 Tuf for tipper bodies, buckets and containers

The Hardox 500 Tuf from SSAB features excellent strength, hardness and toughness. This wear plate is designed for tipper bodies, buckets and containers, combining the best properties of Hardox 450 and Hardox 500.

SSAB said the performance of Hardox 500 Tuf has also been proven in cold climates and freezing conditions. Its superior wear and dent resistance allow for increased service life and the ability to withstand heavy impact. Typical working conditions include loading and unloading of heavy and sharp rocks in quarries and mines, handling large and heavy steel scrap, and in demolition when pieces of concrete with rebar are loaded or dropped into tippers.

According to SSAB, Hardox 500 Tuf offers 85-100% longer estimated service life compared to Hardox 400, guaranteed impact energy of 27 joule at -20°C, and narrow Brinell hardness window of 475-505 HBW. ■

Website: www.ssab.com



ABOVE AND LEFT: The dump body of this vehicle features the Hardox 500 Tuf in the bottom plate, which offers excellent strength, hardness and toughness. The Hardox 500 Tuf combines the best properties of Hardox 450 and Hardox 500.



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Liebherr expands digital solutions with Remote Service

Liebherr has developed a RemoteService app to improve assistance through visual information, leading to faster and easier troubleshooting. It is designed for the company's crawler cranes, deep foundation equipment and maritime cranes.

Audio and video calls, a chat function, screen sharing, image and document exchange, as well as whiteboarding functions are some of the features that have been integrated in the app. These enable real-time, fast and effective customer support from Liebherr experts worldwide.

In the last 12 months, Liebherr has tested the system in remote locations and challenging situations in order to meet and adapt to customer requirements. The company said that during this phase, a lot of experience has been gained and a high level of positive feedback has been received.

External factors such as the current Covid-19 pandemic have proven how indispensable the Remote Service system can be. In April of this year, Liebherr's major customer Adani Murmugao Port Terminal Pvt Ltd required immediate assistance for one of its Liebherr machines; however attendance on site was not permissible. Using Remote Service, the Liebherr engineers instructed the Adani staff how to remove the defect pump, inspected the condition of the gearbox remotely, and then guided the site staff through the installation of the new pump.

Writing his appreciation for the Remote Service system, Mangesh Sangodkar, head of engineering at Adani Murmugao Port Terminal said, "The way you plan the job through Remote Service, communicate and execute with your highly professional and technically efficient engineering team is great. In light of your impeccable services, we would like to continue our association with you for the years to come."



Real-time and effective assistance through Remote Service app from Liebherr.

Due to the current pandemic situation worldwide, Liebherr has decided to accelerate the market launch of Remote Service in terms of an extended test phase. This means that all Liebherr customers now have the opportunity to use the app free of charge until the end of 2020. They only need a laptop, tablet or smartphone, and an internet connection.

In addition to the Remote Service app, Liebherr offers a number of digital solutions that make the daily jobsite planning, operation and service considerably easier. These include the Crane Planner 2.0, the LiDAT fleet and plant management system, and the MyLiebherr online portal, to name just a few. ■

Website: www.liebherr.com

Ecotray system for Skyjack DC electric scissor lifts

Skyjack is offering Ecotray, a leak containment system specifically designed for the company's new range of DC electric scissor lifts. It prevents any potential leaks from hydraulic systems dripping onto floors and other internal components.

The Ecotray system removes the need for cumbersome, unsightly 'diapers' and is particularly suited for sensitive areas, such as work on decorative flooring, clean rooms and areas where hygiene and fear of chemical contamination are of concern.

"The idea of the so called diaper has been around for some time. However, they have proven cumbersome to employ and restrict key lift functionality, so we looked at something different," said Kris Schmidt, product manager at Skyjack.

Unlike other systems, Skyjack's Ecotray has been designed for essential machine functionality in mind. Functions such as pothole protection, static strap use,

access to the emergency stop, emergency lowering and the base controls. The system is protected from jobsite debris damage, forklift handling and other influences that can hinder leak containment.

Provided as a factory install or field kit option, the system is available on Skyjack's range of Ecotray ready DC scissors. The system uses a series of purposefully placed catchment trays that contain absorbent pads, which can be easily replaced.

As a field kit, Ecotray can be fitted within 10 minutes and has been designed to be installed without the need for tools. The changing of absorbent pads takes seconds and replacements are available directly from Skyjack parts. A distinct label shows that the machine is fitted with the system to allow rental companies, operators and customers to identify the machine with an eco-friendly system. ■

Website: www.skyjack.com



The Ecotray leak containment system is available for Skyjack's new range of DC electric scissor lifts.

FreeFalcon: Doka's mobile fall protection system

The FreeFalcon system aims to protect construction workers in areas where the risk of a fall is most critical. It enhances user safety without sacrificing mobility, helping to minimise the risk of falls from height.

This mobile personal fall-arrest system from Doka, featuring a diameter of 2.25 m and weight of 450 kg, is specifically designed for the overhead anchorage of fall arresters with a maximum radius of up to 10 m. In its default position, the anchor point is 2.35 m above the installation surface.

On surfaces with a maximum angle of 5°, the unit allows users to individually determine the position of their anchor. By using a standard hand pallet jack, the unit can be easily moved horizontally on surfaces by just one person. The attachment of approved loading straps or four-rope chain for relocation with a crane is made possible by the four attachment point rings on the base plate. ■

Website: www.doka.com



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Doka's FreeFalcon system enhances user safety without sacrificing mobility, helping to minimise the risk of falls from height.

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Primus Line helps secure water supply in Van Don

In the Van Don district, Quang Ninh province, Vietnam, network operator Quang Ninh Water Company (Quawaco) is operating a DN 300 steel water main located underneath and inside a bridge construction to supply Van Don Island with drinking water. The three bridges have individual lengths of 410 m, 170 m and 270 m.

The pipes were originally installed in 2002 with construction of the bridges. Recently, due to corrosion and aiming to secure the water quality, the water network operator decided to perform preventative maintenance of these steel pipes. The goal of the renovation work, carried out in September 2019, was to elongate the lifespan of the pipes and secure the water supply.

Because of difficult access and in order to quickly upgrade the existing pipe, the Primus Line system was the preferred method. This project represents the first deployment of the Primus Line system in Vietnam, said the company.

According to Primus Line, only a small investment in necessary tools was required to install the system. In addition, a Primus Line instructor performed a local training for the contractor in two working days. During the same week, the contractor renovated the first bridge under the instructor's supervision. Quawaco proactively manages the water supply in its region and has reportedly reduced the non-revenue water rate below 18% over the past couple of years.

In a first step, the pipe was CCTV inspected to assess the condition of the host pipe. The inspection revealed several areas where incorrect welding seams were protruding into the cross-section of the pipe. The individual pipe shots were butt-welded. Due to the complex accessibility of the steel pipe underneath the bridges and inside a box girder, the contractor's team removed the welding seams manually.

The contractor performed mechanical cleaning of the host pipe using scrappers and rubber pigs. The 840 m of liner were delivered pre-folded into U-shape on timber transport reels directly to the site. The contractor mounted a pulling wire to the start of the liner and connected it to a rotation joint and subsequently to the cable of a pulling winch. As such, the liner installation took less than one hour for each section.

Afterwards it was re-rounded with compressed air. The contractor's installation team finally mounted the end fittings equipped with DIN flanges PN 10. The renovated section was successfully pressure-tested using potable water with 9 bar. The pipe was reintegrated into the network using HDPE pipe shots.

The whole renovation was completed within three weeks, extending the asset's life by 50 years. Thus, the water quality and supply are now secured.

The Primus Line system is referenced in EN ISO 11295:2017



ABOVE: A bird's eye view showing two of the three rehabilitated bridge sectors.

LEFT: The Primus Liner was delivered on timber transport reels directly to the project site.

BELOW: The end fittings are equipped with DIN flanges PN 10.



— classification and information on design and applications of plastics piping systems used for renovation and replacement. The system also complies with the technical standard DVGW VP 643 – flexible textile-reinforced plastic inliner for pipe-relining of gas high pressure pipes. The system consists of a Kevlar-reinforced liner and specifically developed end fittings.

Manufactured in Germany, the liner accommodates the operating pressure of the pipe, due to the reinforcement layer and does not bond to the host pipe. An annulus space remains. Thanks to the flexibility of the material, the liner can traverse angles of up to 45 degrees, can be installed in lengths of more than 1,000 m in one pull, and has an installation speed of up to 600 m per hour. ■

Website: www.primusline.com

Haulotte big booms hard at work in China

Haulotte's HA32 RTJ Pro articulating boom and HT43 RTJ Pro telescopic boom have been used in various construction projects across China. Recently, a unit of HA32 RTJ Pro was delivered to a cultural project in Chengdu, Sichuan province. With a total area of about 760,000 sq m and a cost of nearly 50 billion yuan, this development is expected to become one of the most popular commercial districts and tourist destinations in Chengdu, incorporating a Water and Snow World, an outdoor theme park, luxury resorts, and a shopping mall.

In another project, a Haulotte HT43 RTJ Pro telescopic boom has been working on the construction of an electric power system in Guangdong province. The machine's 3D jib and dual load capacity are said to be important features in this large-scale project.

Both the HA32 RTJ Pro and HT43 RTJ Pro boom lifts are renowned for their



Haulotte HT43 RTJ Pro telescopic boom (above) and HA32 RTJ Pro articulating boom (below) have been used in various construction projects across China. Both machines are renowned for their all-terrain driving features, and their front oscillating axle increases stability on uneven grounds.

all-terrain driving features, equipped with four wheel drive and steer, and their front oscillating axle increases stability on uneven grounds. In case of poor adherence, the differential lock provides

additional traction. The machines are also designed with proportional movements and the Haulotte Activ'Shield Bar system that ensures optimal safety. ■

Website: www.haulotte.com



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Specialist contractor relies on Volvo for demanding jobs

Australian company MGN Civil operates along the country's eastern seaboard as a contractor for public and private sector clients, working on some of the industry's most technically challenging marine projects. Based in Brisbane, the company was established in 2015.

Joint owners Guy Schweitzer, Neville Foley and Michael Foley bring together more than 30 years of project management experience, technical engineering knowledge and civil construction and plant expertise – and pride themselves on their ability to think outside the box.

"We need to have the most reliable equipment available to enable us to complete these challenging projects," said Mr Schweitzer. It is for this reason that MGN Civil turned to CJD Equipment, Volvo Construction Equipment (Volvo CE)'s dealer partner in Australia, as soon as the company was founded.

"CJD has been supplying MGN Civil equipment since our inception, however, the relationship with the directors dates back much further than that," revealed Mr Schweitzer.

The MGN Civil fleet of Volvo machines includes an EC360B LC crawler excavator, an EC480DL crawler excavator, an L260H wheel loader and recent purchases of an A35G and A40G articulated hauler.

MGN Civil is using these Volvo machines on projects such as the dredging campaign at the Port of Brisbane; the Clump Point



ALL IMAGES: MGN Civil has turned to Volvo CE and dealer CJD Equipment in search of reliable machines, to help complete various technically challenging marine projects.



Safe Boating Project; levee restoration in South Murwillumbah; and the Stoters Hill Landfill Project.

"I have a great working relationship with the directors, and they each have their own requirements in terms of service relating to the interesting and diverse projects that they undertake," said Lea Clarke, regional sales manager for Brisbane South at CJD Equipment.

At MGN Civil, one day the company could be developing cost-effective solutions for underwater marine infrastructure works and the next day, it could be constructing boat ramps and pontoons.

"CJD is a reliable and cost-effective trade partner, assisting us to source the best fit-for-purpose equipment for our speciality needs," concluded Mr Schweitzer. ■

Website: www.volvoce.com

Potain MCT 325 L16 crane towers above Xian

Xian Xintuo Construction Machinery has deployed a Potain MCT 325 L16 tower crane - known as the MCT 328 in China - to build a new vocational school in the Chinese province of Xian. With investment from the OPEC Fund for International Development, the new Shaanxi Youth Vocational College is expected to open in the first quarter of 2021 and will provide skills training for youth.

"First off, we are fans of the Manitowoc brand because they provide an innovative, advanced and comprehensive range of lifting solutions," said Li Xutang, general manager of Xian Xintuo Construction Machinery. "Secondly, the Potain MCT 325 L16 was ideal for us because we could use the crane on construction of two buildings."

Shaanxi Youth Vocational College is an extension of the Shaanxi Provincial Communist Youth League School, which was established in 1952. Once the new vocational school opens in 2021, it will house up to 8,000 students and offer courses ranging from economics to communications and arts.

On site since November 2019, the MCT 325 L16 works 10 hours daily lifting building materials such as rebar, formwork, steel tube and wood. For this project, the crane was configured with its maximum 75 m of jib, at a 48 m working height. The 16 t capacity MCT 325 L16 is a new addition for Xian Xintuo Construction Machinery and is expected to remain on site until August 2020. ■

Website: www.manitowoc.com



ABOVE AND BELOW: **Potain MCT 325 L16 tower crane operates 10 hours daily on the project, lifting building materials such as rebar, formwork, steel tube and wood.**



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Long Ying deploys first Sandvik QI442 HS in China

Guangdong-based Long Ying Construction Engineering Ltd has become the first customer in China to purchase Sandvik Mobile Crushers and Screens' revolutionary QI442 HS. This advanced HSI (Horizontal Shaft Impact) crusher is able to provide highly accurate material reduction at high rates of throughput. Additionally, through the use of Sandvik's advanced modular hanging screen, the crusher is also able to produce up to three products where and when required.

Long Ying serves the needs of the local construction industry. To offer a modern, productive and environment-friendly solution, the company recently turned to a Chinese equipment dealer, POTA Environmental Technology (Guangdong) Co Ltd - the authorised distributor of Sandvik Mobile Crushers and Screens.

POTA recommended the Sandvik QI442 HS, one of its latest developments. This requirement was based on crushing and screening mainly rocks, bricks, concrete and other materials arising from demolition and excavation projects that Long Ying undertakes. The combination of impact crusher with double-deck hanging screen was seen as the ideal solution in order to produce aggregates for road construction as well as concrete and asphalt plants.

The QI442 HS supplied to Long Ying comes equipped with a range of customer-focused features. A pre-screen is fitted to ensure maximum scalping capability and to prevent any undersize material passing through the impactor, maximising throughput and reducing wear costs. This also allows a specific sized product to be produced from the natural fines conveyor.

The pre-screen also has a choice of grizzly or punch plate top deck and mesh bottom, providing the flexibility to suit any application whilst an under pan feeder located beneath the impactor protects the main conveyor belt from the material exiting the impact crusher. The newly developed CI621 Prisec Impactor includes a new rotor locking and positioning device for controlled rotor movement during maintenance, which enhances safety and meets legislation requirements.

With a host of innovations for improved efficiency and greater safety during maintenance, the QI442 HS is able to operate in either primary or secondary crushing modes. Moreover, the two hydraulically assisted curtains can be readily adjusted to produce a wide range of high quality product sizes.

One of the benefits incorporated into the QI442 HS is the optional double-deck modular hanging screen system. It is interchangeable and offers the flexibility for the crusher to operate in open or closed circuit. The innovative design enables set-up in less than 30 minutes and can be fitted without the use of additional lifting equipment.

The hanging screen option delivers multi-functionality as a 1-, 2- or 3-way split screener, as well as a highly productive and efficient impact crusher. The double-deck hanging screen enables the machine to produce two screened products and recirculate the oversize back into the feed conveyor.

The oversize conveyor may be hydraulically rotated for material stockpiling (90°) of up to three products on the floor, or removal (180°). The tail section can be raised hydraulically to give improved ground clearance for transport when loading or unloading.

The QI442 HS also comes with Sandvik My Fleet remote monitoring system as standard. This facilitates accurate production forecasting, ensuring that the most efficient use is obtained from equipment, thereby maximising return on investment.



TOP AND ABOVE: Sandvik QI442 HS crusher is able to provide highly accurate material reduction at high rates of throughput. Equipped with an advanced modular hanging screen, the machine is also able to produce up to three products where and when required.

Long Ying is now using the Sandvik QI442 HS to crush mainly construction and demolition waste with a maximum feed size of 800 mm, producing two core products: 0-10 mm and 10-40 mm, at an average production rate of 200 tph.

Mr Zhang, operations manager at Long Ying said, "Our company would like to expand our business. We'd like to cooperate with Sandvik to have a national wide, full product lifecycle, comprehensive solutions in different applications support. We received excellent service from POTA from the very beginning: from the delivery of the machine, to commissioning and training of service and wear parts replacement, the POTA field engineer gave their full support until the machine was fully operational. We really appreciate the service."

He added, "Sandvik equipment is world class quality, very stable, and we have experienced no downtime due to any failures. The machine is highly productive with a good shape end product and low fuel consumption of 1.2 rmb/ton. The hanging screen solution means that only one machine is now required to do the job. In future projects, if we need more machines, definitely we will choose Sandvik due to good quality and production rates, dedicated, professional service and good parts supply." ■

Website: www.rocktechnology.sandvik

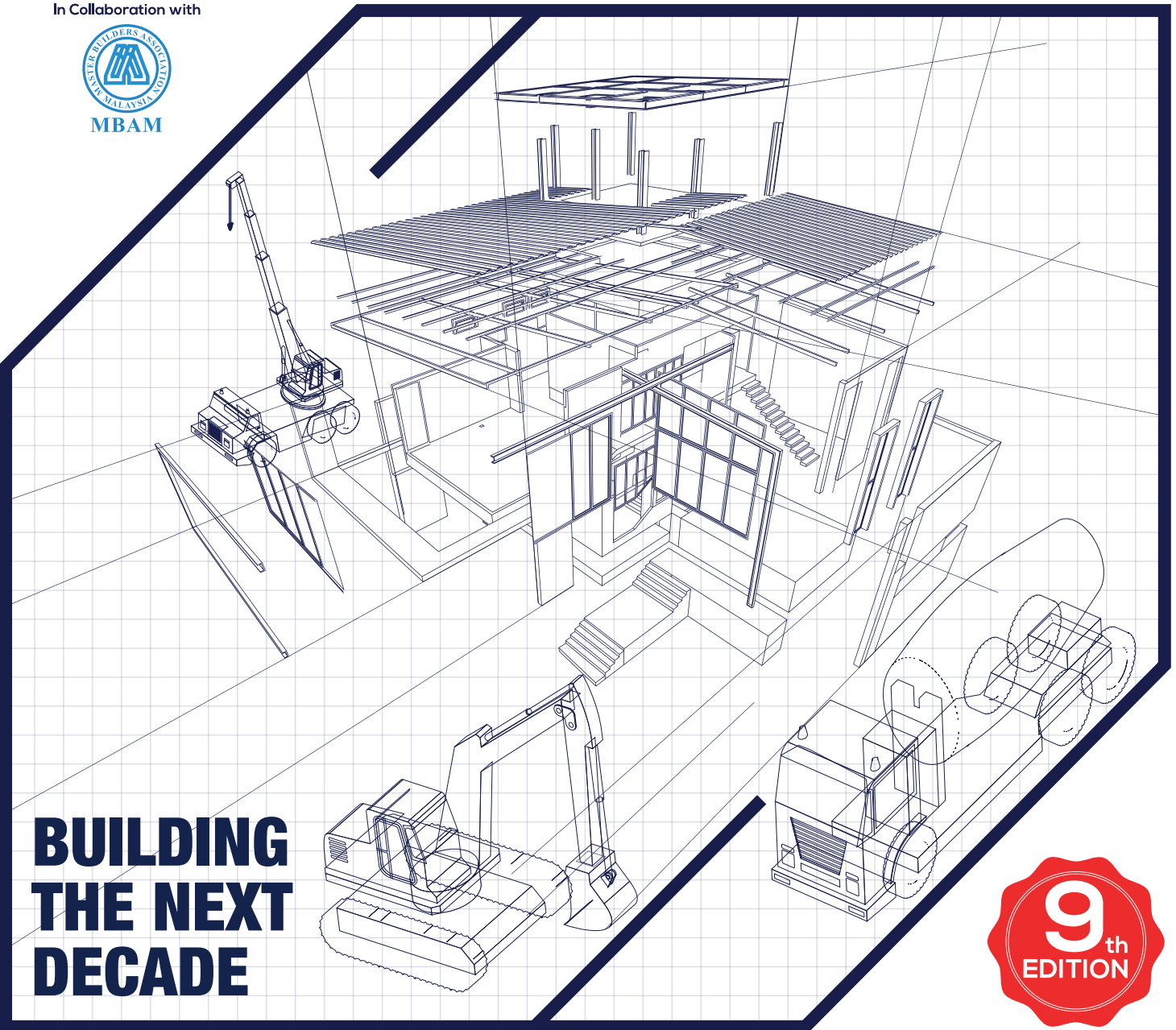


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Ammann equipment meets challenges in South Asia

NEM Construction, based in the Sri Lankan capital Colombo, recently completed compaction work on an extension of the southern expressway from Matara to Beliatta. The new road is 30 km long and 25 m wide, connecting key urban hubs and providing access to the international airport in Colombo.

"A challenging construction schedule was prepared to meet the target deadlines, and on top of that, we had to contend with severe weather conditions during construction," explained Raja Nanayakkara, chairman of NEM.

Handling asphalt compaction on the project were four Ammann AP 240 pneumatic tyred rollers. The machines carried out both intermediate and finish compaction. Ballast was adjusted to provide a proper weight distribution during the two stages of compaction. Ammann's convenient air-on-the-run system also enabled tyre pressure to be adjusted from the cab.

Speaking about the benefits of the AP 240 pneumatic tyred roller, Mr Nanayakkara said, "It's a heavy-duty machine that's easy to operate. It minimises the operating time through the power steering and automatic transmission. The braking system is efficient, and visibility is good. The driving positions can be switched easily."

Excellent ground access makes maintenance points easy to reach, minimising labour and reducing the likelihood of fluid spills. Ultimately, all the efficiencies offered by the rollers helped NEM meet the project's deadline.

"Competition among contractors to secure the limited number of projects available in the market is one of the biggest challenges we face," said Mr Nanayakkara. "We separate ourselves from the competition by completing projects in a timely fashion, using eco-friendly methods and delivering the best quality that meets the employer's requirements."

In India, an Ammann ABC 180 ValueTec asphalt plant has been used on a recent project at the Chhatrapati Shivaji Maharaj International Airport in Mumbai. The work included resurfacing and profile correction of runway intersections, which took place between 7 February and 30 March 2019.

The job was quite challenging, said Ammann. An average of 1,000 flights arrive or depart from the airport every day. To minimise disruptions to service, the airport was closed daily for



Ammann ABC 180 ValueTec asphalt plant being deployed at the Chhatrapati Shivaji Maharaj International Airport in Mumbai, India.

only six hours. Even this limited timeframe impacted approximately 240 flights during each closure. Plant production and dependability were crucial to meeting the project deadline.

AIC Infrastructure handled the asphalt production and placement. The company utilised the Ammann ABC 180 ValueTec plant, which produced approximately 700 t of asphalt mix per day to help keep the resurfacing work on track. The company also deployed two Ammann AP 240 pneumatic tyred rollers, two ARX 91 tandem rollers, and an AFT 600-3 tracked paver.

According to AIC Infrastructure, the biggest challenges were "procurement of plant and machines, time management to ensure everything was executed as planned, quality to meet the desired parameters, and safety to ensure zero incidents and zero accidents." In the end, the project was completed successfully – on schedule, with minimal interruptions to travellers.

Kritharth Raja Desai, managing director of AIC Infrastructure, revealed that the Ammann plant, paver and rollers were the ideal solutions for the project. "Excellent team work, a pro-active approach and the customer centricity of the Ammann team members helped us to complete the runway resurfacing and profile correction work at India's busiest airport within the stipulated timeframe," he said. "We are happy to note, we did not lose even a minute of productivity."

Mr Desai added that several factors contributed to the successful project completion. "The Ammann customer support team was very cordial and cooperative in extending on-site parts support. In addition, Ammann India deployed trained operators and technicians on-site, which helped us become productive instantly."

Ammann engineers monitored the condition of the plant and machines nearly every day. Proactive maintenance ensured there were no breakdowns. "The best part is, the maintenance routines were scheduled by Ammann India in such a way that our productive hours were not impacted at all," said Mr Desai. "The suggestions given by Ammann India towards proactive maintenance were very helpful and gave our team a new perspective on how to achieve more with Ammann products." ■

Website: www.ammann.com



Ammann AP 240 pneumatic tyred rollers perform compaction work on an extension of the southern expressway from Matara to Beliatta, Sri Lanka.

Liebherr LB 24 drilling rig excels in the Bay of Kotor

A new luxury hotel, Portonovi Resort, is currently under construction in Kumbor, located in the Bay of Kotor, Montenegro. Briv Construction d.o.o. is carrying out deep foundation work on the project, with the help of a Liebherr LB 24 drilling rig.

Owned by the South African luxury chain One&Only, the hotel is expected to open in the second half of the year. Villas, apartments and piers as well as recreational and shopping facilities are also being developed on approximately 1.4 km of coastline.

The biggest challenge for Briv is the stabilisation of the beach section. To overcome this, the company has opted for the Liebherr LB 24. The machine is drilling the piles required in the bay from a barge.

The first pile for this project was drilled by Briv in 2014. Since then, the company has installed 70 km of piles using 22,000 cu m of concrete and 3,400 t of reinforcements. The piles are 32 m deep, have a diameter of up to 800 mm and are fully cased. The tools used are rock drilling augers and buckets.

Briv had initially calculated with the installation of one pile per day. However, due to the good daily performance of the LB 24, latterly even three to four piles were installed, including concreting. "The drilling rig combines power and precision. The control system is simply the best," said the machine operator Hanic Almir.

Briv is also installing drilled piles for the luxury hotel's pier. Furthermore, breakwaters are being built in the harbour area for protection. In addition to the LB 24, Briv is employing other Liebherr machines on the project, including two LB 28 drilling rigs, an LRB 125 piling and drilling rig, an HS 873 HD duty cycle crawler crane, and an LTM 1100 mobile crane. ■

Website: www.liebherr.com



ABOVE AND BOTTOM: Piers and breakwaters are being developed in front of the luxury resort. The Liebherr LB 24 drill rig is seen here working from a barge.



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DIGITAL TWINS OR TRIPLETS

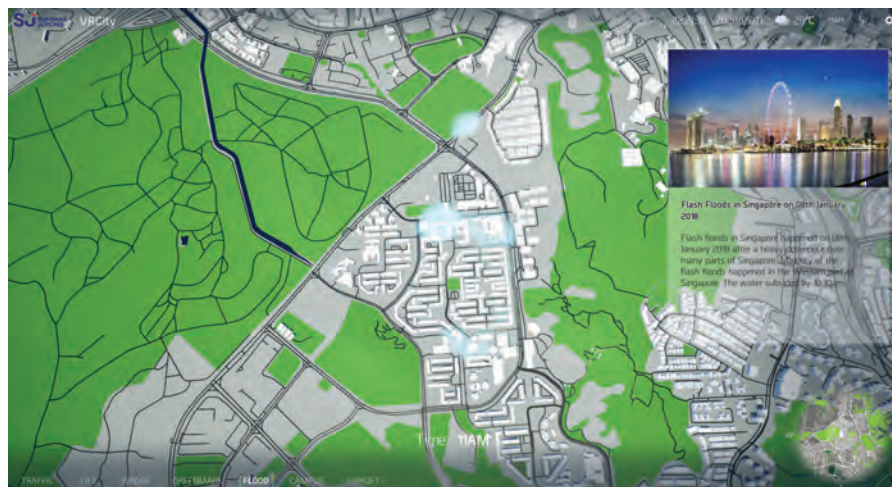
BY: DR RAJ THAMPURAN, MANAGING DIRECTOR, TECHNOLOGY & RESEARCH, GROUP RESEARCH & DEVELOPMENT, SURBANA JURONG

A ‘pretty large bang’ was heard by the crew of Apollo 13 two days after their launch from the Kennedy Space Centre on 11 April 1970. This was followed by the immortal words “Okay, Houston, we’ve had a problem here.” The ignition and blast from an exposed wire inside an oxygen tank heralded a dramatic rescue by Mission Control in Houston 330,000 km away. The subsequent four-day odyssey home for the space shuttle was the quintessential ‘what can go wrong, will go wrong’. As has been said about that mission, “no one has been in this amount of trouble so far from home.”

There are many heroes in a rescue mission of this complexity. One of them is surely a ‘digital twin’. A total of 15 simulators connected to computers were able to replicate the response to an immense number of technical permutations, which would guide the craft home after circling the moon. The space shuttle and its crew landed safely in the Pacific Ocean on 17 April.

Digital twins in built environment

Simply, digital twin is the virtual representation (if you like, an avatar) of a physical system in real time. The idea is



TOP AND ABOVE: SJ VR City can integrate a variety of data sources and is a convenient platform for urban planners to visualise and study the environment. A flood simulation analysis can be seen here (top), using stormwater management model integrated into 3D model to identify vulnerable regions prone to flooding. The other image (above) shows that in city-wide lift or critical M&E asset monitoring, users will have a pictorial overview of asset status and condition, and drill in to the individual asset as necessary to query or activate a follow-up.

that the digital twin inhabits and exhibits the realities of a physical asset.

While technology progresses, its use is determined by cultures and people. In a fast paced, ever-changing digital era, not surprisingly for some, digital twins pervade

many industries and aspects of private life today. Concepts in Industry 4.0 use digital twins in factory operations to monitor machine performance and spot problems. There are digital twins of hospitals, medical equipment and even human organs.

Formula One racing is dominated by digital twins that predict problems, rectify difficulties and optimise the cars during an ultra-high speed race. With over a hundred sensors in each car, billions of data (of tyre pressures, temperature, drag, acceleration, shifts in the locus of gravity, cockpit conditions) are transmitted via telemetry to remote command centres.

Neither is the built environment industry the last bastion to witness the influence of digital twins that will shape and transform its future. Digital twins will follow any industry impacted by big data. In fact, well before the built environment practice universally shifts from the classical use of two-dimensional drawings and physical models to three dimensional, 'living' models across the continuum of workflows, the profound value of the information from these twins is already known.

In April 2019, the 12th century French Notre Dame Cathedral was ravaged by a devastating fire. The heroic work of a Vassar Professor, the late Andrew Tallon and his digital twin, restoring the Cathedral to its original design is now a realistic goal. In 2015, Professor Tallon used lasers to create point clouds of the Cathedral's interior and exterior facades replete with gargoyles and spires. This is today the basis of the 3D digital rendering used in restoring this historical building.

Twins are Triplets in many ways. One of which is that their 'DNA' depends



With the SJ VR City platform, traffic monitoring with associated video analytics allows users to zoom in to road conditions or troubled spots to advise on diversionary routes to ease congestion or assist police in tracking rouge vehicles.

on sophisticated software codes, data absorption abilities and pattern recognition (through machine learning or artificial intelligence). There are also commentators who describe twins as cyber, physical and social triplets because their properties manifest in all three realms. However it is viewed, what enables digital twins is the same technologies that propelled so many other revolutions: faster processing speeds, near unquenchable data ingestion capacities, cheap sensors' ultra-integrated networks, communication rates and bandwidth, data storage, precocious analytical tools and new visualisation

techniques that allow the physical and digital worlds to meld and blend.

One way to think about the value of digital twins is its ability to participate in the entire built environment industry's asset life cycle through concept, design, development, project management, construction and managed services. Take the example of the Virtual Singapore platform. There has been much adulation in the media about Singapore's vision to model and simulate the pulse of a vibrant city. The platform is surfeit with geospatial data about the city-state. It intends, when completed, to provide a digital space and



Surbana Jurong is creating digital twins of SJ Campus harnessing the power of BIM, IoT, artificial intelligence, integrated digital delivery, sensor networks and new age visualisation tools.



To accomplish an equilibrium from many complex factors, the SJ campus demonstrates the use of integrated twins from concept to construction, to long-term maintenance.

experimental commons to make policy and design decisions, test hypotheses about urban systems and their interdependencies, model environmental impact on the landscape temporally and study community engagements in townships and its surroundings. It is an ambitious digital twin project made successful only by organisations and people able to harness its value.

With Surbana Jurong's (SJ) domain expertise in the built environment, we have generated 3D models, large scale simulations and high dimensionality building information modelling (BIM) systems in a wide array of areas such as transport, flood control, engineering, master planning, design and asset management. And with our ability to incorporate data ingestion, digital twins have also been created.

For instance, SJ's VR City platform is a solution to test infrastructure and its design in response to connections and neighbouring dependencies. On it, changes can be made in a myriad of ways and candidate solutions derived through better information and consequently, preferred outcomes. The vision is to simulate a smart, conscious city that constantly monitors, among other factors, ambient conditions, traffic, accidents, emergencies, commuter and pedestrian patterns. Information is then channeled to an integrated operations centre and the appropriate responses transmitted to the relevant people or agencies.

Digital twins of SJ Campus

We are creating digital twins of our SJ Campus harnessing the power of BIM, IoT, artificial intelligence, integrated digital delivery, sensor networks and new age visualisation tools. To accomplish an equilibrium from many complex factors, the campus demonstrates the use of integrated twins from concept to construction, to long-term maintenance. The aim is to create a balanced tropical ecology of light and shade, cooling and radiation deflection, and excellent air circulation and quality. The campus will become a living, pulsating laboratory responding to internal and external ambient factors and always sentient.

The constituents of cities and campuses are physical assets – some critical ones such as lifts, airports or hospitals – whose properties are embodied by their twins. If these constituents, each as digital twins, are connected, a digital thread is created. This gives us a glimpse of a future where the connected twins can collaborate with each other, share information and respond in ways that optimise the properties of the group or network.

“ ONE WAY TO THINK ABOUT THE VALUE OF DIGITAL TWINS IS ITS ABILITY TO PARTICIPATE IN THE ENTIRE BUILT ENVIRONMENT INDUSTRY'S ASSET LIFE CYCLE THROUGH CONCEPT, DESIGN, DEVELOPMENT, PROJECT MANAGEMENT, CONSTRUCTION AND MANAGED SERVICES. ”

Therefore, in SJ, we embrace a multiscale, multifunctionality, multidisciplinary strategy to our development of digital twins and its associated technologies. This way, our culture of ideas, creativity and collaboration is not limited by technologies or disciplinary specialisations.

Challenges and opportunities

The attractiveness of digital twins should not of course disguise difficulties. One inhibitor is the cost of creating and maintaining digital twin assets. This presents an opportunity for a business model innovation for consultants to become custodians and managers of digital assets for their clients. Providing services that governs and regularly improves data security, storage and integrity enhances model quality, refreshes technology and acts on other important factors of managing the twin.

There is substantial evidence of an industry that has rapidly burgeoned in a short period offering digital twin development services. Another that offers twin and digital asset management and quality assurance services will surely emerge soon, perhaps akin to another data management and applications hosting industry known as cloud service providers.

Digital twins or triplets, quadruplets or siblings, virtual avatars have emerged from the realms of imagination to reality in businesses. Ultimately, as history has proven, companies that are adept at creating, using, innovating and improving through technologies - like digital twins - will have distinct and formidable advantages over those less able. ■

Website: www.surbanajurong.com

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STANDING TALL

Comansa has made some improvements to its 11LC Series tower cranes. The company said the range provides enhanced ergonomics thanks to new and simplified accessing elements not only to the cathead, but also to the jib sections for easy access to the trolley. Furthermore, a new single trolley is now available as an option, which allows a manual single-double reeving change by the operator directly from the ground.

With attached potentiometers, new drives in the hoisting winch and trolley give new linear movements. According to Comansa, this makes it possible to easily move and precisely position sensitive loads. A new version of the 18 kW hoist mechanism has also been added to the 6 t versions, resulting in less power supply while maintaining drum capacity and speed features.

Power Lift system comes as standard, added Comansa, improving the load diagram by 10% at reduced speeds for jobs that require. Optional 24 kW and 37 kW hoist motors feature the Effi-Plus system, which increases the hoisting and lowering speeds for light loads without increasing the power or consumption.

Another notable feature is the new M sized Cube cab together with a resized and redesigned platform for simpler erection and maintenance. The fully glazed front window of the cab enables a complete view of the load and work area, thereby maximising performance. The improved positioning of the seat and body posture provides an excellent comfort for the operator.

The Quick Set system, already available in the 21LC series, is now introduced in the 11LC family as an option. This technology



ABOVE AND LEFT: The newly upgraded cranes also incorporate the Cube M cab. Its fully glazed front window enables a complete view of the load and work area, leading to better performance.

is designed to simplify the commissioning of cranes. With Quick Set, the set up and calibration times have been significantly reduced using a system that leads to easier, safer and more intuitive adjustments, achieving faster and less labour-intensive calibration.



ABOVE AND BELOW: Comansa has upgraded its 11LC Series flat-top tower cranes. The range continues to offer four models - the 11LC90, 11LC132, 11LC150 and 11LC160 – plus a new 6 t version of the 11LC150.



Comansa said it will continue to offer four models in the 11LC Series - the 11LC90, 11LC132, 11LC150 and 11LC160 – plus a new 6 t version of the 11LC150. All of the units are designed for faster and safer assembly, as well as providing a longer life for the

structure and smaller distance between overlapping cranes. The company further mentioned that the improvements will soon be expanded to the 16LC range. ■

Website: www.comansa.com

Beijing Daxing International Airport

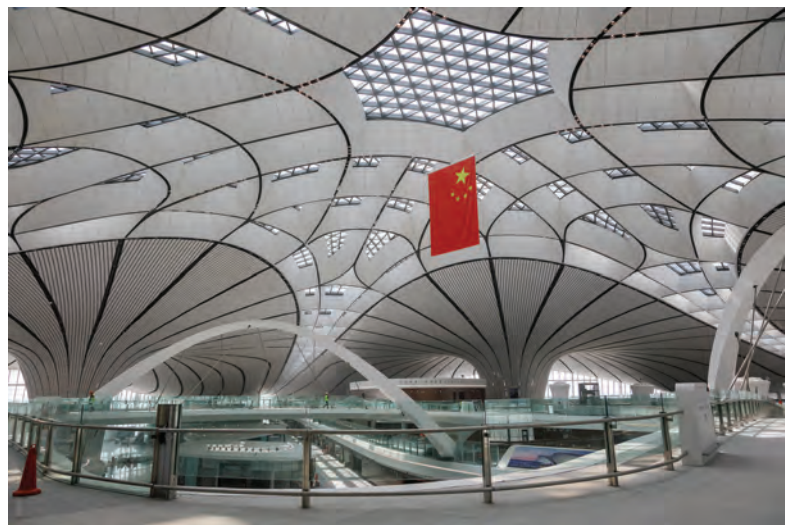
Inaugurated in 2019, Beijing's new airport is set to become the largest in the world in terms of passenger numbers. It is well connected to the local high-speed railway network, and will help reduce congestion at the Beijing Capital International Airport (on the northeastern edge of the city).

The new airport - located in the Daxing district, about 46 km south of the centre of Beijing - is capable of handling approximately 45 million passengers per year. The airport capacity is expected to rise to 72 million by 2025 and to 100 million by 2040.

This large-scale development was designed by the Joint Design Team, comprising Zaha Hadid Architects, ADP Ingénierie (ADPI), Beijing Institute of Architectural Design (BIAD), and China Airport Construction Group Corporation (CACC). Main contractor on the project was China Construction Eighth Engineering Bureau.

The building features six wings extending from the central nucleus, and a large central piazza set over various levels. Designed to be energy efficient and environment-friendly, with a high level of flexibility to accommodate future growth, the airport provides a total surface area of 700,000 sq m - which, with the eight runways and other service areas, amounts to 1.4 mil sq m.

A self-sufficient energy supply comes from photovoltaic panels around the perimeter of the structure, while pumps feed recovered geothermal heat into a central heating system. A water management system to collect rainwater is also part of the design and any excess water is directed into new wetlands, lakes and rivers to prevent flooding and to counteract the airport's 'heat-island' effect during the summer.



TOP: An aerial view of the new Beijing Daxing International Airport, which was inaugurated in 2019.

ABOVE: The building incorporates many energy-efficient and environment-friendly features, and has a high level of flexibility to accommodate future growth.

LEFT: The carpark area at the airport's west wing, covering more than 5,000 parking spaces. Here, Mapei was commissioned by the main contractor to provide various solutions for the floor surface.

Coating the carpark floor

In this project, Mapei was asked by the main contractor to supply cutting-edge systems for the floor surface of the carpark at the airport's west wing. The area has more than 5,000 parking spaces, 600 of which with charging points for electric cars.

To start off, the concrete substrate had to be thoroughly cleaned. Then, the surface was primed by applying a coat of Mapefloor I 900 (a two-component epoxy binder) with a roller to completely fill all the pores. After that, the second coat of Mapefloor I 900 was applied, fillerised with Quartz 0.5 quartz sand.

Later, a seamless surface coating of Ultratop - an ultra-fast setting, self-levelling mortar - was applied to give the floor surface an attractive finish and high resistance to abrasion.

Around 80,000 sq m of the carpark area were coated with Ultratop. This particular job was said to be the most extensive of all the work carried out so far with this product. Its performance properties met with the full approval of the client and designers, which convinced Mapei to propose the product for the next projects planned for the airports in Xiamen, Chengdu and Urumqi.

The Ultratop self-levelling mortar features special hydraulic binders for abrasion-resistant floorings. It is used internally in public and industrial buildings, for levelling and smoothing new or existing concrete and ceramic substrates in thickness from 5 to 40 mm, to make them suitable for heavy pedestrian use in shopping centres, offices, shops, showrooms and areas where rubber wheeled vehicles are in use.

Ultratop offers high mechanical strength and resistance to abrasion. Thanks to its versatility, the system is also ideal for numerous applications in the decorating sector of buildings for civil use. ■

Website: www.mapei.com.sg

TOP: Applying the first coat of Mapefloor I 900 epoxy binder to prime the concrete substrate at the carpark.

MIDDLE: After applying the second coat of Mapefloor I 900, fillerised with Quartz 0.5 quartz sand, Mapei's Ultratop self-levelling mortar (inset) was applied over the floor surface to give it an attractive finish and high resistance to abrasion.

RIGHT: The carpark upon completion of the flooring work.



The article courtesy of Rodolfo Mapei International no. 78



Potato Head Studios, Bali

The newly opened Potato Head Studios in Bali, Indonesia – which comprises a beach club and two hotels – is the cultural heartbeat of Desa Potato Head, a creative village by the ocean where music, art, design, food and wellness play together. Located in the Seminyak area, Potato Head Studios was designed by global architecture firm OMA and engineered by Aurecon. It offers 168 accommodation rooms, guest facilities, function rooms, bar and nightclub, and public spaces that celebrate the essence of Bali.

Designed to disrupt the private typology of resorts in tropical locations, the open public areas are flexible spaces that will accommodate festival celebrations, cultural events, and day-to-day leisure activities for guests and visitors. The open platform at the ground level and a private garden on the second level evoke the raised courtyards in Indonesia, where traditional Balinese courtyards are found at ground level.



TOP: An aerial view of Potato Head Studios in Bali, Indonesia. It is the cultural heartbeat of Desa Potato Head, a creative village by the ocean.

ABOVE: Designed by OMA and engineered by Aurecon, Potato Head Studios comprises a beach club and two hotels. The development was constructed from pigmented in-situ concrete and poured concrete cast in reclaimed driftwood to minimise its environmental footprint.

Environment-friendly construction

Potato Head Studios was constructed from pigmented in-situ concrete and poured concrete cast in reclaimed driftwood to minimise its environmental footprint. Aurecon collaborated with the client and builder in outlining and prototyping these experimental techniques.

According to Aurecon, the textures of some concrete walls were created by local craftsmen, while the facade design along the guestroom corridors was inspired by Balinese Tika, or divination calendar. At the rooftop is a sculptural park open to the general public, accessible via a public route that connects amenity spaces including restaurants, pools and spas. Aurecon was instrumental in creating the stunning column-free access route, and in some of the larger sculptural installation such as the concrete dome restaurant.

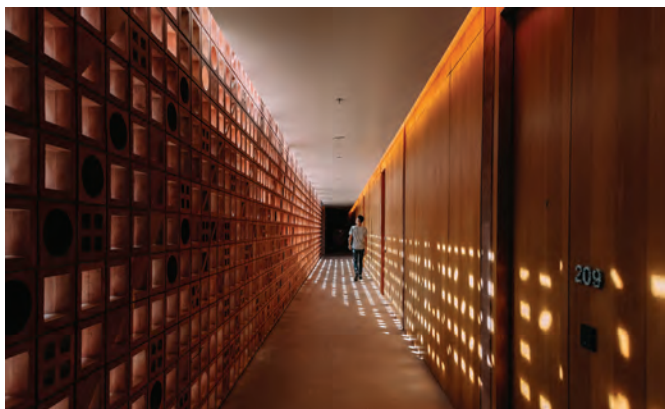
Potato Head founder, Ronald Akili, commented that the building and open spaces are a cultural institution that mixes public with private, guests with locals, and future thinking with time-honoured craftsmanship.

The project pays homage to the essence of Bali – deeply spiritual, with the roots of the island's beliefs and traditions running deep in how it presents itself to the world.

A 'floating' building

Raising the building to create the elongated open public spaces at ground level was the grandest engineering challenge, explained Aurecon. To stay true to the architectural intent of a building 'floating' over the public spaces, the company formulated a structural solution that resembles a house on stilts. A series of differing wall and frame systems provide the mirage of a floating hotel and invites locals and visitors alike to interact and connect.

The building design accomplished four elements. First, it protected what would otherwise have been a vulnerable building against seismic activity. Second, it enhanced the floating on stilts visual by hiding all services reticulation from sight. Third, it



The textures of some concrete walls were created by local craftsmen, while the facade design along the guestroom corridors was inspired by Balinese Tika, or divination calendar.



ABOVE AND LEFT: Raising the building to create the elongated open public spaces at ground level was the grandest engineering challenge on the project. To stay true to the architectural intent of a building 'floating' over the public spaces, Aurecon formulated a structural solution that resembles a house on stilts.

sustainably manages water across the site for the good of the wider community, by sourcing sustainable drinking water, and managing flows and odours while protecting the culturally sacred river. Lastly, it created visually stunning elements, including free-span external stairs and a dome-shaped restaurant.

This design was accomplished by designing pilotis, or piers, as support columns that lift the building above ground. The pilotis support a hidden frame system and secretly decoupled walls, in order to balance the building's stiffness and provide safety during Bali's frequent earthquakes. This configuration has resulted in a cultural ground plane and a five-storey building above that is approximately 29,200 sq m and 20.5 m high.

A river passing through the middle of the site was important to the community both spiritually, and functionally as their sewer. To free the site layout, create an odour-free environment, and protect from flash flooding, Aurecon designed a covered culvert diversion in consultation with community groups.


Aurecon's network of international offices played an important role to deliver a successful building design within the project timeframe. The company said specialist skills were applied from its offices across Asia, in order to achieve the successful structural and building services solutions posed by the challenge of building an entertainment and accommodation precinct on stilts. ■

Website: www.aurecongroup.com

All images © Kevin Mak, courtesy of OMA

Sai Kung Outdoor Recreation Centre Temporary Quarantine Facilities

A pilot case for modular integrated construction in Hong Kong



Covid-19 has brought both challenges and opportunities, with various innovations flourishing and new technologies finding their ways to advance further. In April 2020, LWK + Partners, a leading design architecture practice in Hong Kong, completed the temporary quarantine facilities in Sai Kung Outdoor Recreation Centre to assist the government's response to the pandemic situation.

The project, delivered in collaboration with Paul Y. Construction and Paul Y. – iMax, is one of Hong Kong's pilot cases for modular integrated construction (MiC). According to LWK + Partners, it took only 77 days to design and build three blocks of three-storey facilities from scratch, setting the city's record.

“MiC is an innovative construction method based on the concept ‘factory assembly followed by on-site installation’. Freestanding integrated modules are fabricated, finished and inspected in the factory before being transported to the site for installation. On-site processes like foundation works can be carried out all the while the above takes place, substantially raising the levels of efficiency and quality,” explained Paul Ng, director of LWK + Partners, who oversaw the development of the quarantine facilities.

Hong Kong’s first MiC adopters

There have been previous examples in mainland China, Singapore, the UK and the US. LWK + Partners said Singapore is leading the way in Asia with relatively mature technologies, providing references and benchmarking for others in the region. In Hong Kong, MiC is still in its early stages, so the approval process takes a much longer time and involves complicated preparation.

Last year, LWK + Partners and Paul Y. – iMax took the initiative to work together on an MiC installation system, which secured ‘pre-acceptance’ from Hong Kong’s Buildings Department. This provided critical technological foundations for the



© LWK + Partners

temporary quarantine facilities in Sai Kung Outdoor Recreation Centre.

As one of Hong Kong’s first architectural firms to adopt the MiC method, LWK + Partners has garnered experience in both design and management. The project

will join the company’s pool of common resources shared across its extensive global network, ready to be integrated into different types of future projects, and serving as an illustrative example for the whole industry.



© Paul Y. - iMax

TOP AND ABOVE: The development comprises three blocks of three-storey buildings. Each building has 33 temporary units, making up a total of 99 - all with their own toilets and connected through steel staircases and open-air corridors.



Both images © Paul Y. - iMax

TOP AND ABOVE: With the modular integrated construction (MiC) method, it took only 77 days to design and build these temporary quarantine facilities from scratch.



Challenging, yet promising

The three blocks of three-storey temporary quarantine facilities were built on the mini football pitch of Sai Kung Outdoor Recreation Centre. Every building consists of 33 temporary units, making up a total of 99 - all with their own toilets and connected through steel staircases and open-air corridors. While the modular units were made in factories, the steel staircases and semi-open corridors were built on site.

"A single corridor design was adopted to contain the virus spread," said Mr Ng. "We placed all corridors at the front of the building and the bathroom vents at the back. The blocks are arranged front-to-front or back-to-back to ensure a clear divide of 'clean' and 'dirty' air."

However, transporting huge modular units posed a major difficulty, added Mr Ng. "This is due to their massive size compared to ordinary construction material. These units must be transported by sea and then overland. Site constraints must also be overcome to get them properly delivered. Border restrictions during the pandemic also meant that the modules could not be manufactured on the mainland. The team quickly turned to Malaysia and managed to complete the project within a limited time frame."

With MiC, a lot of on-site works were transferred to the factory. Quality control becomes more effective, thus improving the standards of delivery, explained LWK + Partners. Factories are weather-proof and provides a better work environment, potentially drawing new blood into the industry, which bolsters both capacity and resilience.

LWK + Partners further pointed out that, as the total construction period is shortened, MiC brings down the costs



TOP AND ABOVE: The facilities' modular units were made in factories, while the steel staircases and semi-open corridors were built on site.

Both images © LWK + Partners

of labour and building materials, while carbon emissions and possible nuisance to the community are reduced. It will also speed up market supply to better accommodate long-term demand for housing and function space in dense cities.

But more importantly, it presents a potential driving force for sustainable development and circular economy. “MiC leads to less construction wastage and raises cost-effectiveness overall,” noted Mr Ng, “Modular units can also be brought back to the supply chain to be ‘reused’, extending the life-cycle of building materials and relieving the pressure on the planet’s resources. At the Sai Kung temporary quarantine facilities, the project team has designed certain flexibility in the units so that they can be reused in transitional housing in the future.”

Architecture ‘will not be the same’

LWK + Partners highlighted that the global trend of MiC points to a new approach to building, shaping workflows and the way projects are planned and designed. The building industry is set for a revolution.



Paul Ng, director of LWK + Partners.

In a bid to promote wider use, the Hong Kong government reportedly announced a policy in March 2020, making MiC a requirement in future tenders for specified types of public capital works projects, including staff

quarters, hostels, residential and care homes, schools, office buildings and medical facilities, as well as staircases and communal areas of the above where possible. This applies to tenders where the total construction area exceeds 300 sq m.

Though MiC is now predominantly used in the public sector, it is expected to expand to different types of real estate as technology progresses, affecting the industry in Hong Kong, the Greater Bay Area, the whole mainland China and Southeast Asia.

LWK + Partners said it will continue exploring the possibilities brought by MiC, making the best use of its own extensive international experience in building information modelling (BIM) and valuable support from isBIM Limited, a sister company also under C Cheng Holdings Limited. “The expanded use of MiC promises efficiency and quality, helping the firm respond with agility and timeliness to the rising demands for the built environment on the back of a growing urban population across the world,” concluded LWK + Partners. ■

Website: www.lwkp.com



As the use of MiC allows a shorter construction period, it brings down the costs of labour and building materials. The modular units at the Sai Kung temporary quarantine facilities have also been designed to be flexible, so that they can be reused in transitional housing in the future.



Peach Blossom Pool Park dredging project



TOP AND LEFT: This environmental dredging project was aimed to speed up the flowrate of the river, improve the ecological conditions, and restore the aquatic environment of the East Lake. The job was completed by using only one machine, the Watermaster Classic IV.

The Chinese city of Xi'an has developed rapidly, with its booming population and advanced industrialisation. However, the flowrate of rivers and lakes in the city has also reduced and the aquatic environment pollution has intensified.

In the second half of 2018, the Xi'an municipal government decided to restore the city's urban aquatic system and so, the Peach Blossom Pool Park was chosen as an emergency pilot project. This urban riverside landscape park - in the centre of Chanba Ecological Zone - features the East and West Lakes of Peach Blossom Pool. It is situated in the lower reaches of Chanhe River covering an area of 101 ha, including 40 ha of water surface.

The lake water comes from the Chanhe River. The flood discharge from the river and the overflow of sewage from the upstream sewage treatment plant had caused many problems:

the inlet and outlet of East Lake and the sediments in the lake were silted up, the water body was polluted, and the aquatic vegetations were corrupt. The East Lake's aquatic environment had seriously deteriorated.

Following thorough investigations and analysis, the municipal government opted for dredging method to remove the polluted sludge. The goal was to speed up the flowrate of the river, improve the ecological conditions, and restore the aquatic environment of the East Lake.

Watermaster - one machine for all

Shaanxi Chenghai Water Engineering Co., Limited was appointed to carry out the dredging project. The company used its amphibious multi-purpose dredger, the Watermaster Classic IV, purchased from

Finnish manufacturer Aquamec. The machine is highly mobile and versatile, making it able to undertake various tasks just by changing its attachments.

The Watermaster dredger is also compact, easy to transport on public roads and in the city, offering a transportation weight of only 20 t. It is a fully amphibious machine, suitable for shallow water or even water-free operations. According to Aquamec, upon arriving on the project site, Watermaster 'walked' into the lake by itself and started to work immediately.

The machine can operate with less noise and qualified exhaust emission, with a water depth that is not limited by draught, said Aquamec. It can manoeuvre simply without the need for a crane, is self-propelled in the water and able to walk on the land and climb in the mud.

Installed with a backhoe bucket, Watermaster began to renovate the revetment, widen the river channel, and remove the construction waste from the bottom of the river. This job lasted for half a day, with about 300 cu m of construction waste cleaned up. After that, the rake was deployed to clear the debris near the water surface and then the machine continued to the main step of the project, the cutter suction dredging.

One of the difficulties was the transportation and disposal of the dredged sludge. For this, the solution that was agreed on included cutter suction dredging by Watermaster, transportation by pipeline, and dewatering by geotubes.

Watermaster can be operated by one person. Designed with two tiltable spuds at stern and excavation arms, the dredger can reposition itself quickly. The cab is equipped with 10 working lights to ensure the machine is capable of running for 24 hours a day in three shifts.

The working conditions of the project were complex, as the lowest ambient air temperature at that time reached -5°C , revealed Aquamec. The cutter suction operation took about 15 days, and the total dredged volume was 15,000 cu m. The whole project was successfully completed five days ahead of schedule.

'No easy task'

Aquamec explained that it is quite difficult to deliver large-scale machines to such a densely populated site, and it is also not easy to transport the dredged sludge outside the city. The working conditions were quite challenging as well, as the water surface of 4 ha was covered by rotten lotus and other aquatic vegetations. There was a lot of construction waste and unknown quantity of domestic garbage buried underwater.

Aquamec said the water depth was generally less than 50 cm, and some areas were even free of water, so ordinary dredgers



ABOVE AND LEFT: Thanks to its high mobility and versatility, the amphibious multi-purpose Watermaster dredger from Aquamec was able to carry out various tasks on the project. The machine is self-propelled in the water and can walk on the land and climb in the mud.

could not be used in the project. The dredging work was performed while the park was in operation, and the project had to comply with the National Environment Dredging Code. Furthermore, the project had to be completed within a short period (25 days) despite the winter season when the lowest air temperature could reach between -8°C and -10°C .

Aquamec, along with its local exclusive agent KAT Aquatic Technology Trading Co., Limited, delivered the Watermaster Classic IV to the customer in March 2018. Aquamec's after-sales service engineer carried out a technical training for the operators, and about three months later, the machine was put into operation. ■

Website: www.watermaster.fi



The ecological condition prior to dredging (left) and after dredging (above). The overall water flowrate in the East Lake has now increased significantly, the water quality and the visual effect of the water surface improved, and the quality of air in the surrounding residential zones enhanced.

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