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# CONSTRUCTION

JANUARY - FEBRUARY 2018



## Cover Story:

Installation of new pipeline in Thailand

## Features:

Construction of Singapore DTSS Phase 2 starts

New Champlain Bridge project in full swing

Liebherr launches various new machines

BIM Technology: Bentley

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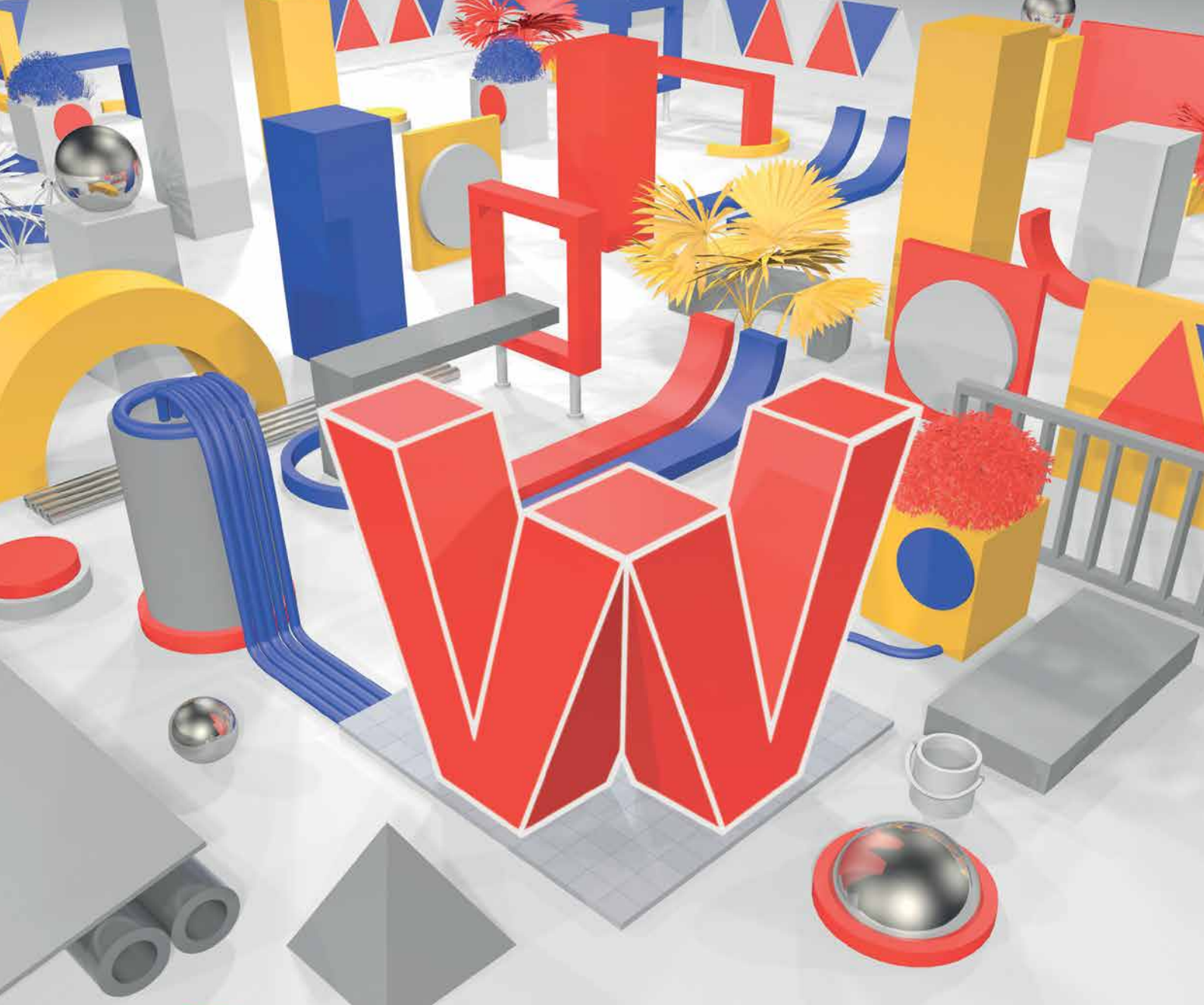
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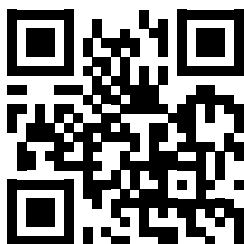
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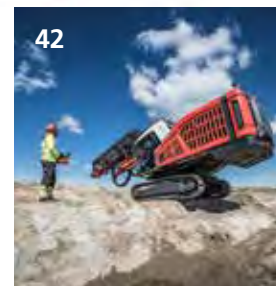
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## Hoiana set to transform central Vietnam

Hoiana is set to be Vietnam's first world-class integrated resort (IR), with the first phase scheduled to open in 2019. It will include a casino; Rosewood Hotels & Resorts, a 445-room hotel and 200 condominiums; and a golf course-country club. Recreational facilities will include a beach club and entertainment venue for live shows and events, watersports and dive centre, and a promenade packed with bars and restaurants.

Located in the south of Hoi An city, Quang Nam province, Hoiana is being developed at a cost of US\$4 billion by a joint-venture between VinaCapital, an investment management and real estate development firm in Vietnam, and Gold Yield Enterprises Ltd, a joint venture between the Suncity Group of Macau and a private investor from Hong Kong.

Over the next 10 to 15 years, Hoiana's masterplan will feature a host of tourism and leisure-related projects through subsequent development phases. The ultimate vision is a thriving township of hotels, residential and lifestyle zones, trendy beachfront village, convention centre, hospitality training college, water sports hub, and a giant lagoon for safe year-round swimming. It is estimated that Phase One will create 2,000 jobs for local residents. The developers have also committed to establishing a hospitality school that will train employees not only for Hoiana, but other tourism businesses in this growing region. ■



ABOVE AND LEFT: Located in Quang Nam province, Hoiana is set to be Vietnam's first world-class integrated resort, with the first phase scheduled to open in 2019.

## SMEC to play role in Trans-Asian Railway

SMEC has been commissioned to provide construction supervision consulting services for the construction of single line dual gauge railway track from Dohazari to Cox's Bazar via Ramu and Ramu to Gundum near Myanmar. This proposed rail line is the missing link of the Trans-Asian Railway (TAR) route connecting Bangladesh to the Myanmar border.

Construction of a rail line from Dohazari to Gundum has reportedly become a priority project for the Government of Bangladesh and needs to be implemented immediately to eliminate the bottleneck of the TAR route. This project will also

provide essential railway connectivity to the famous tourist spot Cox's Bazar, catering for more tourists and helping to improve the socio-economic condition for local residents.

SMEC's scope of work includes: contract management, administration and planning; technical support construction supervision, testing and inspection; and environmental, social and resettlement aspects. The company will work in joint venture with Canarail Consultants Inc, Canada; Systra, France and ACE Consultants Ltd, Bangladesh in association with sub-consultant Strategi Consulting Company Ltd, Bangladesh. ■

## ADB helps accelerate Philippines' flagship infrastructure projects

The Asian Development Bank (ADB) has approved a US\$100 million loan for the Infrastructure Preparation and Innovation Facility, which will support the Philippine government in accelerating the delivery of high quality public infrastructure projects under its ambitious 'Build, Build, Build' programme.

The facility will assist two key agencies - the Department of Transportation and the Department of Public Works and Highways - in preparing flagship infrastructure projects under the Build, Build, Build programme using international best practices. In all, it is estimated to spur US\$3.8 billion in public infrastructure investments in national roads, railways, bridges, flood control, ports and airports, which in turn will add as much as US\$10 billion to the country's gross domestic product (GDP) between 2019 and 2024.

The Build, Build, Build programme, the centrepiece of President Rodrigo Duterte's 10-point Socioeconomic Agenda,

aims to increase public investment and accelerate infrastructure delivery. Public spending on infrastructure is expected to reach 7.4 percent of GDP by 2022, up from 5.3 percent in 2017 and less than 3 percent from 2010-2016.

The new loan, along with the recently approved US\$5 million technical assistance grant, serves as a catalyst for the government's project management and monitoring system. It will strengthen the government's project facilitation and monitoring systems, reduce infrastructure bottlenecks, and help relevant agencies systematically monitor project progress and address operational issues at every stage of project planning, construction, and operation.

The total cost of the facility is US\$164.06 million, with the Government of the Philippines contributing US\$64.06 million. The project is expected to be completed in the second quarter of 2021. ■

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## HKA to support three-runway system at HK airport

HKA, a global provider of advisory, consulting and expert services, has entered into a five-year framework agreement with the Airport Authority Hong Kong to support the delivery of the new three-runway system.

The HK\$141.5 billion megaproject will expand Hong Kong International Airport from the current two-runway system into a three-runway system (3RS). The project includes reclamation of 650-ha of land, construction of a third 3.8 km runway, a new passenger concourse, expansion of the existing Terminal 2, provisional of a new 2.6 km automated people mover, a new, high-speed baggage handling system along with the construction of other associated airport support infrastructure and utilities. Upon completion of the 3RS, Hong Kong International Airport is expected to be able to serve 30 million additional passengers annually.

HKA will lead a consortium delivering best-in-class planning, programming, risk and building information modelling (BIM) expertise drawn from its own global pool of advisers and its specialist delivery partners: Equib (risk management), Logikal (project performance management), Waldeck (digital twin solutions), and BIMS Group (BIM technology).

“Our professional team of advisory specialists will be working under the direction of the Authority during the planning and programming phases, providing specialist risk management and



Hong Kong International Airport is expanding its current two-runway system into a three-runway system (3RS).

BIM implementation support for this world-scale, highly complex megaproject,” said Paul Roberts, HKA Partner.

HKA is a new global brand that unites the former Construction Claims & Consulting Group of Hill International and associated subsidiaries – Binnington Copeland & Associates, Cadogans, Hill-PCI Group, Knowles and McLachlan Lister – following its sale and demerger from Hill International. HKA has over 960 professionals in more than 40 offices across 21 countries worldwide. ■

## Samsung C&T wins first contract for Singapore’s North-South Corridor

Singapore’s Land Transport Authority (LTA) has awarded the first civil contract to design and construct a stretch of the North-South Corridor (NSC) to Samsung C&T, at a contract sum of S\$809 million.

Under the contract, Samsung C&T will design and construct a 1.25 km stretch of tunnels with two entry ramp tunnels and two exit ramp tunnels between Novena Rise and Toa Payoh Rise. Commuter facilities such as pedestrian overhead bridges, sheltered linkways, bus stops and cycling paths will also be built along this stretch as part of the contract.

Works for this stretch of the NSC are scheduled to commence in 2018. According to LTA, the civil contracts for the rest of the NSC’s tender packages are expected to be awarded in 2018/2019.

Samsung C&T has completed several major projects in Singapore, including the construction of North-South Line’s Marina South Pier Station, a 1.75 km stretch of the Marina Coastal Expressway as well as the Downtown Line 3’s Expo and Upper Changi Stations. The company is also currently involved in the construction of Xilin Station and tunnels as part of the Downtown Line Extension and the Caldecott and Marine Parade Stations as part of the Thomson-East Coast Line.

“It is an honour to have an opportunity to work with LTA again and to continue building upon our long-term relationship with them,” said Bruce Lee, head of civil infrastructure business unit at Samsung C&T.

The North-South Corridor is Singapore’s first integrated transport corridor featuring continuous bus lanes and at-grade cycling trunk routes, to serve public bus commuters, cyclists and pedestrians, in line with the country’s car-lite vision. The entire project is expected to be completed in 2026. ■



LTA has awarded the first civil contract to design and construct a stretch of the North-South Corridor to Samsung C&T.



Under the contract, Samsung C&T will design and construct a 1.25 km stretch of tunnels with two entry ramp tunnels and two exit ramp tunnels between Novena Rise and Toa Payoh Rise.



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## Keppel in JV for new residential projects in Bangkok

Keppel Land, through its wholly-owned subsidiaries Valicour Pte Ltd and Topalle Pte Ltd, has formed a joint venture with Thai property developer KPN Land Co Ltd to develop two condominiums projects in Bangkok. Construction for both developments is expected to commence around the third quarter of 2018.

The first project spans about 1,600 sq m and is located in a prime residential enclave along Sukhumvit Road on Sukhumvit soi 19. This new condominium will comprise approximately 140 homes in a 24-storey tower, with a net saleable area of about 8,000 sq m. The second project, spanning about 3,200 sq m, is located in a residential district along Sukhumvit Road on Sukhumvit soi 28, and

will be developed into a condominium that will yield about 265 units spread across approximately 30 floors, with a net saleable area of about 16,000 sq m.

“We continue to seek opportunities in the Bangkok real estate market and are confident of the potential of Thailand’s property market, especially in Bangkok, which is benefitting from increasing urbanisation, a growing middle class as well as improving infrastructure, all of which support the demand for quality lifestyle projects with strong attributes and value offerings located in Bangkok’s CBD,” said Ang Wee Gee, CEO of Keppel Land, a subsidiary of Keppel Corporation. ■

### Keppel to establish new unit for integrated master development

Keppel Corporation will establish a new business unit called Keppel Urban Solutions (KUS), which aims to be an end-to-end integrated master developer of smart, sustainable precincts in the Asia Pacific region. Its offerings will include masterplanning, the development and operation of efficient horizontal infrastructure such as smart utilities and district-level heating and cooling, connectivity and urban logistics, as well as innovative programming to create active and engaging communities.

KUS expects to leverage the Keppel Group’s more than two decades of experience as the master developer of large scale projects in Asia, including the China-Singapore Suzhou Industrial Park, Sino-Singapore Tianjin Eco-City, Sino-Singapore Jinan Smart City, as well as Keppel Bay in Singapore. According to Keppel, KUS will also enter into a strategic collaboration

with Microsoft to develop and provide modern smart urban applications using sensing technology and the Internet of Things (IoT) as well as to effectively manage infrastructure and community services in KUS’ projects.

KUS’ capabilities will first be applied in Saigon Sports City (SSC), a 64-ha township that Keppel Land is developing in the District 2 of Ho Chi Minh City, Vietnam. The development will include iconic features such as a waterfront boulevard, an open public plaza and Vietnam’s lifestyle hub with comprehensive facilities for sports, entertainment, shopping and dining. Biophilic design principles will be incorporated into the SSC, said Keppel, including natural lighting and ventilation, a linear park, vertical greenery and picturesque water features with natural filtration. ■

## Volvo EC210D goes to Nepal

The EC210D crawler excavator from Volvo Construction Equipment (Volvo CE) has been launched into Nepal, now available through the company’s local dealer Explore Earth Moving. According to Volvo CE, the machine is more powerful than its predecessor EC210B and also has up to 10 percent improved fuel economy.

“Nepal’s government is planning a series of road building and infrastructure developments; while the hydropower industry is a strong and fast-developing business sector. Contractors are looking for good quality and reliable equipment to help them meet increasingly tight construction schedules. With its 20-t rating, the Volvo EC210D is a versatile machine that is perfect for a range of applications, from construction and quarry work, through to hydropower projects and irrigation jobs,” said Peh Jing Peng, business director for Nepal at Volvo CE.

The Tier 3 Volvo engine of the EC210D is equipped with intelligent work modes, including the new G4 work mode. Operators can choose the best mode to suit the task at hand, selecting from I (Idle), F (Fine), G (General), H (Heavy) and P (Power max) mode. The machine features increased hydraulic flow for responsive, accurate control in grading and combined operations.

The EC210D is also designed for reduced fuel consumption and lower operating costs. The intelligent ECO mode contributes



The Volvo EC210D crawler excavator has recently been launched into Nepal.

to the machine’s total improved fuel efficiency – without any loss of performance. The design optimises flow and pressure while maintaining digging power and swing torque. ■

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# Atkins wins projects in Singapore and the Philippines

Atkins has been appointed by Singapore's Urban Redevelopment Authority (URA) to provide masterplanning and urban design services for Bayshore precinct, a 60 ha residential-led development in Singapore that is aimed to accommodate around 12,000 families. URA aspires for the new development to capitalise on the existing greenery and new strong public transport connections to the rest of Singapore. With Atkins' expertise in sustainable masterplanning and the implementation of a 'car-lite' strategy, the new living environment is expected to create a strong sense of community.

Atkins said the 'car-lite' strategy is central to the vision for Bayshore, where streets will support the progress of technology and in turn respond to changes in behaviours and expectations of the travelling public, such as the adoption of concepts like Connected Autonomous Vehicles, already under trial in areas of Singapore.

Other elements key to the Bayshore masterplan include integration of the two MRT stations currently under construction, one of which includes an integrated transport node; integration of open spaces, weaving blue and green networks through the dynamic and diverse community open spaces into the masterplan; and flexibility and adaptability to allow implementation of the masterplan to adjust over time.

## Philippines integrated resort

Atkins has also been commissioned to provide masterplan and full scope architectural design services for the expansion of Widus Hotel & Casino in Clark Freeport Zone, the Philippines. Upon completion, this integrated resort will cover an area of 170,000 sq m - approximately four times its current size.

The extension will include a new casino, a hotel tower, retail, dining and a waterpark. At the heart of the development will be the main gaming area, designed to attract guests from around the property due to its ease of access from areas such as the grand entrance, hotels and the new retail areas.

"One of the key challenges we faced was to integrate the extension seamlessly with the existing facilities of Widus Hotel & Casino. To address the challenge, our team carefully created a masterplan with optimised accessibility and connectivity throughout the property. A sophisticated yet intuitive pedestrian network ensures that guests can easily reach the main gaming



Atkins will provide masterplanning and urban design services for Bayshore precinct in Singapore, a 60 ha residential-led development that will house around 12,000 families.



Atkins will also provide masterplan and full scope architectural design services for the expansion of the Widus Hotel & Casino in the Philippines.

areas, or any facility on the property, from all directions," explained Ian Milne, Atkins' senior design director.

According to Atkins, sustainability is a major focus of the integrated resort, which will set high standards in energy efficiency due to its careful orientation of the tower and the innovative design of facade sunshades. It is also intended that energy will be generated from the large array of photovoltaic panels on the casino roof. ■

## Vinci boosts construction operations in Australia

Vinci Construction has finalised its acquisition of Seymour Whyte company based in Queensland, Australia. In addition to that of HEB Construction in New Zealand in 2015, this latest move strengthens Vinci Construction's operations in the Pacific area, where it generated 2016 revenue of €549 million, employs 2,000 people and delivers wide-ranging expertise in the highway construction, civil engineering, soil reinforcement and oil & gas sectors.

"Seymour Whyte is a company that resembles us, with a strong entrepreneurial culture. This acquisition will enable us to expand synergies with Vinci Construction's existing expertise in Australia and more broadly in the Pacific area," said Jérôme Stubler, chairman of Vinci Construction.

Seymour Whyte employs 475 people and generated revenue

of A\$433360 million in the fiscal year ended on 30 June 2017. Founded in 1987, the company operates in the fields of civil engineering, earthworks and utilities, notably for the construction of roads, bridges and water and pipeline infrastructure.

Seymour Whyte is made up of two entities: Seymour Whyte Constructions and Rob Carr Pty Ltd. Over the past decade, Seymour Whyte Constructions has completed more than 80 infrastructure projects in Queensland and New South Wales, including modernisation of the Ipswich motorway, the access roads to the Sydney airport and, more recently, renovation of a section of the Bruce Highway motorway. Rob Carr Pty Ltd is one of Australia's leading water and pipeline infrastructure companies, specialising in microtunnelling and directional drilling. ■

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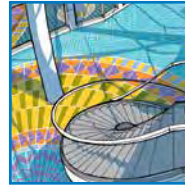
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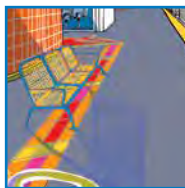
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## Work on Toyota Mega Solar Power Plant starts

Pacifico Energy has begun the construction of a 62 MW solar power plant in Toyota City, Aichi Prefecture, Japan. Built on mountain land, the new Toyota Mega Solar Power Plant is expected to start its operation in December 2019, following a 26-month construction period. Once commissioned, it will generate approximately 74 million kWh of electricity annually, contributing to an annual reduction of approximately 40,000 t of CO<sub>2</sub> emissions.

According to Pacifico Energy, Chubu Electric Power will purchase all electricity generated by the plant. Chiyoda Corporation will be providing EPC (engineering, procurement and construction) services.

Pacifico Energy has already completed construction of two solar power plants in Okayama (in Kumenan and Mimasaka) and one solar power plant in Furukawa, Miyagi, totalling 130 MW - all of which are now in commercial operation. With the start of the Toyota project, Pacifico Energy is currently constructing over 450 MW of solar power plants, including a 96 MW plant in Miyazaki (construction started in March 2015), a 257 MW plant



An artist's impression of Toyota Mega Solar Power Plant.

in Okayama (construction started in April 2017), and a 42 MW plant in Fukushima (construction started in September 2017). ■

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## BASF and Dong-Il CNE partner for polyurethane composite applications

BASF and Dong-Il CNE have signed a Memorandum of Understanding (MoU) to develop lightweight utility poles and oil and gas pipes, as well as other solutions for advanced infrastructure. As the initial project of the partnership, Dong-Il CNE will provide its manufacturing expertise to produce BASF branded utility poles made with BASF's Elastolit polyurethane (PU). The partners will also explore other lightweight applications to meet the growing demand for stronger, lighter composite products for the building and infrastructure industries.

"We are delighted to partner with Dong-Il CNE to identify new opportunities and tap into the global composites market, which is estimated to reach almost US\$40 billion by 2021," said Andy Postlethwaite, senior vice president for Performance Materials Asia Pacific at BASF. "Our ultra-light utility poles will help provide uninterrupted electricity to cities across Asia, especially in areas that are prone to severe weather conditions, such as Philippines, Indonesia, Malaysia, Korea, Japan and Australia."

Under the agreement, BASF and Dong-Il CNE will also explore several new technologies including PU pultrusion, PU with carbon fibre filament winding, as well as oil and gas pipes with a PU filament winding process.

"By combining BASF's broad competencies in composite materials and technologies with our integrated manufacturing capabilities, our partnership will create new material applications that will help address urban infrastructure challenges brought by population increases across Asia," said Choi Young Ki, president



BASF and Dong-Il CNE sign an MoU to develop lightweight utility poles and oil and gas pipes, as well as other solutions for advanced infrastructure.

of Dong-Il CNE. The company has extensive manufacturing experience in the high-performance composite material business in Asia, covering automotive, shipbuilding, building and civil engineering construction industries, as well as in the chemical industry.

Utility poles made with PU and enabled by BASF's filament winding technology, are lightweight and robust yet flexible. The poles can withstand severe weather conditions such as typhoons and can be optimised for specific conditions. In addition, they weigh less and are yet more durable and resilient than the concrete poles they replace. ■

## Gammon awarded contract for new hotel in Hong Kong

Gammon Construction has been awarded a contract worth over HK\$1 billion by Parkland (Hong Kong) Limited, for the development of The Fullerton Ocean Park Hotel Hong Kong. It will incorporate two 10-storey blocks on a three-level podium in Tai Shue Wan.

The project will also include site formation and piling works. Commenced in September 2017, it is expected to be completed in 2021. According to Gammon, a workforce of 700 will be engaged at the peak construction period. ■

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## Surbana Jurong to work on housing project in China

Surbana Jurong has secured a contract to provide full-suite design services for a housing project in Baoshan city, Yunnan province, China. Awarded by the local Baoshan government, it includes 26 blocks of over 2,000 housing units, a multi-storey carpark, a kindergarten and a neighbourhood centre.

Covering a total site area of 418,000 sq m, the project is expected to be completed in three years. Surbana Jurong will provide architectural, civil & structural engineering, mechanical and electrical engineering, landscape design, civil defence shelter design as well as site coordination services.

According to Surbana Jurong, the project will feature a community-centric design, with spaces for residents' interactions and accessible amenities and services. At the same time, it will be planned with sustainability in mind, for example, by greening the roof of the multi-storey carpark.

"This township project is Baoshan's commitment to create a beautiful and sustainable city in this Southwestern region of the Belt Road Initiative," said Baoshan city's vice mayor Geng Mei. "Our partnership with Surbana Jurong, a global company with proven track record in creating sustainable township, will ensure this project will be a success."

"China will face increasing demand for affordable, quality housing, like many rapidly urbanising cities around the world," said



Surbana Jurong has won a contract to provide full-suite design services for a housing project in Baoshan city, China, which includes 26 blocks of over 2,000 housing units, a multi-storey carpark, a kindergarten and a neighbourhood centre.

Wong Heang Fine, group CEO of Surbana Jurong. "This project will showcase how local governments can partner Surbana Jurong to create sustainable township and positively shape the lives of its people and the community." ■

## Yale-NUS and Surbana Jurong sign MoU on smart city solutions

Yale-NUS College and Surbana Jurong (SJ) have signed a Memorandum of Understanding (MoU) to collaborate in testbedding the next generation of smart city solutions within the College campus in Singapore. Both parties will use their respective resources and expertise to co-develop a digital masterplan for 'Smart City in a Campus', an initiative by Yale-NUS, in a variety of ways:

Firstly, in knowledge sharing to co-create solutions, Yale-NUS students, staff and faculty members will share their feedback and experience on using SJ's smart facilities management solutions, and explore the use of artificial intelligence in Yale-NUS' upcoming mobile app, to allow users to conveniently submit feedback or report defects.

Secondly, in test-bedding and refining technology innovations, SJ will deploy and test its smart city solutions such as a predictive lift monitoring system at the campus to enhance the residential living facilities and built environment of the College. Yale-NUS faculty and students will play an active role in improving and refining the prototypes alongside SJ via user testing and feedback and faculty expertise in collating and analysing data findings from the project.

Lastly, in training of students, SJ and Yale-NUS will explore various collaboration channels (e.g. internships, job attachments and lectures) to educate Yale-NUS students and equip them with the relevant skills on smart city solutions.

These initiatives are aimed at enriching Yale-NUS' residential living and learning model, which provides an ideal environment to test-bed SJ's technology solutions. Currently housing more



FROM LEFT: Teo Say Hong, group director, Strategy M&A and Integration, Surbana Jurong; Poon Joe Keen, managing director (Smart City Solutions), Surbana Jurong; Dr Koh Poh Koon, Senior Minister of State for Trade and Industry; Professor Tan Tai Yong, president of Yale-NUS College; Professor Lam Khee Poh, dean of School of Design and Environment, NUS; and Kristen Lynas, executive VP (Administration), Yale-NUS College.

than 800 residents, the 64,000 sq m Yale-NUS campus consists of three residential colleges (RCs), 1,000 student rooms, seminar rooms, laboratories, a library and a performance hall among other facilities. With students staying in suites of four to six people within three RCs, Yale-NUS is a microcosm of a small town, allowing SJ to test their solutions accurately in a real-life environment. The College's close-knit community will also facilitate the collection of data and feedback that will enable SJ to improve their smart city solutions. ■

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## New dealers for Grove cranes in Vietnam and Hong Kong

Manitowoc has appointed two new dealers for its Grove cranes in Asia, Rainbow Ace Ltd in Hong Kong and Tuyet Nga Co Ltd (TNC) in Hanoi, Vietnam. Both will sell the full line of Grove all-terrain, rough-terrain and truck cranes and offer comprehensive Manitowoc Crane Care customer support.

Rainbow Ace was established 25 years ago, and the company already sells and supports a number of construction equipment brands to serve sectors such as road building and general construction. "There is a healthy population of Groves in Hong Kong that are performing well but which will benefit from on-the-ground support," said Chow Kwok Kei, general manager of Rainbow Ace.

Mr Chow said the Grove cranes feature a compact design with excellent capabilities and innovative technologies, such as the Megatrak suspension system. "This will appeal to Hong Kong companies who often need to work in congested spaces but still require powerful lifting support."

TNC, based in Hanoi, Vietnam, is another well-established and experienced



ABOVE (FROM LEFT): Wee Peng Chai, Manitowoc; Rhodes Chow, Rainbow Ace; Chow Kwok Kei, Rainbow Ace; and Leonard Siow, Manitowoc.



ABOVE RIGHT: The sales team at Tuyet Nga Co Ltd (TNC) based in Hanoi, Vietnam.

equipment reseller with a host of brands in its current portfolio. With more than 20 years of experience, the company's staff includes a crew of 30 technicians with deep knowledge of industrial equipment.

Tran Kim Dzung, general director of TNC, said the company expects to supply

cranes to several growing business sectors, such as construction, oil and gas, mining and power generation. "We chose to partner with Grove because its product range offers a multitude of technical options for customers that allow us to offer the right crane for customer needs," she said. ■

## Potain Hup 32-27 cranes arrive in Southeast Asia

Manitowoc recently organised some events to celebrate the first arrivals of its Potain Hup 32-27 self-erecting cranes in the Southeast Asia region.

In Malaysia, Potain dealer IFT helped stage an open house at the offices of its customer, Sunway, in Kuala Lumpur. The Potain Hup 32-27 on display was purchased by Potain customer, Selangor-based HAB Construction.

"The Hup's height is perfect for the projects we work on, like shopping malls and car parks. We consider it to be like a mini tower crane. Its speed and ease of use are impressive, and the fact that it's easy to transport is a huge bonus, too," said Ong Tien Ling, executive director of HAB Construction.

The Hup 32-27 will be working for the next 12 months on the new DoubleTree by Hilton hotel in I-City, Selangor. The development includes a three-storey car park, an office tower, a hotel and two residential buildings. The crane will hoist formwork and rebar and help with concreting before one of the company's MCR 225 A cranes is brought in to work on construction of the tower.

In Thailand, Manitowoc staged an event in partnership with SB Siam, the exclusive dealer for Potain cranes in the country. The event took place at the local offices of construction



company Christiani & Nielsen, which purchased the first Hup 32-27 in Thailand.

Christiani & Nielsen set the crane to work immediately after the launch event, sending it to a project in Khon Kaen, in the northeast of the country. It will be working at a factory for the next two years lifting steelwork, cement and formwork, with loads ranging from 1 to 2 t.

"We decided on the Hup 32-27 because it's a better and more cost-efficient alternative to a mobile crane. We

would need four mobile cranes to lift what we can with this one crane. With its reach and height, it can stay in one place to do all the jobs on the site. It's also quick to erect and easy to control," said Som Puangmalai, senior manager for equipment and steelwork at Christiani & Nielsen.

The Potain Hup 32-27 has a maximum capacity of 4 t, and a 1 t capacity at its jib end of 32 m. The machine is versatile, designed with an array of options for adjusting the height and reach, making it suitable for a wide range of applications and projects. Several jib configurations are available, which offer horizontal reaches of 11.1 m, 23.3 m or the 32 m maximum. It is also possible to raise the jib at 10°, 20° or 30°, along with a telescopic mast. Maximum height under hook for the crane is 40 m. ■

## iMax Modular introduces expandable prefab homes

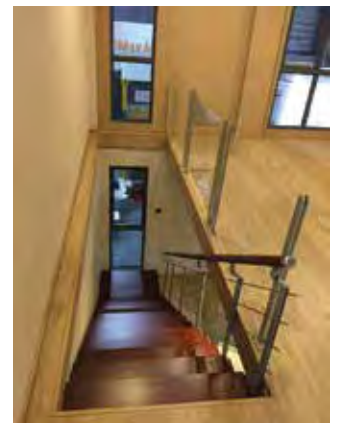
Singapore-based company iMax Modular Pte Ltd recently introduced its Solitaire and PopUp modular homes at the BuildTech Asia 2017 exhibition, designed to meet the rising demand for affordable and quality housing that can be delivered quickly. These 20-ft long modular homes come with an innovative connection system, which enables them to expand into bigger living spaces, and are designed to maximise the use of its internal space.

The Solitaire home can transform from a single unit into a double unit apartment by revolving its inner unit sideways while the PopUp home can be raised upwards to form a double storey apartment. High quality control is achieved as the building modules are prefabricated and fully fitted with internal finishes and fixtures in a Singapore factory before they are transported to site.

Desmond Poh, managing director of iMax Modular Pte Ltd said, "We are committed to make a difference to the future of construction by developing new practical solutions to achieve quality living at a low cost and in the shortest possible amount of time. Innovations such as Solitaire and PopUp are highly mobile and can be easily relocated and deployed to any part of the world. They can also be used to create villages, townships and precincts faster than any other construction system in the world."

The Solitaire technology is developed with engineering consultant Arup and designer Pod Structures Pte Ltd. They are suitable for social housing projects, army camps and emergency deployments for homes destroyed by disasters. The Solitaire modules can also be used as temporary living spaces and facilities for events such as the World Cup, Olympics and other festivals. The PopUp homes are also ready for instant occupation and fills the demand for proper and affordable housing.

Besides the Solitaire and PopUp homes, iMax Modular has also designed and supplied other modular systems that can significantly improve the efficiency of logistics and installation works on site. Schools, hostels, dormitories, hotels and nursing homes can be rapidly constructed with its modular construction technology. This includes a steel prefabricated prefinished volumetric construction system where the top and bottom building modules are connected using a Candle-Loc fastening connection system, and has been adopted for a dormitory in Tuas, Singapore. ■



TOP, ABOVE LEFT AND ABOVE RIGHT: The Solitaire and PopUp homes come with an innovative connection system, which enables them to expand into bigger living spaces, and are designed to maximise the use of its internal space. These modular homes were showcased for the first time at the 2017 BuildTech Asia exhibition in Singapore.

## CapitaLand to develop new residential project in Ho Chi Minh City

CapitaLand has acquired a new 1.45-ha site in District 4, Ho Chi Minh City (HCMC), Vietnam, which will be developed into an 870-unit residence with a retail component at a total value of US\$177 million. Located close to Districts 1 and 7, the new development will comprise three 24-storey towers – two single blocks and one triple block - as well as retail units on the lower floors. The average size of the apartments will be around 79 sq m. Residents at the new development will also be able to enjoy panoramic views of the Saigon River and city skyline.

The latest acquisition will expand CapitaLand's portfolio to 11 residential developments, 21 serviced residences with around 4,700 units and one international Grade A office development across six cities in Vietnam. According to CapitaLand, Vietnam is the third largest market for the company in Southeast Asia, after Singapore and Malaysia. ■



An artist's impression of the new 870-unit residential development in District 4, HCMC, Vietnam.

## Skyjack expands Australian facility

Skyjack has expanded its Australian office in New South Wales. The company said that increased market share in both Australia and New Zealand has been a driving force behind the expansion since its market entry over six years ago. The new facility encompasses 3,500 sq m of internal space and measures five times larger than the previous location.

“With our expanded workspace and a significantly larger parts department we can stock more machines and more parts,” said Jason Cranmer, Skyjack’s sales and operations director. “This means that customers have easier access to the products they need, with limited wait time. The additional space also allows for an easier flow through of machines, which increases our efficiency.”

The new facility can store all the machines indoors and is equipped with an eco-friendly wash bay that uses recycled water. It also incorporates the 5S system found in all Skyjack locations, and is designed to reduce waste and optimise productivity through maintaining an orderly workplace and using visual cues to achieve consistent results. ■



ABOVE AND LEFT: Skyjack’s newly expanded Australian office in NSW encompasses 3,500 sq m of internal space and measures five times larger than the previous location.

### New Skyjack order in the Middle East



Abu Dhabi-based rental company Safelift LLC recently added a number of Skyjack aerial platforms to its lineup. The order has been delivered to the company’s new facility in Al Quoz, Dubai.

According to Safelift, this is the first significant investment in a new fleet for the company. “We selected Skyjack because they produce a range of strong and robust products, which are ideal for the region,” said Wayne Taylor, managing director of Safelift. “The recent order encompassed SJ66 T straight booms, SJ46 AJ, SJ63 AJ,

and the recently launched SJ85 AJ articulated booms, and a range of DC electric scissors. (They) offer a good list of features, including the latest technology in secondary guarding that some of our customers are now requesting as standard.”

Skyjack’s new SJ85 AJ provides a raised platform of 25.91 m, combined with a 17.07 m reach. This unit offers the flexibility of an articulating boom and the speed of a straight boom with SpeedyReach versatility, allowing the operator to cycle between maximum platform height and ground level without lowering the riser section. For excellent traction, Skyjack booms come equipped with an axle-based 4WD system and selectable rear differential lock, while EasyDrive direction sensing drive and steer controls eliminate operator confusion when rotating the machine. ■

## Arup secures contract for major hospital projects in Hong Kong

Arup has been appointed by the Hong Kong Hospital Authority to provide project management consultancy services for two major hospital developments – the New Acute Hospital (NAH) and the redevelopment of the Prince of Wales Hospital (PWH).

These are said to be the two largest projects under the Hong Kong government’s 10-year Hospital Development Plan to cope with the growing and ageing population. Arup will lead and manage the projects from planning to execution while aligning all stakeholders with the programme vision and requirements.

The NAH, to be built in the Kai Tak Development Area with a construction floor area (CFA) of 500,000 sq m, is set to be the largest hospital in Hong Kong. This eight-year project includes five buildings, delivering a comprehensive range of acute secondary and tertiary hospital services, with modern service models incorporating advanced technology and facilities. The hospital will house 2,400 beds, 32 operating theatres, a designated trauma

centre, providing accident and emergency, clinical, ambulatory and rehabilitation services. The facilities will also include a community health centre, helipad, public waterfront promenade with link bridges and subways.

The PWH redevelopment will group the currently scattered clinical services to enhance accessibility while providing additional space for operational needs and service developments. A regional acute hospital, PWH provides a wide range of secondary and tertiary services for the residents in the New Territories East Cluster as well as highly specialised quaternary services for patients from other areas. It is also the teaching hospital for the Faculty of Medicine, the Chinese University of Hong Kong. The entire redevelopment will comprise 1,650 in-patient and day beds in a CFA of 140,750 sq m. Arup will be delivering the In-patient Extension Block with 1,200 beds to be built in 10 years. ■

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## LiuGong buys into piling foundation business

LiuGong has completed the acquisition of 51 percent shares (totalling RMB 546 million) in Shanghai Jintai Engineering Machinery Co Ltd, which was formerly held by Liugong Group, the parent company of LiuGong. The deal can be traced back to the May of 2011 when LiuGong Group signed a strategic cooperation agreement with Shanghai Mechanical and Electrical Industry Co Ltd and Shanghai Electric International Economic & Trading Co Ltd, the two subsidiaries of Shanghai Electric (Group) Corp and bought in a 51 percent share of Shanghai Jintai Engineering Machinery Co Ltd.

Jintai manufactures a wide range of machines for the piling foundation industry, and is also considered a pioneer in R & D and sales of underground hydraulic diaphragm wall grabs and rotary drilling rigs in China. The company has developed a full line of piling machinery, comprising 16 series of more than 70 models. Its products are widely used in the construction of railways, subways, highways, bridges, dams and harbours.

The underground hydraulic diaphragm wall grabs, rotary drilling rigs, engineering drilling rigs and multi-axis drilling machines are among Jintai's core products. The company has reportedly ranked No.1 for many years in the domestic sales of its SG series of underground hydraulic diaphragm wall grab, and its self-developed products of double wheel mixing drillers (SC-series) and double wheel milling machines (SX-series) have filled the industry gaps in China with world-class performance.

This latest acquisition allows LiuGong to add piling machines to its product portfolio. LiuGong will participate in the R&D,



Jintai manufactures a wide range of machines for the piling foundation industry.

manufacture, sales and services of the piling machines to further enhance its commitment of providing comprehensive equipment, in order to meet its customers' various application needs around the world. Likewise, through LiuGong's global business network and customer resources, Jintai will have a large leap at its global sales and thus the collaboration will improve the profitability for both companies. ■

## Kryton acquires Cementec Industries

Vancouver-based Kryton International, which specialises in crystalline concrete waterproofing, has acquired Calgary-based Cementec Industries, a manufacturer of concrete additive solutions for the construction and oil & gas industries.

Cementec has developed Hard-Cem, the integral concrete hardening admixture that provides concrete with excellent resistance to abrasion and erosion. With this admixture, concrete floors and infrastructure are said to last up to six times longer than untreated concrete. Cementec also manufactures Silica Fume products that are used to densify and strengthen concrete. These can be used in conjunction with the Krystol Internal Membrane (KIM) system from Kryton to provide Smart Concrete solutions that will save time while providing durability.

The concrete solutions from Cementec "increase infrastructure's service life and eliminate exposure to harmful dust," said Kari Yuers, CEO of Kryton. "Hard-Cem removes quality control issues and provides increased design flexibility."

"Hard-Cem and Silica Fume will extend our product offerings in integral concrete durability, erosion and abrasion protection. We intend to be a go-to solutions provider to an industry that is increasingly concerned about protecting and extending the lifespan of concrete structures," added Kevin Yuers, VP of product development at Kryton.

"This is a perfect match of expertise and a shared mission in providing unique solutions, exemplary customer service and market leadership," said Farid Remtulla, president of Cementec. "Kryton will offer global exposure for Cementec products." ■

## Vancouver's new iconic residential project



An artist's impression of Joyce residential tower, scheduled for completion in mid 2020.

Canada-based developer Westbank has unveiled its new iconic residential project in Vancouver, named 'Joyce'. It is located in the heart of the Joyce-Collingwood neighbourhood, close to the Joyce-Collingwood SkyTrain Station. Designed by Henriquez Partners Architects, the development will provide 256 apartments and is expected to be completed in mid 2020. ■

# Hyundai Construction Equipment opens European HQ

Hyundai Construction Equipment (HCE) has completed its new European headquarters in Tessenderlo, Belgium, strengthening the company's presence in the European market. According to HCE, this follows its strong performance including securing the second place in the domestic market in terms of numbers of excavators sold for the first half of 2017, and a 30 percent increase in sales in the emerging markets over the comparable period in 2016.

HCE posted 89.2 billion won in sales in the first quarter of 2017, and 97.9 billion won in the second quarter for the European market. With this, HCE said its annual sales for the market might reach about 380 billion won, 10 percent up from 2016.

Macroeconomic factors are also favourable, said HCE, as European Central Bank recently revised up euro area GDP growth rate of 2017 to 2.2 percent from 1.9 percent, and maintained its growth projection of 2018 and 2019 as 1.8 percent and 1.7 percent respectively. Under the circumstance, HCE plans to accelerate efforts to raise its brand recognition in the regional market by implementing various training programmes for dealers and customers, and also community activities.

The new headquarters consists of a large parts logistics centre, an office building, a demonstration area and a training facility. Moreover, with two-folded parts supply capacity compared to the previous headquarters, HCE expects sales increase in parts



HCE's new European headquarters in Tessenderlo, Belgium.

including lubricants. "We see now the completion of the new European headquarters will work as catalyst for strengthening our presence in the European Market. We will exert our utmost efforts to rank global Top 5 by 2023 with the global annual sales of 7 trillion won," said Ki-young Kong, president and CEO of HCE. ■



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Date	Events in Asia	Organiser & Contact
14 to 18 Mar 2018	Worldbex 2018 World Trade Centre Metro Manila Manila The Philippines	Worldbex Services International Tel: +632 656 9239, Fax: +632 477 1899 Email: info.worldbex@gmail.com Website: www.worldbex.com
15 to 18 Mar 2018	Megabuild 2018 Jakarta Convention Centre Jakarta Indonesia	PT. Reed Panorama Exhibitions Tel: +62 2556 5000 Email: steven.chwee@reedpanorama.com Website: www.megabuild.co.id
27 to 29 Mar 2018	Ecobuild Southeast Asia 2018 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	United Business Media (M) Tel: +603 2176 8788, Fax: +603 2164 8786 Email: ecobuild-sea@ubm.com Website: www.ecobuildsea.com
7 to 8 May 2018	Trenchless Asia 2018 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	Westrade Group Tel: +44 845 094 8066, Fax: +44 870 429 9275 Email: pharwood@westrade.co.uk Website: www.trenchlessasia.com
9 to 11 May 2018	Build4Asia 2018 Hong Kong Convention & Exhibition Centre Hong Kong	UBM HKES Tel: +852 2827 6211 Email: exhibit@build4asia.com Website: https://build4asia.com
7 to 9 Jun 2018	Laobuild 2018 National Convention Centre Vientiane Laos	AMB Tarsus Events Group Tel: +603 2692 6888 Email: rina@ambtarsus.com Website: www.laobuild.com
6 to 8 Sept 2018	Intermat ASEAN 2018 Impact Exhibition & Convention Centre Bangkok Thailand	Impact Exhibition Management Tel: +662 833 5315 Email: info@asean.intermatconstruction.com Website: www.asean.intermatconstruction.com
6 to 8 Sept 2018	Concrete Asia 2018 Impact Exhibition & Convention Centre Bangkok Thailand	Impact Exhibition Management Tel: +662 833 5315 Email: info@asean.intermatconstruction.com Website: www.concrete-asia.com
19 to 21 Sept 2018	Concrete Show Southeast Asia 2018 Jakarta International Expo Kemayoran, Jakarta Indonesia	PT. UBM Pameran Niaga Indonesia Tel: +62 21 2930 5959, Fax: +62 21 2930 5960 Email: niekke.budiman@ubm.com Website: www.concreteshowseasia.com
27 to 30 Nov 2018	Bauma China 2018 Shanghai New International Expo Centre Shanghai China	Messe München Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bauma-china.com Website: www.bauma-china.com
Date	Events outside Asia	Organiser & Contact
23 to 26 Jan 2018	World of Concrete 2018 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6379 Email: info@worldofconcrete.com Website: www.worldofconcrete.com
23 to 28 Apr 2018	Intermat 2018 Paris Nord Villepinte Paris France	Comexposium Email: communication@intermatconstruction.com Website: https://paris-en.intermatconstruction.com
8 to 14 Apr 2019	Bauma 2019 Munich Trade Fair Centre Munich Germany	Messe München Tel: +49 89 949 11348, Fax: +49 89 949 11349 Email: info@bauma.de Website: www.bauma.de
10 to 14 Mar 2020	Conexpo-Con/Agg 2020 Las Vegas Convention Centre Las Vegas, Nevada USA	Association of Equipment Manufacturers Tel: +1 414 298 4167, Fax: +1 414 272 2672 Email: international@conexpoconagg.com Website: www.conexpoconagg.com

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## BuildTech Asia 2017 ‘sets new attendance record’

A key anchor event of the Singapore Construction Productivity Week (SCPW), BuildTech Asia 2017 welcomed some 11,000 professionals, technology experts and distributors from the built environment sector. The trade show, which concluded on 26 October 2017, has set a record number of visitors and international participation, according to the show organiser Sphere Exhibits.

Hosted by the Building and Construction Authority (BCA), BuildTech Asia 2017 featured a variety of cutting edge technologies and solutions for the Asian market. Over 130 exhibitors showcased virtual reality, drones, smart solutions and other productive technologies apart from staple exhibits such as construction machinery, equipment, building materials, architectural solutions, and quality finishes.

At the SCPW opening ceremony, the government also launched a Construction Industry Transformation Map (ITM) for the built environment sector. Recognising major global trends that impact the sector such as digital revolution, rapid urbanisation and climate change, the ITM identified Integrated Digital Delivery (IDD), Design for Manufacturing and Assembly (DfMA) and green building as key transformation areas to address the challenges faced by the sector.

Hugh Lim, CEO of BCA, said that the transformation process will lead to greater investment in capability building and more collaboration amongst firms to capture new business opportunities. It will also attract more Singaporeans to join the sector as a more technologically advanced workforce is needed.

The inaugural SMART Women in Built Environment Conference held alongside BuildTech Asia was attended by more than 100 industry professionals. Organised by the Prestressed and Precast Concrete Society, Structural Engineering World Congress and Sphere Exhibits Pte Ltd, the conference provided a perspective on the current progression and empowerment of women professionals in the built environment sector in the region.

A new Built Environment Summit organised by the Singapore Contractors Association Ltd (SCAL) was also held in conjunction with BuildTech Asia. In addition, more than 30 local and overseas trade mission groups visited BuildTech Asia and fostered business alliances through networking events. The trade show also seeded new partnerships in the region with European markets that were interested to explore more integrated business opportunities.

The Singapore Public Sector Built Environment Leadership Pavilion showcased 10 public agencies in Singapore that have applied smart solutions and productive technologies in their projects. Visitors also witnessed a live demonstration of constructing building services with prefabricated Mechanical, Electrical and Plumbing (MEP) modules at the new Productivity Technology (ProTech) Demonstration.

Furthermore, innovations by 10 finalists of the second SCAL Productivity and Innovation Awards (PIA) were showcased for public voting at the BuildTech Asia. The PIA is an industry initiative to raise productivity in the construction sector through a ground-up approach for innovative ideas. The three winning innovations included: a moveable lifting frame wall formwork from Koh Brothers Building and Civil Engineering Contractor (Pte) Ltd (Gold); a reinforced concrete pile handler machine from CS Construction & Geotechnic Pte Ltd (Silver); and an easy safe adjustable riser platform from Straits Construction Singapore Pte Ltd (Bronze). ■

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



ALL IMAGES:  
Scenes from  
BuildTech Asia  
and Singapore  
Construction  
Productivity  
Week 2017.

## Intermat ASEAN and Concrete Asia team up

Intermat ASEAN and Concrete Asia 2018 will be held together from 6 to 8 September 2018 at the Impact Exhibition and Convention Centre in Bangkok, Thailand. The event is aimed to create a comprehensive platform for the construction, infrastructure and concrete industry in Southeast Asia. This collaboration follows the recent acquisition of Concrete Asia by Comexposium, the Intermat show organiser.

Concrete Asia is an international trade exhibition and conference serving the concrete and construction industry in the Asia region, which takes place in Bangkok. Comexposium will now co-organise the event with Impact Exhibition Management Co Ltd, a premium venue and leading exhibition organiser in Thailand.

In June 2017, Comexposium and Impact had also jointly organised the first edition of Intermat ASEAN in Bangkok - which is the extension of Intermat Paris - to cater to the emerging building and construction needs of Southeast Asia. Intermat ASEAN is supported by the Thai Contractors' Association.

The acquisition of Concrete Asia further extends Comexposium's presence in and product offering to service the ASEAN construction market. "A partnership was formed with Comexposium to broaden and strengthen Concrete Asia's position in the ASEAN region," said Loy Joon How, general manager of Impact Exhibition Management. "This new collaboration with Comexposium is geared to better support the needs of the concrete industry across ASEAN, as they go through the next decade of exciting transformation."

Isabelle Alfano, Comexposium's construction business unit director added, "We are strongly confident that by co-locating Intermat ASEAN and Concrete Asia in 2018, we would leverage synergies and enhance the value for the regional and local buyers



Intermat ASEAN was first launched in June 2017 in Bangkok, Thailand. The second edition of the show will be held from 6 to 8 September 2018, together with Concrete Asia.

and visitors to attend the events."

"Comexposium is excited to co-operate once more with Impact to better serve the growing needs of Southeast Asian building and construction stakeholders. The ASEAN markets are not only an attractive FDI destination underpinned by mid- to large-sized economies such as Thailand and Indonesia, they are a key destination for China's One Belt One Road policy. These trends bode well for the future building and infrastructure development in ASEAN," commented Paul Lee, Comexposium's CEO for Asia Pacific. ■

Website: [asean.intermatconstruction.com/](http://asean.intermatconstruction.com/) [www.concrete-asia.com](http://www.concrete-asia.com)

## bauma China to return in November 2018

The next bauma China is set to take place from 27 to 30 November 2018 at the Shanghai New International Expo Centre (SNIEC). Taking up 300,000 sq m of exhibition space, it is deemed the biggest construction industry trade show in Asia and is held every two years.

Growing infrastructure and mining activities have led to a noticeable increase in demand and an improved order situation in the Chinese construction machinery segment, said Messe München, the show organiser. The sector had been in a recession for five years. The Chinese construction machinery segment has been rapidly recovering since September 2016 and was forecast to reach peak levels in the first half of 2017, according to Messe München.

Maritta Lepp, Messe München's project manager for bauma China added, "Similar to the upswing in the Chinese economy, we are seeing positive signs for the upcoming bauma China 2018." Among other factors, the Chinese government has reportedly played a role in the industry's upturn by promoting the public-private partnership (PPP) model. This scheme encourages construction projects by private investors, which is beneficial for the Chinese population and has a positive impact on the demand for cement pumps, excavators and cranes. Some machines are said to be highly sought-after, and thus manufacturers have to add extra shifts to cover the demand.



The next bauma China is set to take place from 27 to 30 November 2018.

Despite the economic slowdown in China in the past years and the atmosphere of change in the industry, bauma China 2016 attracted more than 170,000 visitors from 49 countries and regions, along with 2,953 exhibitors from 41 countries and regions. Since its first event in 2002, the trade show has continued to evolve and has consistently expanded its leading role in Asia. ■

Website: [www.bauma-china.com](http://www.bauma-china.com)

# New IPAF Council established in Hong Kong

A council of representatives and experts from across the powered access industry has applied to the International Powered Access Federation (IPAF) Board for recognition as the official IPAF administrative region council for Hong Kong.

Nine experts from across the industry will sit on the newly formed IPAF administrative region council for Hong Kong, which will be chaired by Tony Small, director of Gammon Construction Ltd. The other members of the new council are: Raymond Wat, regional general manager of IPAF in Southeast Asia; Nice Wu, project manager, Shing Fung Engineering & Equipment Ltd; Rain Ku, managing director, Honor Us Equipment (HK) Ltd; Ken Tsang, manager, Modern (International) Access & Scaffolding Ltd; Cheung Chi Sing, director, Chicardo Investment Ltd; Glenn Ho, senior regional manager, Terex AWP (HK); Lewis Wu, director of marketing, strategy and product management, Asia JLG Industries (Shanghai); and Tomie Chan, general manager for North Asia, Haulotte Group.

“We’re pleased to have been able to put this group together, and we have high hopes that such a broad range of stakeholders from across the powered access industry in Hong Kong coming together on a regular basis to discuss the main opportunities and challenges of the day will lead to a much safer and more productive industry,” said Raymond Wat, IPAF’s regional general manager in Southeast Asia.

“The primary aim of IPAF’s country and regional councils around the world is to bring together rental companies, associations and



Nine experts from across the industry will sit on the newly formed IPAF administrative region council for Hong Kong, which will be chaired by Tony Small, director of Gammon Construction.

manufacturers to help drive our industry forward and towards greater safety, technical and training provision across the board, so we’re excited by the potential the new council in Hong Kong offers in terms of sharing ideas and promoting safety campaigns and best practice.” ■

## IPAF Asia Conference & Showcase 2018 to be held in Malaysia

IPAF Asia Conference & Showcase 2018 is set to take place in Kuala Lumpur, Malaysia, from 18 to 19 July 2018. The event aims to promote the safe and effective use of powered access, which will be addressed through various talks by a comprehensive line up of speakers who are also crucial stakeholders, in the powered access industry.

2018 promises to be an exciting year for the Malaysian market as there are approximately 15,000 MEWPs and 500 MCWPs in this country and the Malaysian market is set for further growth as its use of powered access in various industries is increasing year by year.

In 2017, more than 300 delegates from across Asia and further afield attended the IPAF Asia Conference in Changsha, China – the first one to be held in the country. The event also saw the delegates sign a pledge to equip all operators of boom-type MEWPs with a safety harness. ■

Website: [www.ipaf.org/asiainconference](http://www.ipaf.org/asiainconference)



ABOVE AND LEFT: The IPAF Asia Conference & Showcase 2017 was held in China, attended by more than 300 delegates from across Asia and further afield.

## IPAF appoints new director of technical & safety



IPAF has made a seniormanagement appointment to head up its global technical & safety department. Andrew Delahunt (left) will join from a major global mobile elevating workplatform (MEWP) manufacturer, where he is currently the worldwide safety and homologation manager. Mr Delahunt will be based in IPAF’s office in Basel, Switzerland, and will take up the post from January 2018.

Mr Delahunt has a wealth of experience in the powered access industry, having worked for his current employer since 2011, first as product safety manager for Asia based in his native Australia before moving to the company’s head office in France to take up his most recent role in early 2015. Prior to that he spent more than a decade as an engineer working for Kenworth Trucks and Volgren Australia in Melbourne. ■

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 [youtube.com/CATPaving](https://youtube.com/CATPaving)



## Demag AC 45 City crane

The new 45-t Demag AC 45 City crane is highly compact with a total length of only 8.68 m, a width of 2.55 m and an overall height of just 3.16 m. The height can be reduced to less than 3 m, according to Terex Cranes, making it excellent when space is at a premium, as is the case indoors.

The base section of its fully hydraulic main boom is also compact with a length of 7.80 m, and therefore the AC 45 City is able to work in buildings with a relatively low clearance while still keeping its boom at a steep angle. This advantage comes in handy, for example, when assembling overhead cranes, as the AC 45 City can lift heavy loads at a small radius. In addition, its fully hydraulic 31.2-m main boom means it can get ready to start working much faster than comparable cranes with booms that need to be set up with pins.

Another advantage of the AC 45 City is its vast configuration flexibility, which makes it possible to customise the crane perfectly for the requirements at hand – for instance, with the 1.3-m-long runner for loads of up to 25 t or with the three-sheave hook block, which allows for six-part reeving. And with offsettable main boom extensions of 7.10 or 13 m, the system length can be increased to 44.20 m.

The three-axle Demag AC 45 City also comes with features such as an axle load indicator, a hook height indicator, cruise control and cameras for load, plus hook and hoist monitoring and for backing up. Remote radio control and storage boxes are included as well.

One of the highlights of the new Demag crane is the innovative IC-1 Plus control system, which calculates the crane's lifting capacity for every boom position as a function of the superstructure's slewing angle, and in real time to boot. This means that the lifting capacity for a specific radius is no longer limited to the lowest value for a pre-calculated 360° lifting capacity, as used to be the case. Instead, the crane can always take full advantage of the maximum available lifting capacity. This advantage is particularly useful when it comes to lifts in which the outriggers are extended in an asymmetrical configuration, as it enables the Demag AC 45 City crane to take care of jobs that would normally be the exclusive job of larger cranes.

Besides the real time calculation for lifting capacities dependent on slew angle, the IC-1 Plus control system also has a 'smart' feature to calculate and show the working range of the real time lifting capacity within +/-30° slew angle. Moreover, the control system features an automatic counterweight detection function that the crane operator needs to confirm.

Together with the IC-1 Plus control system, the new Demag crane is able to work with any outrigger configuration with continuously variable adjustments, meaning that the AC 45 City can be adjusted for all space conditions and load requirements. On top of this, and for the first time ever, the crane offers the possibility of working with the IC-1 Plus control system both when using the runner and when telescoping under load, said Terex Cranes.

The AC 45 City is easy to set up, as it features an automatic leveling system that enables the crane to balance itself with computer assistance when the outriggers are extended. The crane is also designed to stay in the 12 t axle load limit, as the three-axle unit does not weigh more than 34 t even when outfitted with its full equipment. That way, the crane can get to work without the need for any additional transport vehicles.

Terex Cranes said that when using a reduced counterweight, the AC 45 City even falls below the 10-t limit, meaning that the crane can still perform a broad range of lifting operations as its



TOP, ABOVE AND LEFT:  
The new 45-t Demag AC 45 City crane is highly compact with a total length of only 8.68 m, a width of 2.55 m and an overall height of just 3.16 m. It also features a vast configuration flexibility, making it possible to customise the crane perfectly for the requirements at hand.

lifting capacities remain strong. And since it only weighs around 26 t when not carrying any counterweight, a permanent permit can be obtained if necessary.

Last but not least, the AC 45 City features a drivetrain with six forward gears and one reverse gear. The 260-kW MTU motor meets Euromot 4 requirements and, together with the crane operation start/stop function, ensures cost-effective and environment-friendly operation. ■

Website: [www.terex.com/cranes](http://www.terex.com/cranes)

# Pile Dynamics' static load tester for deep foundations

Static load testing is used to evaluate the load resistance behaviour of deep foundations prior to structure construction. The test can be performed to validate foundation design assumptions regarding the axial compression or axial tension resistance provided by a deep foundation element, or its deflected shape under a lateral load. Pile Dynamics' static load tester (SLT) automatically obtains and records reliable readings at programmable load intervals during a static load test. The system allows for monitoring of up to 256 independent channels (192 analogue and 64 digital) taken from traditional pile-top measurements or from embedded sensors connected to a data acquisition box with smart universal inputs.

Each data acquisition box can accept up to 16 independent channels, with up to 16 data acquisition boxes connected together to the SLT at once with wireless configuration for easy set up and remote operation. This automatic data collection and display allow real time monitoring, analysis and interpretation of results.

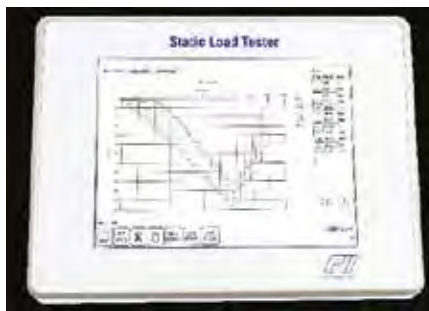
Conventional readings of the applied load determined from the jack pressure gage and load cell, and deep foundation head movement determined by LVDTs, digital dial gages, or mechanical dial gages, can be combined with the SLT to determine the capacity or nominal soil resistance, the load-transfer behaviour under axial loads, or deflected shape under lateral loads. The SLT reads strain gages and vibrating wire gages.

The SLT Tablet is equipped for high-speed internet access and remote



LEFT: Static load testing is used to evaluate the load resistance behaviour of deep foundations prior to structure construction.

BELOW, LEFT AND RIGHT: Pile Dynamics' static load tester (SLT) can obtain and record reliable readings at programmable load intervals during a static load test.



operation, error checking and updating. Offering real-time graphical presentation of load, strain, displacement and pressure measurements, the SLT operates in traditional, SI or metric units.

Static load tests are standardised by ASTM D1143, standard test methods

for deep foundations under static axial compressive load; ASTM D3689, standard test methods for deep foundations under static axial tensile load; and ASTM D3966, standard test methods for deep foundations under lateral load. ■

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

# PRO



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## Grove GMK4090 all-terrain taxi crane

Manitowoc has introduced a new 90 t all-terrain crane, the Grove GMK4090, which features a modern and compact design focusing on roadability and manoeuvrability. The unit represents a generational upgrade over the previous GMK4080-1/GMK4100B, a popular all-terrain crane in Europe due to its versatility in applications, especially with rental companies.

Manitowoc has also introduced the GMK4080-2, a similar crane with 80 t capacity. The GMK4090 will be released globally, whereas the GMK4080-2 will not be available in North America, according to Manitowoc. The company said that both the GMK4090 and GMK4080-2 models are essentially the same crane, except that the GMK4080-2 carries less counterweight to match the load chart of its predecessor, the GMK4080-1/GMK4100B.

The GMK4090 taxi crane offers a 51 m, six-section Megaform boom that utilises Grove's Twin-Lock pinning system. Boosting its overall reach is a 9/15 m bi-fold swing-away jib that can be extended with a 6 m boom extension for a total jib length of 21 m. The crane is ideal for a variety of jobs, such as general construction and plant maintenance work.

The GMK4090 can travel with a maximum 18.3 t counterweight, and within 12 t/axle it can transport up to 9.1 t to the jobsite without the need for an additional transport truck. The crane features compact dimensions, with a narrow 2.55 m width, so it can easily access and manoeuvre within tight jobsites. It has a minimum tailswing of only 3.53 m,

so it stays within the maximum outrigger width.

The GMK4090 also offers the new MAXbase feature as an option - this variable outrigger setting gives the crane more setup flexibility on the jobsite, especially when erecting it on irregular grounds, and also more capacity when compared with the 360° standard load chart. In addition, the GMK4090 is fitted with Manitowoc's Crane Control System (CCS), an easy-to-use operating interface that has now been standardised across the company's crane offerings and is featured on every new model. ■

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



The new Grove GMK4090 taxi crane has a modern and compact design focusing on roadability and manoeuvrability.

## Compact electric concrete form vibrator

Martin Engineering has developed a new heavy-duty compact electric vibrator that provides excellent performance on the inside and outside of small diameter precast concrete pipe form cores. The new MB36-3000 concrete form vibrator offers excellent compaction of the cast for improved material strength.

The unit is only 365 mm in width and its rugged design has a high force-to-weight ratio and ensures reliability using high heat-rated internal components, allowing the unit to perform consistently under punishing conditions for extended periods.

The compact design permits easier installation in tight spaces. Able to fit most standard mounting configurations, the 230/460 V, 3 Phase, 60 Hz motor runs at 3,450 rpm, allowing the unit to supply a centrifugal force output of 13.3 kN using permanently lubricated roller bearings in ductile iron bearing flanges. Adjustable eccentric weights enable operators to customise force, save energy and maximise the life of the vibrator.

To mitigate material accumulation, dust and moisture penetration commonly found in precast applications, the resilient aluminium casing has a smooth gloss coating and covers sealed by O-rings. Internal high temperature Class H windings are able to withstand continual use in a heated, sealed environment, further ensuring reliability. ■

Website: [www.martin-eng.com](http://www.martin-eng.com)



ABOVE AND LEFT: The MB36-3000 is designed to deliver high performance and low cost of ownership. The unit fits standard brackets and features a high force-to-weight ratio.

# Himoinsa generators

Himoinsa has added seven new models with FPT engines to its Power Cube generator sets, supplying between 411 and 579 kVA for the 50 and 60 Hz markets. Their electric radiator has been fitted with a frequency changer that adapts its speed depending on cooling needs. This optimises fuel consumption by the radiator, leading to the generator set running more efficiently.

With these new models, Himoinsa is expanding the power range of its Power Cube series, which already included four generator sets ranging between 500 and 700 kVA with MTU engines.

The Power Cubes with FPT engines feature a compact dimension, in 10-ft containers, facilitating transport and logistics. Their remote cooling system, installed on the top of the container, optimises space. Two of the new models, the HPCW 420 D5/6 and HPCW 505 D5/6 can run at 50 and 60 Hz interchangeably. These dual-frequency models are ideal for port applications or to meet the needs of rental companies, which work in different markets.

In addition, Himoinsa is expanding its series of generator sets with Mitsubishi engines up to 2,650 kVA. The new HTW-2415 T5 model, with an S16R-PTAW-E engine, offers 2,405 kVA of PRP power and 2,650 kVA of standby power, at a frequency of 50 Hz. Himoinsa has also included the new HTW-790 T5 in this series, with an S6R2-A2PTAW2-5 engine. It can supply up to 788 kVA of PRP power and 860 kVA of standby power, thus offering more power solutions to better meet different market demands. In total, Himoinsa series of generators with Mitsubishi engines now offers a power range of 670 to 2,650 kVA. ■

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



LEFT: Himoinsa has added seven new models with FPT engines to its Power Cube generator sets, supplying between 411 and 579 kVA for the 50 and 60 Hz markets.

BELOW: Himoinsa is also expanding its series of generator sets with Mitsubishi engines up to 2,650 kVA.



## Double Drum Cutter Heads

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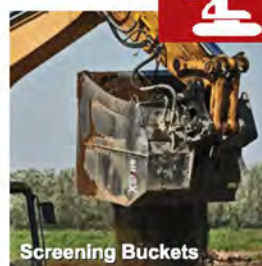
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## Link-Belt RTC-80160 Series II rough terrain crane

The new 145-mt RTC-80160 Series II rough-terrain crane from Link-Belt is an upgrade from the company's previous 135-mt model. The new crane has a standard boom of 12.9-59.5 m, maximum tip height of 94.8 m, maximum line pull of 100.07 kN and maximum speed of 132.9 m/min.

Link-Belt first introduced to the global market its RTC-80100 Series II in 2002, featuring hydrostatic drive on a six-wheel carrier frame. Since then, the company has evolved its product offering into three six-wheel rough terrain models: RTC-80110 Series II, RTC-80130 Series II and now RTC-80160 Series II, with many of these units working across the globe.

The six-wheel rough terrain cranes are ideal for various applications, ranging from pier and dock work to refineries and industrial plants with their tight turning radius and reach, to wind farm maintenance with their strong charts and ease of travel. ■

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



ABOVE AND LEFT: Link-Belt's new RTC-80160 Series II rough terrain crane features a tip height of 94.8 m and maximum speed of 132.9 m/min.

## Wirtgen W 210 XP large milling machine

The new Wirtgen W 210 XP large milling machine features a six-cylinder engine with an output of 571 kW, making it suitable for a wide range of applications, from surface course rehabilitation to complete pavement removal and fine milling jobs.

The machine is equipped with a 2-m milling drum unit as standard. Drum units with milling widths of 1.5 and 2.2 m are also available as options. Wirtgen's Flexible Cutter System Light (FCS Light) not only ensures greater flexibility but also high machine utilisation. Both the 2-m and 2.2-m milling drum units are FCS Light-compatible. This allows milling drums of the same width but with different tool spacings to be fitted without difficulty as required for the job at hand.

All the milling drums are fitted with Wirtgen's HT22 quick-change toolholder system. The robust upper part of the system can be changed directly on site. This minimises machine downtime and increases the lifespan of the milling drum.

Thanks to its compact dimension and optimum machine transport weight, the W 210 XP can be easily transported from one jobsite to the next. Without the water tank content of approximately 29 t, the transport weight is low, so that the machine can also be transported on a light low-bed truck with a low gross train weight.

The ergonomically designed operator platform is another highlight. The control elements have been arranged to provide a clear overview and make operation easy for the machine operator. Most functions can be controlled by the multi-functional joystick mounted in the armrest. ■

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



Wirtgen W 210 XP large milling machine is ideal for a wide range of applications. The unit features a compact design, and thus can be transported easily from one jobsite to the next.



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## Sandvik Ranger DXi drill rig and screening media

The new Ranger DX900i top hammer surface drill rig from Sandvik Mining and Rock Technology has several new high-performing features for improving the drilling process. The rig is designed with a 290-degree revolving upper structure, new rockdrill family with 21-27 kW power, and Sandvik GT 60 tools that enable higher productivity with straighter 92-127 mm holes.

The DX900i has a drilling coverage of 55 sq m and can tackle difficult rock with the iTorque control system. Despite the rig's ability to rotate, its counterweight structure ensures stability by maintaining weight opposite the boom. The rig is also mobile, thanks to a low centre of gravity and high tramming power.

Operator ergonomics and low cabin noise are some highlights of the DX900i's new iCab cabin. Sandvik said the new user interface has been developed based on several customer trials and positive feedback has been received on the good ergonomics, easy-to-use joysticks and control panels. The new cabin also features room for a trainer behind the operator seat. Thanks to a close co-operation with VTT, Finnish Technical Research Centre, Sandvik has been able to lower the noise emission to levels never before seen in this type of drill rig.

In addition, Sandvik has developed the WX6500 screening media with a low environmental footprint. It has the same accuracy as wire mesh at 2–32 mm separations, and offers everything a rubber media can, from 10 times the product life to easy delivery as a lightweight roll.

With 10 times the durability of wire mesh, the WX6500 gets changed significantly less often, so customers experience far less screen downtime. The thinness and flexibility of the material prevents the blinding and pegging associated with wire mesh. Because it blinds and pegs less, customers can avoid frequent media inspections. Thus they spend less time on troubleshooting and replacements and more time producing. ■

*Website: [construction.sandvik.com](http://construction.sandvik.com)*



**TOP RIGHT AND RIGHT:** The new Sandvik Ranger DX900i top hammer surface drill rig features a 290-degree revolving upper structure and drilling coverage of 55 sq m. The rig can also tackle difficult rock with its iTorque control system.

**ABOVE:** The Sandvik WX6500 screening media features a low environmental footprint. It has the same accuracy as wire mesh at 2–32 mm separations, and offers everything a rubber media can.

## Ammann AFW 150-2 mini paver

Ammann has unveiled its new AFW 150-2 mini paver, designed for paving widths from 250 to 1,650 mm. The machine can be run by a single operator and is ideal in applications such as bike lanes, sidewalks and garden walkways.

The AFW 150-2 is a three-wheeled paver - two in the rear to enable traction and one in front for steering. It utilises a screed similar to those on large road pavers. Hydraulic adjustment of the screed is quick and effortless and can occur while the machine is operating. The fixed hopper can be side-loaded with a skid steer. An optional hopper insert makes loading even easier.

The 150-2 features several significant material flow improvements. Auger diameter has been increased from 100 to 120 mm, ensuring consistent material distribution along the length of the screed. Also enhancing material flow is a new mechanical sensor that enables even asphalt distribution along the screed.

The conveyor concept includes a completely redesigned material flow divider, conveniently located and controlled through easy-to-engage hand levers. The divider allows the operator to select whether asphalt is distributed on both sides of the paver, on one side, or stopped entirely.

The operator platform utilises a steering wheel for optimal control. An updated display and a secure location for LPG gas bottles are other upgrades. Air inlets located on the side of the cooler help prevent asphalt and aggregate from reaching the engine compartment. The service hood opens wide for easy access, important when it comes to service and maintenance work. Transport is easy given the machine's compact size and weight of 1,150 kg. ■

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



TOP RIGHT AND RIGHT: Ammann's new AFW 150-2 mini paver is capable of paving at widths as narrow as 250 mm.



### New Products for QA/QC of Deep Foundations



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## XCMG XCA100E all-terrain crane

The XCMG XCA100E is a four-axle all-terrain crane with a maximum lifting capacity of 100 t. The machine is designed with an independent suspension system, which makes it easier to travel on rugged roads and improves its stability when turning.

The XCA100E is fitted with four steering modes, including crab walk, steep turning, front-axle turning and rear-axle turning. The crane has a minimum turning circle diameter of 15.8 m, a

maximum speed of 80 km/hr and a maximum gradeability of 60 percent.

The XCA100E is equipped with a seven-section 60-m boom, with a maximum lifting height of 88 m. A new energy-efficient hydraulic system helps the crane reach a steady lifting speed of 2.5 m/min and a steady slewing speed of 0.1°/s. ■

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



LEFT AND RIGHT: The new XCMG XCA100E all-terrain crane has a maximum lifting capacity of 100 t. The machine is designed with an independent suspension system, four steering modes and a new energy-efficient hydraulic system.

## Bomag tandem rollers

Bomag has introduced its new BW 154 APO and 174 APO tandem rollers with split drums, which combine tangential oscillation technology with a split drum. Such combination results in two advantages, including a soft compaction of the surface due to the oscillation and a reduction of the shear forces due to the split drum, said Bomag. This in turn leads to perfect surfaces, even in narrow curves and radii.

Another new development from Bomag is the BW 138, which will be equipped with dual amplitudes starting from January 2018. In addition to the standard 0.5 mm amplitude, the roller will feature a second, 0.2 mm amplitude. This second amplitude is aimed to reduce vibration, making the roller ideal for use in cities, on very thin asphalt layers or in connection works. The new rollers were recently introduced at the Bomag Innovation Days that took place in October 2017.

One of the highlights of Bomag tandem rollers is the Economizer system, which measures the level of compaction and displays the result in a simple, easy-to-understand manner. The company said the system can now be made available on any of its single drum roller models worldwide.

The Economizer system is easy to use as no activation or calibration is required, said Bomag. The display is designed intuitively, meaning no operator training is needed; a light strip that expands progressively with the degree of compaction indicates the compaction progress to the operator and warns against over-compaction.

The Economizer display has been used widely on Bomag small and large tandem rollers to measure asphalt compaction. In the



Bomag has introduced several new tandem rollers at the company's Innovation Days 2017, among which were the BW 154 APO and 174 APO with split drums.



The Bomag Economizer system measures the degree of compaction and displays the results in a simple, easy-to-understand manner.

soil compaction segment, the display is available for reversible plates and trench compactors. ■

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



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# Enerpac high tonnage cylinders and Jack-Up system

Enerpac's high tonnage cylinders suitable for the Southeast Asian market include the CLL, CLP, CLRG, CLS and CLSG types, which are designed to handle 50 to 1,000 t each with pressures up to 700 bar. Cylinder efficiency is complemented by a wide range of cylinder pump technologies including electric, cordless, air, petrol and computer controlled types.

The CLRG and CLSG ranges are similar, except that CLRG offers double-acting performance, whereas CLSG is appropriate where only single-acting cylinders are required. Both ranges feature: a baked enamel outside finish and plated pistons that provide excellent corrosion protection; a plunger wiper to reduce contamination, which helps to extend cylinder life; and an integral stop ring to provide piston blow-out protection.

The CLL range of lock nut cylinders comes with mechanical locking of the load. Instead of relying solely on valves for load holding, this feature provides high safety during heavy lifts for maintenance and installation.

The CLP range of pancake lock nut cylinders has an extremely low height and is suitable for confined spaces. It comes with lock nut load holding as well as overflow ports that function as stroke limiter.

The CLS range of cylinders is appropriate where only single-acting cylinders are required and has a lower height than the CLSG range. The CLS range also comes with an overflow port that functions as stroke limiter.

In addition, Enerpac's fully computer-controlled JS500 Series multi-point incremental Jack-Up system provides optimum safety and precision control for demanding high-tonnage lifting and lowering applications.

Typical JS set-ups employ four 500-t incremental lifting towers, each with a maximum tower height of up to 10 m. A typical 2,000-t lift configuration involves JS500 units positioned at each corner of the load.

The JS system's uncluttered, self-contained design features simple-to-use software with automatic synchronisation of multiple networked lift points. Safety is further enhanced by step-by-step operator interaction while the JS system operates in auto-mode and is also pre-programmed with emergency alarms, which automatically stops lifts based on



LEFT AND FAR LEFT: Enerpac high tonnage cylinders are designed to handle 50 to 1,000 t each with pressures up to 700 bar.



LEFT: The high tonnage cylinders can be used in various industries. Here, they are being used to lift and shift the Shanghai Opera House.

BELOW: Enerpac's fully computer-controlled JS500 Jack-Up system provides optimum safety and precision control for demanding high-tonnage lifting and lowering applications.

parameters such as load and stroke per tower and the entire system.

Most importantly, during lifting or lowering operation no one is required under or near the load, allowing workers to stay clear of potential drop zones and providing the ultimate form of safety.

Tasks for which the custom-developed JS series are well suited include applications such as: quay crane jack ups and leg extensions; bridge construction; lifting and lowering of heavy equipment, like large earthmoving equipment for maintenance; lifting and lowering of structures and buildings; and de-propping and load transfer from temporary steel work. ■

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



LEFT: The JS500 Jack-Up system being applied in a bridge lifting project. Typical JS set ups employ four 500-t incremental lifting towers, each with a maximum tower height of up to 10 m.

## Simex hydraulic attachments

Singapore-based company IPE-Eagle offers various Simex hydraulic attachments, among which is Simex T-Series wheel saw designed for trenching and excavation. The equipment has a high cutting speed, leading to quicker trenching operations and thus less disruption to traffic as well as cost savings.

The T-Series wheel saw is suitable for cutting thick layers of asphalt, concrete, rock and hard surfaces in general. According to IPE-Eagle, the spoil can be discharged from one side only - left or right - and then used immediately for backfilling the trench. Simex supplies different wheel widths, from the smaller 30 mm to the larger 250 mm.

In addition, Simex CB crusher bucket can be used with excavators or wheel loaders to crush a wide range of materials on site. It is offered in several models to meet different types of requirements. The CB bucket is fitted with a high displacement hydraulic motor that delivers the torque necessary to crush hard materials such as reinforced concrete or rock. The automatic rotation reverse further improves productivity, preventing the operator from having to intervene manually on the command if the rotor is blocked. This feature also means that the bucket operates problem-free when the material contains iron rods, small pipes or other difficult materials, said IPE-Eagle. Furthermore, the CB crusher bucket features a robust frame and a rotor that is now forged in a single piece to withstand tough applications. ■

Website: [www.ipe-simex.com](http://www.ipe-simex.com)



ABOVE: Simex T-Series wheel saw is suitable for cutting thick layers of asphalt, concrete, rock and hard surfaces in general.

LEFT: Simex CB crusher bucket can be used with excavators or wheel loaders to crush a wide range of materials on site.

## Volvo EC300DL crawler excavator

The EC300DL crawler excavator from Volvo Construction Equipment (Volvo CE) is ideal for heavy construction, quarries and mining. Equipped with a smart electro-hydraulic system, the machine provides increased power, digging force, faster cycle times and greater control. It is powered by a 231 hp Volvo D7 diesel engine that delivers up to 11 percent more fuel efficiency compared with previous models, said Volvo.

Operators also have the option of using Volvo's ECO mode, which contributes up to 5 percent of the machine's total fuel efficiency saving - with no loss of performance in most operating conditions, according to Volvo. Additionally, a new gauge bar on the I-ECU shows fuel consumption instantaneously, allowing operators to monitor fuel use on different jobsites or in different applications.

The EC300DL was recently introduced to the Indonesian market, and is now available through Volvo's local dealers: Intraco Penta Prima Servis (IPPS) and Indotruck Utama (ITU). ■

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



Equipped with a smart electro-hydraulic system, the Volvo EC300DL crawler excavator provides increased power, digging force, faster cycle times and greater control. The machine is ideal for heavy construction, quarries and mining.

## Skyjack's new attachments

Skyjack has launched a range of accessories to raise safety and productivity standards in mobile elevating work platforms operations. As part of Skyjack's Accessoryzers, the new accessories are designed to further expand Skyjack aerial lifts' adaptability and customers' power to offer a flexible rental choice.

Skyjack's Accessoryzers cover factory certified attachments, options and accessories to promote productivity and performance. Accessoryzers that enhance productivity are engineered to minimise manual work, deliver increased efficiency and improve working performance. They include:

- Tool tray – total rated work load including the tool tray is 227 kg on both ANSI and CE units;
- Tool caddy – total rated work load on the tool caddy is 11 kg on both ANSI and CE units;
- RT heavy duty pipe rack – total platform capacity including load on the pipe rack ranges from 408 kg/one person to 680 kg/ two people, depending on the model and region;

- DC heavy duty pipe rack – total platform capacity including load on pipe rack ranges from 227 kg/one person to 454 kg/two people, depending on the model and region;
- Boom pipe rack – total platform capacity including load on pipe rack is 220 kg/one person for both models and for ANSI and CE units;
- Material handling stand – total platform capacity including load on material handling stand ranges from 560 kg/two people to 630 kg/two people for both ANSI and CE units;
- Board/drywall carrier – total rated work load including load on pipe rack ranges from 136 kg/one person to 227 kg/two people depending on model and region;
- Glazier kit – total rated work load including load on panel cradle is 227 kg/one person for both ANSI and CE units. ■

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

ABOVE RIGHT AND RIGHT: Skyjack's Accessoryzers cover factory certified attachments, options and accessories to enhance productivity and performance.



## SDLG F-series wheel loaders

The SDLG L956F, L958F and the L968F wheel loaders are targeted at the Southeast Asian market. They are suitable for the moving of stockpiled materials in environments such as quarries, batching plants and coal mines.

The F-series wheel loaders offer higher comfort for the operator, greater ease of maintenance and enhanced durability than previous generation models. They are powered by six-cylinder Weichai engines that meet the emission standards of the various markets.

The 5 t-rated L956F - with dimensions of 8,180 mm by 3,024 mm by 3,423 mm - is the smallest of the three wheel loaders and is ideal for general use. Its bucket, designed for wear-resistance, has a capacity of 3 cu m. According to SDLG, the L956F is one of the company's most popular models in the Philippines.

Both the 5 t-rated L958F and 6 t-rated L968F are designed for heavy-duty applications. The machines' larger wheel bases offer excellent stability when manoeuvring on rough terrain. The L958F has a wheel base of 3,300 mm while the L968F's is 3,400 mm.

The L968F is the heavyweight of the series and has a bucket capacity of 3.5 cu m. While the biggest in size, the machine also excels in operability; it has a steering angle of 38° and a minimum turning radius of 6,062 mm.

With a curved glass design, the air-conditioned cabs of the F-series wheel loaders offer operators 15 percent more space to move in, said SDLG. At the same time, improved dampening of the transmission translates to less cabin vibration, less noise and



The L956F is one of SDLG wheel loader models targeted at the Southeast Asian market. It is particularly popular in the Philippines.

better overall comfort for the operator.

For easy maintenance, the engine hood and heat dissipation hood have gull-wing designs that ensure easy access to the engine. The wheel loaders also feature a centralised electrical system for easy repairs, with a central fuel gauge, engine tachometer and digital-display panel that indicates malfunctions in real-time. ■

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

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# Uplifter glass vacuum lifter enters Asian market

Singapore-based company JP Nelson has introduced the Uplifter glass vacuum lifters to the Asian market. The products are specifically designed for transporting, lifting and mounting glass and window elements.

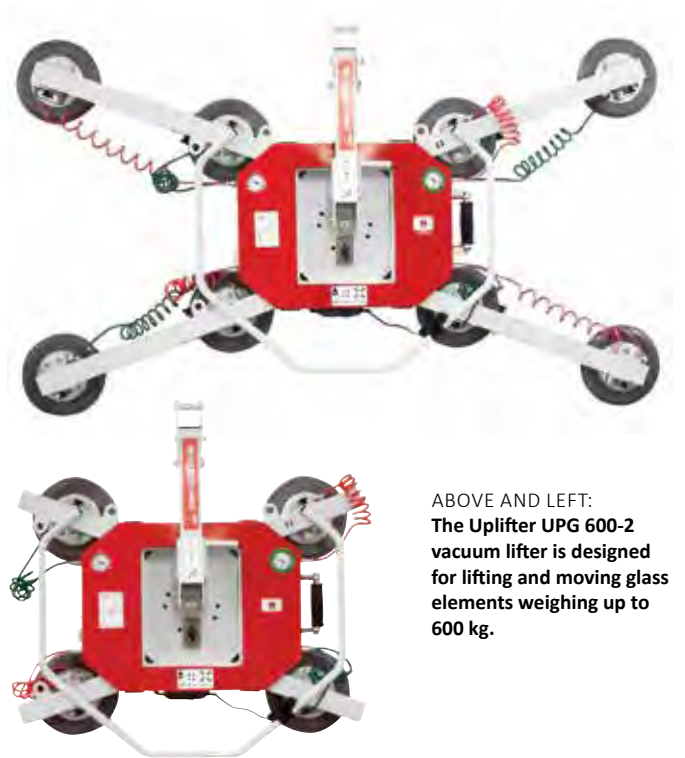
Among the models expected to be popular in the market is the UPG 600-2, which is capable of lifting and moving glass elements weighing up to 600 kg. Thanks to its modular design, the UPG 600-2 can be adapted to meet job requirements on the construction site. It operates in temperatures ranging from 0° to 40°C, and has the ability to work continuously for up to eight hours.

With its extension arms, the unit can handle elements with large surface areas. These extension arms are removable. The suction discs - with a diameter 300 mm - provide high levels of adhesion and power on the construction site. The vacuum cups are adjustable without any tools and they are also silicon-free, thus leaving no marks on the glass.

The UPG 600-2 begins the vacuum suction process automatically at the push of a button. The battery monitors the vacuum pressure independently and permanently after suction has begun. If the vacuum is lost, the MRT-2 re-pumps and also outputs a warning sound indicating the coming loss of vacuum pressure.

The UPG 600-2 can be rotated by 360° manually and tilted for 90°. When being rotated, it can be stopped in position every 30°. The unit is equipped with a 12 V rechargeable battery. ■

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



ABOVE AND LEFT: The Uplifter UPG 600-2 vacuum lifter is designed for lifting and moving glass elements weighing up to 600 kg.



LEFT AND RIGHT: Featuring a modular design, the UPG 600-2 can be adapted to meet job requirements on the construction site. It operates in temperatures ranging from 0° to 40°C, and has the ability to work continuously for up to eight hours.



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# Grove supports projects in the Philippines & Hong Kong

MDC Equipment Solutions (MEQ), the equipment supply subsidiary of Filipino construction giant Makati Development Corporation (MDC), has added a number of Grove cranes to its fleet. The latest arrivals are four Grove RT530E-2 rough-terrain cranes, while two Grove TMS700E truck cranes and a Grove GMK5220 all-terrain crane have also been added in recent months.

The RT530E-2 and TMS700E cranes are used at the MDC precast plant in San Felix, Laguna, to handle concrete sections. When not required for this, they are used on jobsites for a variety of construction work. The RT530E-2 cranes are also used to support the GMK5220 in its primary function: assembling tower cranes.

According to MEQ, the company has mostly deployed the RT530E-2 cranes at the staging areas of the plants to handle rebar and formwork, as well as finished precast sections. The RT530E-2 features rugged, deep-box section frames for better performance in tough conditions. It has a maximum capacity of 30 t, a main boom length of 29 m and a maximum tip height of 44.5 m when working with its full jib attachment. Four steering modes allow easy manoeuvring in tight quarters, while it also performs well when lifting on tyres, making it ideal for pick-and-carry work.

Established in 1974, MDC is the construction arm of leading Philippines real estate company, Ayala Land. MDC's projects include mixed-use, commercial and residential developments, such as offices, hotels, resorts, shopping malls, public housing, condominiums, townships and hospitals. To date the company has completed over 400 projects.



ABOVE AND BELOW: Grove RT530E-2 rough-terrain crane being used by MDC Equipment Solutions at its precast plant in San Felix, the Philippines, to handle concrete sections.



MEQ, now in its fourth year of operation, continues to grow and is currently one of the country's leading equipment solutions providers. The company provides construction equipment for hundreds of MDC projects across the Philippines.

In addition, the Yuen Long MTR station in Hong Kong is undergoing a series of improvements that involves upgrading vehicular access to the site. On the job is a Grove RT550E rough-terrain crane, which Yee Hop Engineering has positioned on the station roof to hoist up construction materials including steel bars and cement with loads weighing up to 14 t.

Yee Hop Engineering said that the RT550E is ideal for delicate lifting operations on the station roof because of its relatively low gross vehicle weight of 28,500 kg and excellent stability. The hoisted material will be used to construct parapet walls on the rooftop. All lifting operations have to be carefully managed as the West Rail Line station remains open and operational throughout the rebuilding work.

The Grove RT550E has a maximum capacity of 45 t and a main boom length of 39 m, which can extend to 47 m when fitted with its jib attachment. Yee Hop Engineering was employed as a subcontractor on the project to handle foundations, site formation and road-building work. ■

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



ABOVE AND LEFT: Grove RT550E rough-terrain crane is involved in the upgrading of the Yuen Long MTR station in Hong Kong. The crane works on the station roof to help Yee Hop Engineering hoist up construction materials including steel bars and cement, with loads weighing up to 14 t.

## Ammann plays role in Singapore projects

Singapore's Changi Airport is currently building the third runway - which is planned to open around 2020 - as part of its expansion project. The work began with placing and compacting aggregate for the base of the runway. Sing Tec Development, based in Singapore, utilised a varying number of rollers - sometimes as many as six - as a subcontractor on the airport expansion. The Ammann ASC 110 single drum rollers owned by Sing Tec proved to be essential to the success of the project. The machines were supplied by Ammann's local dealer, Huasing Construction & Trading Pte Ltd.

Out of necessity, the runway was placed in a low-lying area, so fill had to be added to elevate the entire area 2 m to prevent flooding. Two layers of fill were placed and each was compacted with the ASC 110 rollers working in vibratory mode.

The rollers feature excellent compaction output and no-rear-axle concept that provides an individual drive for each tyre. The extra power and traction were crucial on the project, particularly since requirements changed from one phase of the project to another.



ABOVE AND BELOW: Ammann ASC 110 single drum rollers work on the construction of a new runway at Singapore Changi Airport. The machines are designed with no-rear-axle concept that provides an individual drive for each tyre.



Sing Tec participated in canal diversions, road diversions and road parameter. The company said the rollers' high compactive forces and easy-to-access daily maintenance locations are very useful on the project.

Furthermore, an Ammann ABP Universal asphalt mixing plant also helps United E & P Pte Ltd to meet strict sound and emissions requirements in a key area of Singapore. United E & P has been involved in a number of projects around the country, and it is currently doing work for a private contractor and also on a government project.

The Ammann ABP Universal plant is fully enclosed, including its 350 cu m storage silo. Because the system is fully covered, materials can be protected from the rain so it is not necessary to dry the materials before using them, which in turn saves fuel, explained United E & P. The plant can produce a normal mix or warm mix, and can also carry out recycling and deliver all the special mixes needed in Singapore, added United E & P.

The ABP Universal plant is designed with a variety of fuel-efficiency features. Among them is the proprietary as1 Control System, which utilises technologically advanced software to ensure efficient fuel usage. Aggregates are delivered by lorry to an underground bin and they remain sheltered while distributed to specific silos. ■

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



Ammann ABP Universal asphalt mixing plant also helps United E & P to meet strict sound and emissions requirements in a key area of Singapore.

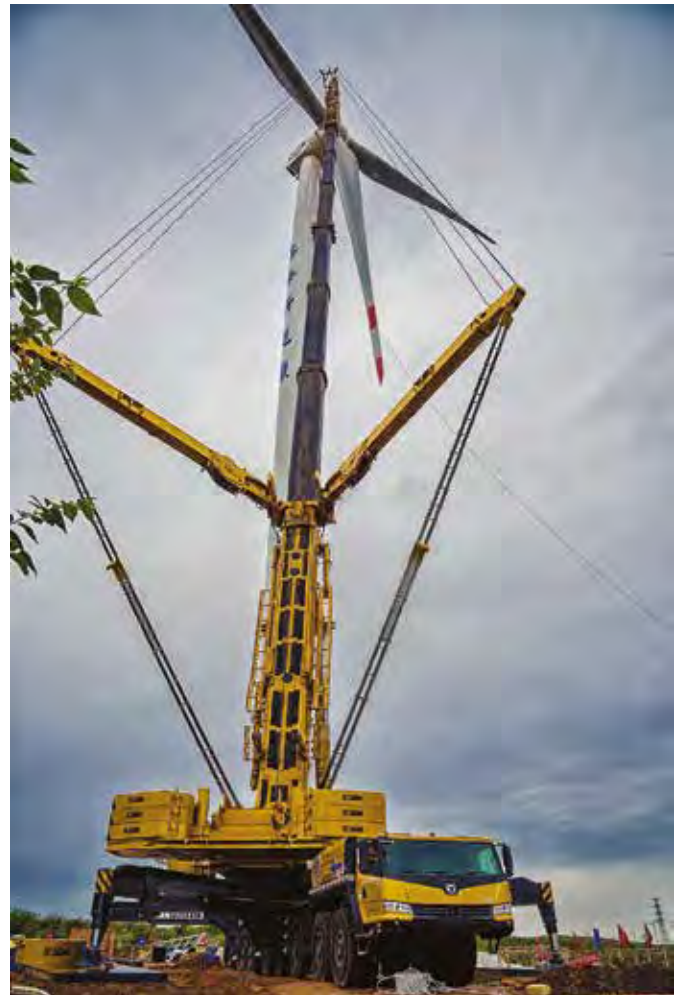
## XCMG provides lifting solutions for China projects

An XCA1200 all-terrain crane from XCMG recently helped with the construction of a 100-m-high wind turbine in Ningxia, China. According to the company, the most difficult part of the lifting process was the installation of the blades, with each measuring 59.5 m long. Another challenge was the rugged terrain and soft soil caused by the continuous rainfall during late August 2017, which required the crane to perform the job very carefully to ensure safety operation.

The project was completed successfully, thanks to the crane's intelligent system, said XCMG. It is fitted with pre-set working modes, which allow the operator to select the most favourable working conditions automatically based on the jobsite requirements.

The eight-axle XCMG XCA1200 is designed to lift wind turbines of up to 2.5 MW. The crane's maximum travel speed is 80 km/hr and it is powered by a 480 kW engine. Featuring a modular design, the XCA1200 is available in both standard and wind power versions. The wind power version consists of a seven-section boom of 89.7 m, a self-folding wind power jib of 25.2 m and a Y-type super lifting device. When the eighth boom section is added and the general outriggers are attached, the crane is set to the standard version equipped with an eight-section boom of 102 m, making it suitable for use in other applications.

In addition, an XCMG RT 60 rough-terrain crane was used for installing a power transmission grid in the Alxa Desert. The work is part of a national power transmission project that is being implemented from west to east China. About 15,000 power grid frames are expected to be installed along the transmission line.



ABOVE AND BELOW: XCMG XCA1200 all-terrain crane builds a 100-m-high wind turbine in Ningxia.



XCMG RT 60 rough-terrain crane installs a power transmission grid in the Alxa Desert.



The RT60 rough-terrain crane successfully overcame the harsh working environment in the vast desert, said XCMG. The machine has a boom length of 43.2 m and a minimum radius of 6.1 m. It is also fitted with an intelligent system for easy operation and the cab is designed for operator comfort. ■

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

# Bauer builds foundation for new high-rise in Indonesia

Construction of a new 59-storey high-rise is currently underway in the Indonesian capital Jakarta, and is scheduled for completion in 2021. The 226-m office tower, being developed by the Japanese company Mori Building, will feature four basement floors, offices, restaurants and cafes.

Main contractors on the project are Shimizu Corporation from Japan and Bangun Cipta Kontraktor from Indonesia. PT. Bauer Pratama Indonesia – a subsidiary of Bauer Spezialtiefbau - has been contracted to carry out the foundation work, which started in May 2017.

Besides the production of several test piles, Bauer’s scope of works also includes drilling 462 foundation piles, each of which is 69 m-deep and with a diameter of 1.2 m. Two Bauer rotary drilling rigs, a BG 28 and a BG 30, are used for this. In addition, Bauer is producing a 44 m-deep diaphragm wall with a GB 34 grab, which will serve as a retaining wall. The four basement floors of the future high-rise will be built using the top-down construction method.

One of the challenges is said to be



Bauer machines carry out the foundation work for a new 59-storey high-rise in Jakarta, Indonesia.

the relatively small area on which the foundation work takes place. Aside from that, the construction site is located in the centre of the megacity, which then requires specific requirements for logistics as the time frames in which the delivery of concrete or removal of the excavated soil

are severely limited.

The foundation work is being carried out in double shifts, with drilling and diaphragm wall work expected to be completed by January 2018 as per the contract schedule. ■

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

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## Volvo boosts productivity in Thailand and Korea

The Great Asian Highway (AH) is deemed one of the largest construction projects in the world. When completed, it will run from Japan to Turkey - crossing 32 countries in Asia and Europe in the process. The section that will run through Thailand, known as AH13, is being built by Thai construction company S. Tengtrirat (Nan) Co Ltd (known as STCL).

The AH13 section starts at Sukhothai and runs 140 km, right through Thailand to the border with Laos, said STCL. Because the terrain on much of the route is mountainous and difficult to work in, the company needed specialised and powerful equipment.

For this, STCL decided to deploy a fleet of Volvo CE machines - supplied by Volvo's Thai dealer, Italthai Industrial. These include the EC480D and EC210B Prime excavators, plus an SD110 single drum compactor and an ABG7820B tracked paver.

The Volvo EC480D has increased engine power and improved hydraulics, to deliver greater digging force and shorter cycle times. Fuel efficiency is major highlight on this 48-t excavator, with power coming from Volvo's D13 engines. The inclusion of the ECO mode contributes to the unit's fuel efficiency, as does the electronic pump control technology, which improves the figure by an additional 5 percent, said Volvo.

When combined, Volvo's efficient diesel engine, enhanced hydraulic system and well matched components can improve overall fuel efficiency by 8-11 percent, added Volvo.

The Volvo EC210B Prime is suitable for the steep and demanding working conditions of the job. Its 110 kW Volvo engine is well-matched to the hydraulic system, components and design. The excavator is designed with better visibility and improved ergonomics.

The Volvo SD110 single drum compactor is an 11-t machine that gives users a powerful drum performance for exacting work with soils and aggregates. It features a dual, high and low, amplitude eccentric design and the Volvo Tier 3/Stage III D5 engine delivers 99 kW performance.

The 1 m x 1 m area of visibility around the SD110 provides increased jobsite safety, and lowers the possibility of equipment damage. In addition, the drum vibration frequencies are easily adjustable from the operator's console from 0 to 30 Hz. There is a two-speed transmission, with low-speed for jobsite applications, and high-speed for faster jobsite changes.

The Volvo ABG7820B tracked paver



ABOVE: Volvo SD110 single drum compactor being deployed along the AH13 section of the Great Asian Highway project. The section runs 140 km, right through Thailand to the border with Laos.

LEFT: Volvo A45G articulated haulers play a major role at Kyung Boo's new crusher plant in Gimhae, South Korea.

has the ability to pave widths from 2.5 to 13 m. Offering single or double tamper screed operation, the machine combines excellent paving quality, high efficiency and cost-effectiveness.

Volvo's D7 engine is included on the ABG7820B, offering quiet and environment-friendly operation. It also features the EPM (Electronic Paver Management) system, which controls all the paving processes. Most applications do not require the high output capacity of the engines and in such cases, the driver can select the 'smart power' mode, which lowers the engine speed to reduce noise emissions and provide fuel savings of up to 15 percent, said Volvo.

In addition, one of South Korea's biggest aggregate producers Kyung Boo Corporation has built a new crusher plant in Gimhae, South Gyeongsang province. Here, a pair of Volvo A45G articulated haulers are playing a central role in operations.

With a load capacity of 45,000 kg, the A45G models are the second largest in the Volvo hauler line and also boast advanced technology of the company's latest G-Series design. The machine is designed for higher productivity with reduced overall fuel consumption.

Technology on the machines includes the optional on-board weighing system, which boosts fuel efficiency and reduces machine wear by guaranteeing an optimal load every cycle. Other features include the Volvo drivetrain, automatic traction control with 100 percent differential locks, all-terrain bogie and hydro-mechanical steering.

Apart from several articulated haulers, Kyung Boo's fleet of 15 Volvo machines includes the heavyweight EC750D excavator. This 75-t rated unit works well alongside the A45G units, helping to move more material in a shorter time. ■

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

# Goldhofer Faktor 5 overcomes challenges in India

The Goldhofer Faktor 5 high girder bridge has been used in India by Lee & Muirhead Pvt Ltd to transport a 405 t power plant generator stator to a jobsite located about 500 km away. The complete rig, comprising a 2x18-axle THP/SL combination and the Faktor 5 with an overall weight of 752 t, took three months to complete the journey.

There are many restrictions on heavy haulage operations on the Indian subcontinent, said Goldhofer, and the road network – although one of the biggest in the world with a total length of 3.3 mil km – is only 50 percent hard surface, plus long-distance multi-lane roads are limited. Due to this, transporting heavy loads like stators, generators, transformers, turbines and cable drums, would be a challenge.

The Goldhofer Faktor 5 had to overcome a number of difficulties on the project, including more than 150 multi-span long bridges and a 15 km stretch with tight bends – here, the 405 t stator was moved onto an 18-axle split combination (1+1/2) and the Faktor 5 completely dismantled.

Moreover, the Faktor 5 had to skirt around a toll plaza. As the terrain was unsuitable for a heavy haulage convoy of this size, some ground was first filled in on the steep terrain. Then, a bypass was constructed to enable it drive over the 25 cm high kerbstones. On other sections of the route, the gradients were so steep that a third tractor was needed in addition to the standard push-pull configuration.

To overcome other obstacles, the Faktor 5 was raised a few times to a height of more than 1.5 m. A particular challenge for the convoy was to go under several railway and road underpasses. On one occasion, the Faktor 5 was lowered to allow it pass under a railway bridge. This left a clearance of just 4 cm, but only when there was no train on the bridge at the time as that would have caused deflection in the deck of the bridge and damage to the stator.

According to Goldhofer, the generator stator was delivered safely to the project site on 20 June 2017, two days prior to the scheduled date and final entry in the TG building on 29 June 2017.

Construction of new power plants is central to India's modernisation programme, with more than 30 major projects reportedly scheduled for the next few years – all involving stators, generators or transformers weighing between 350 and 450 t. ■

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



TOP AND ABOVE: The Goldhofer Faktor 5 high girder bridge overcame many challenges in India to transport a 405 t power plant generator stator over a distance of 500 km. Some of them included more than 150 multi-span long bridges and a 15 km stretch with tight bends.

LEFT: The Faktor 5 passes beneath two railway bridges.

## Safe lifting operations at Turkey port with Sennebogen

Özüaydin Crane has put six Sennebogen crawler cranes to work on a construction site at the port of Istanbul, Turkey. These include two 5500 models and one 3300 model of the E-series, all of which feature a robust Star-Lifter crawler undercarriage. The machines are supplied by Sennebogen's local dealer Forsen Machinery.

Thanks to the innovative self-assembly system, the Sennebogen cranes can assemble themselves on site in just a few steps. The machine's powerful winches rated at 160 kN and rope speeds of up to 105 m/min also enable the job to be carried out quickly.

Safe lifting - even on difficult grounds - is a key requirement for this operation. The uneven ground on the construction site is often quite challenging, said Sennebogen, and this is where the crane's sensitive control guarantees safe positioning of the load at any time. ■

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



Sennebogen 3300 E crawler crane performs lifting duties on a jobsite at the port of Istanbul, Turkey. The machine's powerful winch rated at 160 kN and rope speed of up to 105 m/min help enable the work to be carried out quickly.

## MB Crusher 'goes back to school'

The construction of Oryx International School in Doha, Qatar, consists of two stages. The first stage (Oryx Minor) was completed in November 2016, when the first buildings were opened. Today, the school is operational.

The second stage (Oryx Major) started in June 2017 and is planned to be completed in May 2018. It includes the construction of 41,000 sq m of campus and a three-floor building with new classrooms, laboratories and gyms for over 2,000 students. Here, a BF90.3 crusher bucket from MB Crusher is being used to recycle thousands of cubic metres of inert waste materials from the excavations for the foundations and the underground carpark. The BF90.3 was purchased by Boom General Contractors, a Qatar-based construction company that is involved in the project.

Mounted on a Volvo EC240B excavator, the BF90.3 crushes the material with different sizes; to change the resulting soil texture, thicknesses can be added into or removed from the MB crusher in just a few minutes. The crushed rock will be reused to fill on-site excavations and as subgrade for the roads within the school.

According to MB Crusher, the BF90.3 was the first crusher bucket to have been placed on the market and has reached its fourth series. The model has become more productive - it can yield up to 42 cu m per hour depending on the processed material - while its size has been reduced and it is even more compact. The Series 4 can yield materials of different size, 15 to 140 mm.

Boom General Contractors said it chose the MB crusher bucket because it can crush the material directly on site, without having to bring a large crushing station. As a result, the company can save on transport costs for other machinery, since the crusher bucket



ABOVE: The BF90.3 crusher bucket mounted on a Volvo excavator takes part in the construction of Oryx International School in Doha.

LEFT: The second stage of Oryx International School is scheduled for completion in May 2018.

is carried together with the excavator. Once on site, the crusher can be assembled quickly and ready to work in a few minutes. ■

Website: [www.mbc crusher.com](http://www.mbc crusher.com)

# Doka 'forms' new signature building in Australia

The Aurora Melbourne Central on La Trobe Street is set to be the tallest residential tower in Melbourne's central business district (CBD), with a direct access to the underground City Loop rail station. The building will have 92 floors and stand more than 271 m high from the footpath. Architect Elenberg Fraser designed this high-rise for Malaysia-based developer UEM Sunrise.

For the project, Tier-1 Australian contractor Probuild selected Doka and its Australian subsidiary Lubeca as suppliers of key elements of the formwork solution. When completed in late 2019, the Aurora Melbourne Central will accommodate 959 residential units and 252 serviced apartments, plus commercial office and retail spaces.

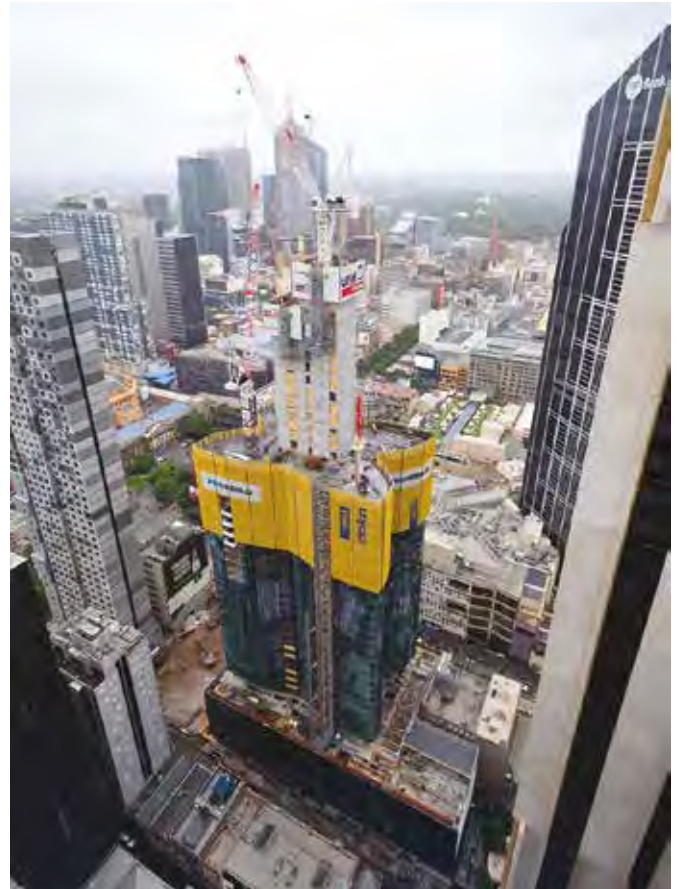
Doka and Lubeca are helping to ensure rapid progress on the project. The building's core is being constructed with two separate platform systems, and this speeds up the cycle times. Consequently, the tower is rising in the steady rhythm of a four-day cycle.

As well as being one of the tallest buildings in Melbourne, featuring curves and glass facade complete with vertical fins and integrated LED lighting, the Aurora tower will be an architectural highlight on the city's skyline. The project ranks as Doka Australia's biggest single contract to date.

According to Probuild, even with the unique geometry and non-typical elements, record levels of daily curtain-wall panel installation have been achieved to date, due to the integration of lifting structures into the Doka screen design.

Doka's Xclimb 60 protection screen enables construction work to be carried out on the top building levels of high-rise projects in great safety, and protected from the weather. The Xclimb 60 is a hydraulically climbed system that can also be lifted quickly by crane when crane capacity is available. It is continuously structure-guided, so it can be operated even at high wind speeds. In combination with an integrated monorail system, it makes the facade panels safer and faster to install, which in turn helps to save costs. ■

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



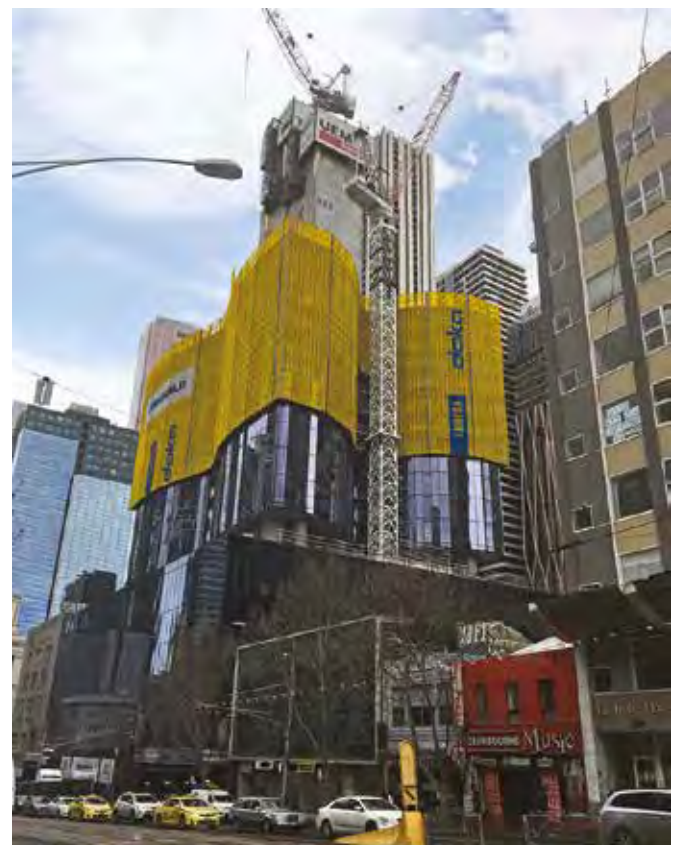
© Probuild



**TOP RIGHT:** The Aurora Melbourne Central is under construction. When completed, the 92-floor building will accommodate 959 residential units and 252 serviced apartments, plus commercial office and retail spaces.

**ABOVE:** Doka's Australian subsidiary Lubeca supplied the platform system for the formwork.

**RIGHT:** The Doka Xclimb 60 protection screen measuring 24 m in height is being used for the installation of the building's glass facade.



# DTSS PHASE 2 BREAKS GROUND

Work has started on Singapore's Deep Tunnel Sewerage System (DTSS) Phase 2. The national water agency PUB recently held the groundbreaking ceremony at the site of the project's first tunnelling shaft at Penjuru Rd.

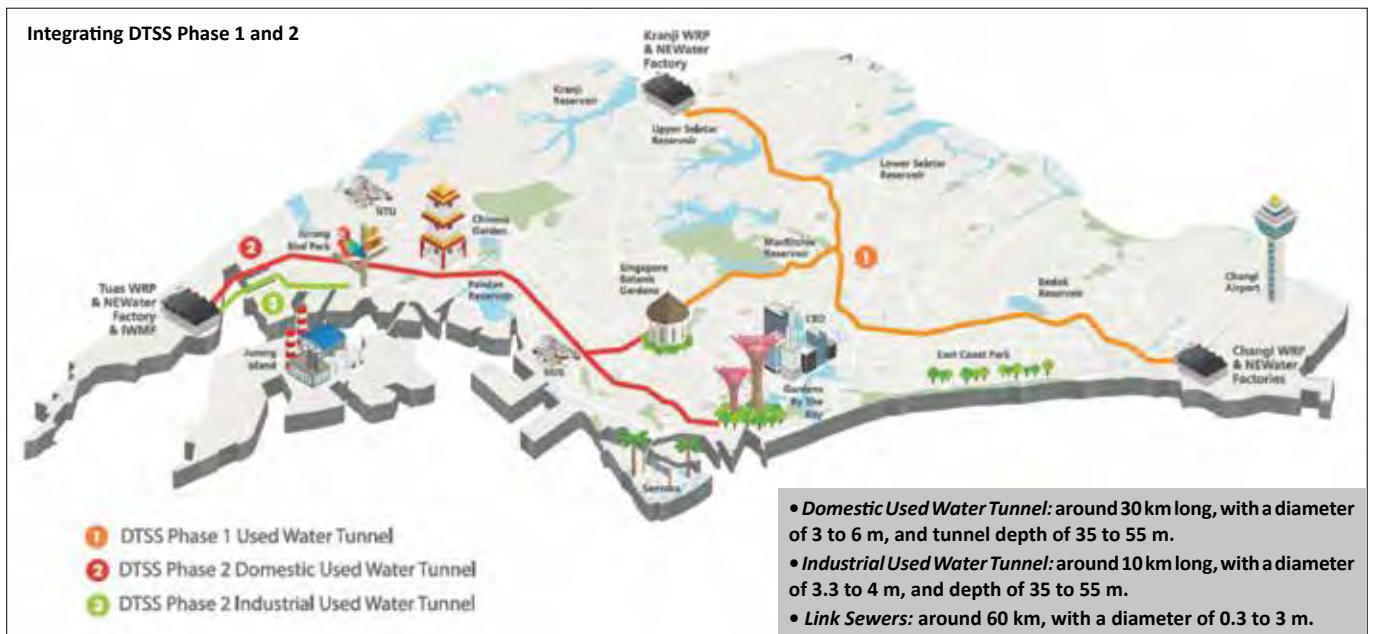
The deep tunnels in Phase 2 will connect to the existing deep tunnels in Phase 1, serving the eastern part of Singapore and the public sewer network to create one seamless integrated system. The whole of Singapore is expected to be served by the DTSS when Phase 2 is complete by 2025. Used water will be conveyed from the DTSS via gravity to three centralised water reclamation plants (WRPs) located at the coastal areas, which is then treated and further purified into ultra-clean, high-grade reclaimed water called NEWater, with excess treated effluent discharged to the sea.

Lead consultant on DTSS Phase 2 is Black & Veatch and AECOM Joint Venture. Several contractors are currently involved in the construction of the first 50 km of deep tunnels and link sewers of the project. These include: Ed Zublin AG (Singapore Branch), Penta-Ocean Construction Co Ltd and Koh Brothers Building & Civil Engineering Contractor (Pte) Ltd Joint Venture, Leighton Contractors (Asia) Limited (Singapore Branch), Nishimatsu Construction Co Ltd, and Shanghai Tunnel Engineering Co (Singapore) Pte Ltd.



ABOVE, FROM LEFT: Akira Matsumoto, GM (International Division), Nishimatsu Construction; Erhan Oguz, board member, Ed Zublin; Albert Chua, permanent secretary, Singapore's Ministry of the Environment and Water Resources; Juan Santamaria, CPB Contractors' MD representing Leighton Contractors (Asia); Masagos Zulkifli, Singapore's Minister for the Environment and Water Resources; Chua Thing Chong, COO, Koh Brothers Building and Civil Engineering Contractor; Ng Joo Hee, chief executive, PUB; Shin Sato, executive officer, head of International Civil Engineering Divisions Group, Penta-Ocean Construction; and Khor Eng Leong, MD, Shanghai Tunnel Engineering Co (Singapore).

BELOW, LEFT AND RIGHT: The groundbreaking ceremony of DTSS Phase 2 was held at the site of the project's first tunnelling shaft at Penjuru Rd.



“The DTSS is a key strategic asset in enhancing our water security. Planning for DTSS started in the 1990s with the recognition that this is a costly but critical investment that we needed to make, to strengthen our long term water security to benefit Singaporeans for generations to come. Phase 2 of DTSS is estimated to cost some S\$6.5 billion, with the deep tunnels and link sewers alone costing about S\$2.3 billion,” explained Singapore’s Minister for the Environment and Water Resources, Masagos Zulkifli.

“We have experienced how unpredictable weather patterns can be, and we expect dry seasons to worsen with climate change. It is therefore critical to augment our water sources by reclaiming water, so that it can be used again and again, in an endless cycle,” added Mr Zulkifli.

**100-year expectancy life**

To be built using the tunnelling method, the 100-km used water conveyance network for DTSS Phase 2 will run largely under the Ayer Rajah Expressway (AYE), crossing undersea at Tuas Bay and ending at deep inlet shafts within the future Tuas Water Reclamation Plant. A total of 19 tunnel boring machines (TBMs) will be used to dig at depths of between 35 and 55m below ground and under the sea to create 40 km of deep tunnels and 10 km of link sewers. The remaining 50 km of link sewers will be constructed using a micro-tunnelling method known as pipe jacking.

The conveyance system in Phase 2 will incorporate advanced technologies to enhance its operations and maintenance. Designed for an operational life expectancy of 100 years in a corrosive sewer environment, the deep tunnels will be lined for corrosion protection – especially against microbiologically-influenced corrosion, with an additional watertight membrane coating the tunnel section running undersea. The deep tunnels will also be the first project in Singapore to use air jumpers in the operations of its air flow management system, said PUB.

Advanced maintenance features of the deep tunnels include the use of embedded fibre optics for remote sensing and monitoring of structural

*Continued overleaf...*

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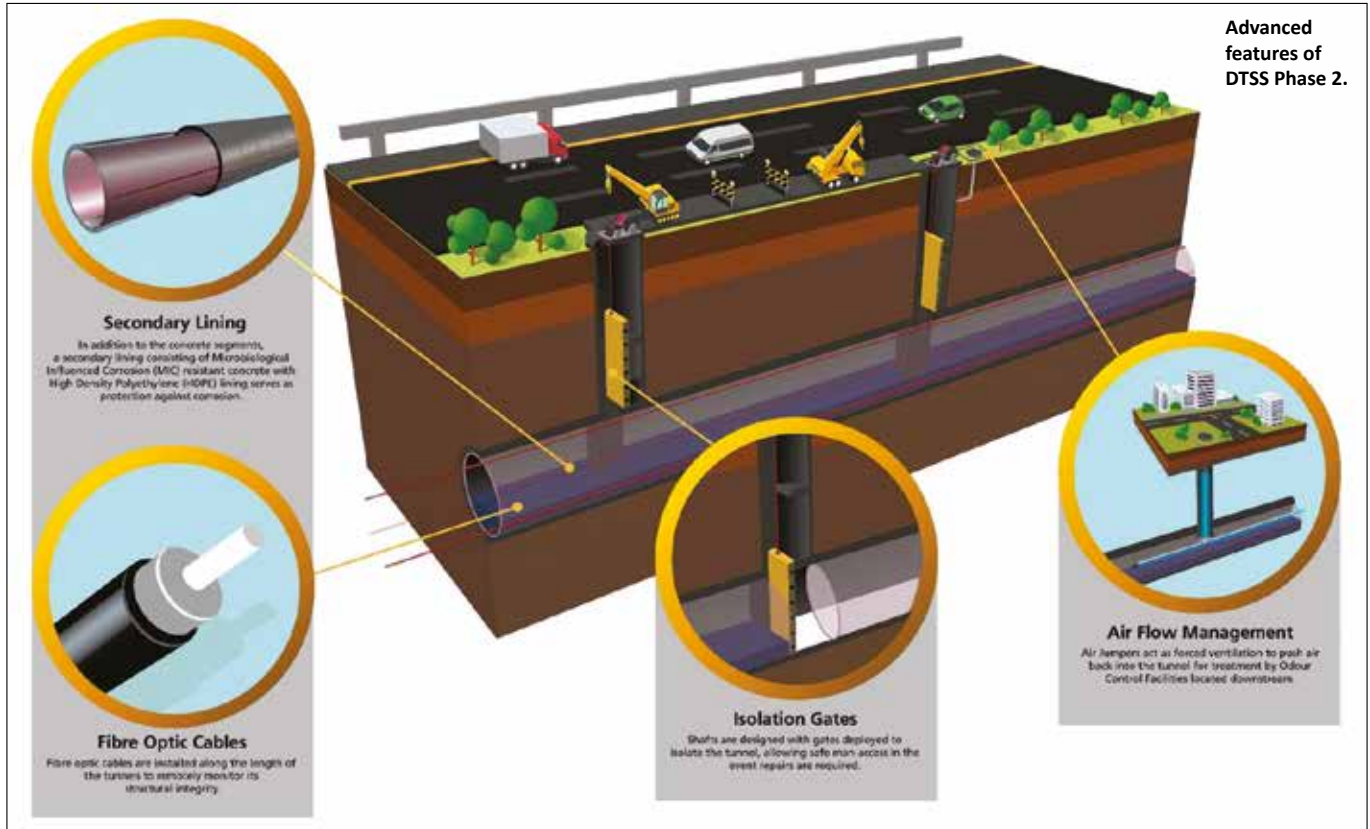
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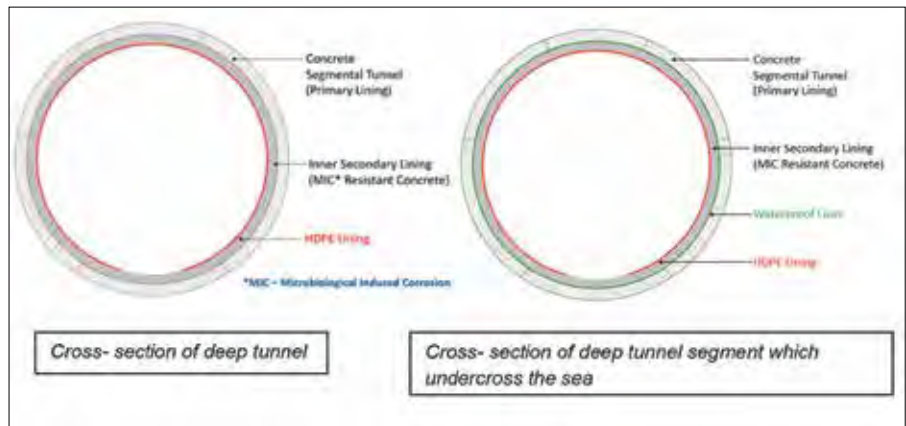
integrity, and tunnel shafts innovatively designed with gates to isolate tunnel sections for used water flow diversion, enabling safe maintenance access with no disruption to used water conveyance, added PUB.

“The construction of the conveyance system for DTSS Phase 2 will pose a new set of exciting challenges for us, as we look forward to dig deep to navigate through a variety of ground conditions in the Jurong Formation as well as tunnel beneath existing underground infrastructure and even under the sea,” said Yong Wei Hin, director of DTSS Phase 2 at PUB.

“The DTSS is a more cost-effective and sustainable way of meeting Singapore’s used water needs and securing NEWater supply for the future than simply renewing and expanding the existing conventional used water infrastructure,” he added. “PUB will continue to harness advanced technologies to enhance Singapore’s used water management system and ensure its water sustainability for the future.”

**Serving western part**

DTSS Phase 1, comprising the North and Spur Tunnels, the associated link sewers, the Changi WRP and outfall, was completed in 2008. A NEWater factory, located on the rooftop of the Changi WRP, was built in 2010 to facilitate large-scale water recycling.



© PUB

For tunnel sections that undercross the sea, an additional waterproof membrane layer is installed between the concrete segment and the secondary lining to minimise any water ingress into the tunnel.

The DTSS Phase 2 conveyance system comprises the South Tunnel, which conveys domestic used water, the Industrial Tunnel for non-domestic used water and associated link sewers. Upon completion, DTSS Phase 2 will serve the western part of Singapore, including the downtown area and major upcoming developments such as Tengah Town and Jurong Lake District.

Under DTSS Phase 2, a NEWater factory to be integrated with the Tuas WRP will be built to facilitate water recycling, contributing to the goal of increasing NEWater supply from 40 percent to up to 55 percent of total water demand

in the long term. Tuas WRP will also be co-located with NEA’s Integrated Waste Management Facility (IWMF), to harness potential synergies.

The completed DTSS will also streamline the used water network with three centralised collection and treatment points: Changi WRP in the east, Kranji WRP in the north and Tuas WRP in the west.

According to PUB, once Phase 2 is in place, the existing conventional WRPs at Ulu Pandan and Jurong, as well as intermediate pumping stations, will be progressively phased out and the land freed up for higher value development.

The implementation of the entire DTSS will result in a 50 percent reduction in land taken up by used water infrastructure once it is fully completed, from 300 ha in the 1990s to 150 ha in the long term.

### Advanced features

Mr Zulkifli pointed out that the second phase of DTSS is also contributing to the transformation of the construction industry. “The Industry Transformation Map (ITM) for the construction industry aims to have 80,000 personnel trained in digital technology. Unlike Phase 1, Phase 2 uses digital imaging to allow engineers to see things ahead of time as they construct and pre-empt design issues.”

The DTSS Phase 2 deep tunnels will feature a number of innovative and advanced features:

#### 1. Microbiological-Influenced Corrosion (MIC)–Resistant Concrete

A secondary lining of Microbiological Influenced Corrosion (MIC) - Resistant Concrete and High Density Polyethylene (HDPE) is used to protect against corrosion, particularly from bacteria and other micro-organisms present and from gaseous fumes in the sewer environment. For tunnel sections that undercross the sea, an additional waterproof membrane layer is installed between the concrete segment and the secondary lining to minimise any water ingress into the tunnel. These linings ensure the longer term life span of the tunnel.

#### 2. Remote sensing and monitoring via embedded fibre optic system

Fibre optic cables will be cast into the concrete primary lining around the deep tunnel to enable remote monitoring of the long-term structural integrity of the tunnel, critical when other construction works are underway in the vicinity, or during other events such as seismic activity.

#### 3. Isolation Gates

Shafts are designed with gates to be lowered into the deep tunnels,

**“ WE HAVE EXPERIENCED HOW UNPREDICTABLE WEATHER PATTERNS CAN BE, AND WE EXPECT DRY SEASONS TO WORSEN WITH CLIMATE CHANGE. IT IS THEREFORE CRITICAL TO AUGMENT OUR WATER SOURCES BY RECLAIMING WATER, SO THAT IT CAN BE USED AGAIN AND AGAIN, IN AN ENDLESS CYCLE. ”**

temporarily isolating the tunnels in the event that repairs are required. During which, the incoming used water flow will bypass the isolated part of the tunnel via the link sewer network and rejoin the tunnel downstream. The gates allow for the tunnel to be dry and safe for man access.

#### 4. Air Jumpers as part of Air Flow Management

DTSS Phase 2 is believed to be the first project in Singapore to use Air Jumpers (AJs) to minimise the number of Odour Control Facilities (OCFs) as part of Air Flow Management. AJs are installed at ground level along the tunnel length to manage airflow within the tunnel. The AJs help to push odorous air rising from the deep tunnel back down, where it flows to the OCFs downstream, located away from residential areas. The odorous air is then treated before being released. ■

## CONTRACTORS' INVOLVEMENT IN DTSS PHASE 2

### 1. Ed Zublin AG (Singapore Branch)

Contract Value: S\$499 million

Length: 12 km

Domestic Used Water Tunnel: Intersection of Jurong Pier Rd and AYE and follow AYE to Tuas Road

Link Sewer: Jalan Bahar/PIE junction to Benoi Road/AYE junction.

### 2. Penta-Ocean Construction Co Ltd and Koh Brothers Building & Civil Engineering Contractor (Pte) Ltd Joint Venture

Contract Value: S\$520 million

Length: 10 km

Domestic Used Water Tunnel: Tuas Road to Tuas Water Reclamation Plant. Part of which will pass under Tuas Bay.

Industrial Used Water Tunnel: Jalan Buroh/Pioneer Road and Pioneer Section 1 before passing under Tuas Bay and terminate at Tuas Water Reclamation Plant.

### 3. Leighton Contractors (Asia) Limited (Singapore Branch)

Contract Value: S\$495 million

Length: 8 km

Domestic Used Water Tunnel: Intersection of Clementi Road and AYE to the intersection at Jurong Pier Road and AYE.

### 4. Nishimatsu Construction Co Ltd

Contract Value: S\$340 million

Length: 8 km

Domestic Used Water Tunnel: Intersection of Portsdowns Road and AYE to the intersection of Clementi Road and AYE  
Link Sewer: Portsdown Road to Leedon Heights and Intersection of Clementi Road and AYE to Clementi Road and West Coast Road

### 5. Shanghai Tunnel Engineering Co (Singapore) Pte Ltd

Contract Value: S\$472 million

Length: 12 km

Domestic Used Water Tunnel: Keppel Road to Portsdown Road  
Link Sewer: Sentosa to Warwick Road

# INSTALLING NEW PIPELINE IN THAILAND





**BOTH IMAGES:** A new 10-km gas pipeline was under construction in Map Ta Phut, Rayong province, Thailand. HDD contractor Thaitan Drilling Company Limited worked on a 3.5 km section, installing a 28-in-diameter steel pipeline at a depth of 12 m.



**T**hailand-based HDD contractor Thaitan Drilling Company Limited recently carried out a gas pipeline installation work in Map Ta Phut, Rayong province, for the Thai state-owned oil and gas company PTT Public Company Limited.

The entire project, which began in January 2017, required 10 km of new pipeline and it took about a year to complete. Thaitan won the contract for a 3.5 km section, installing a 28-in-diameter steel pipeline at a depth of 12 m. The company started its work in March 2017 and finished it in November 2017.



### ‘Extremely careful’

The project aimed to replace the existing pipeline, which has been present for more than two decades, explained Trin Pimhataivoot, CEO of Thaitan Drilling. “The old pipeline was the first transmission pipeline installed in Thailand and is still in use. Our challenge was to install the new 28-in pipeline close to this old pipeline - with a separation distance of only 4 m - so we had to be extremely careful.”

Mr Pimhataivoot added, “The mixed ground conditions – consisting of soil, clay, sand and rock – made our work more difficult. Flexibility was therefore key to our successful completion. We always prepare different types of equipment on-site in order to meet various challenges.”

Thaitan worked on two shifts, 24 hours a day, seven days per week on the project. According to Mr Pimhataivoot, the company employed a team of 30 people, with 15 on each shift to allow continuous operations. There were also six machine operators who run two HDD machines alternately.



**TOP:** The new pipeline had to be installed close to the existing pipeline - with a separation distance of only 4 m - so it required a careful and accurate work process.

**ABOVE:** One of the HDD rigs used on the project was a Vermeer D220X300S, which features a maximum thrust/pullback rating of 1,076.9 kN and 1,479.2 Nm of torque. The machine can stage five rods at a time, minimising jobsite time spent loading rod.

### Most difficult crossing

Thaitan's scope of work involved five crossings, out of 13 crossings in total throughout the whole project. The company deployed its two Vermeer HDD rigs, the D130x150S and D220X300S, to perform two crossings each; except for the fifth and last crossing, where both of them were used.

"The fifth crossing, spanning 1.2 km, was the most difficult crossing in our part and we had to apply the Intersect method," said Mr Pimhataivoot. "It requires the two pilot holes from both sides of exits to drill towards each other, and at a certain point they will intersect."

The Vermeer D130x150S drilling rig features 9.92 m long, 2.49 m wide and 3.28 m high. It is powered by a 240 hp engine, with 59,000 kg of pullback force and 20,337 Nm of torque. The 757 l/min Aplex pump provides high mud flow when working with large reamers. The optional telescoping crane with remote control eliminates the need for backhoe or excavator when changing rod boxes.

The Vermeer D220X300S drilling rig has a maximum thrust/pullback rating of 1,076.9 kN, plus 1,479.2 Nm of torque. The machine creates a smaller footprint, making the drill suited to tighter-fitting jobsites while allowing operators to move the drill in and out of jobsites quickly and easily. The D220x300S can stage five rods at a time, minimising jobsite time spent loading rod.

Thaitan's HDD rigs for the project were supplied by Asia Technical Consulting Co Ltd (ATC), the exclusive dealer for Vermeer equipment in Thailand. Established in 1993, ATC offers a total solution including after-sales service, spare parts provision and operator training. The company started its operation with just four people, and has now grown to become one of Thailand's most reputable HDD equipment suppliers.

"Half of our team members are dedicated to servicing customers," said Jon Jamieson, owner and managing director of ATC. "We must be on standby all the time, even after midnight, because our customers work everyday including weekends and public holidays; and sometimes the projects are located in remote areas. So if they need our support, we will try to be there within 24 hours."

"We have been relying on ATC for our local projects and their reliability is critical, given the intensive and challenging works that we do," said Mr Pimhataivoot. "We operate round the clock and it would be difficult to complete our projects on time without their support." ■



Trin Pimhataivoot (right), CEO of Thaitan Drilling, with Jon Jamieson, owner and managing director of ATC, the exclusive dealer for Vermeer equipment in Thailand.



LEFT AND BELOW: The Vermeer D130x150S drilling rig was also working on the project. The machine features 59,000 kg of pullback force and 20,337 Nm of torque.



Further information on Thaitan Drilling: [www.titanhdd.com](http://www.titanhdd.com), and ATC: [www.vermeerthailand.com](http://www.vermeerthailand.com)



# NEW PREFABRICATION HUB OPENS IN SINGAPORE

In its effort to steer the industry towards raising productivity, Singapore's Building and Construction Authority (BCA) worked with various agencies to formulate a master plan for the development of multi-storey and higher density Integrated Construction and Prefabrication Hubs (ICPHs) on land parcels with 30-year lease term. ICPH is a multi-storey advanced manufacturing facility for producing prefabricated construction elements, such as precast concrete components, with a high degree of automation.

Straits Construction Singapore Pte Ltd was awarded the second ICPH land tender, which was launched by BCA in May 2014. The ICPH - named Greyform Building - began construction in September 2014 and was completed in December 2016. The grand opening of the facility took place in October 2017.

Greyform Pte Ltd, a member of Straits Construction Group, was incorporated in



TOP AND ABOVE: Greyform Building, the latest ICPH in Singapore, is a multi-storey advanced manufacturing facility designed for producing prefabricated construction elements, such as precast concrete components, with a high degree of automation.

December 2015 to offer precast and prefabricated solutions to the construction industry. Greyform capitalises on digital technology and automation for long-term competitiveness, and aims to transform the traditional industry by injecting youth and new skills for the future economy.

Greyform Building comprises a four-storey precast concrete components production factory and office, three blocks of 12-storey dormitory (housing 750 workers), a multi-storey (seven-tier) automated precast components storage and retrieval system, and a concrete batching plant with underground aggregate storage facility.

“ICPHs are significant developments, housing exciting innovations and technologies that can raise productivity in and bring new energy to the building industry,” said Singapore’s Minister for Finance Heng Swee Keat, speaking at the opening ceremony of Greyform Building. “ICPHs support DfMA (Design for Manufacturing and Assembly) and both are critical for improving productivity in construction.”

Mr Heng further explained the benefits of ICPHs. “First, ICPHs optimise land use by consolidating construction processes of many sites in a single facility. Second, they improve labour productivity. With the mass production of prefabricated components, our companies require less time and fewer workers to be on site to construct the buildings. We can also prevent delays from design changes and abortive works, which are more common when using traditional processes and construction methods.

“Third, the controlled and conducive manufacturing environment in an ICPH helps to improve the quality of prefabricated components and minimise disturbance to the surrounding residents. Last but not least, ICPHs create new and higher-skilled jobs that require multidisciplinary skills in construction, manufacturing, logistics and ICT.”

Wong Chee Herng, group managing director and CEO of Straits Construction Group, highlighted the fact that in order to fully realise the potential of DfMA, the entire construction ecosystem has to change. “This means all key players starting from the developers, the architects, the engineers, the main contractors, the subcontractors and the suppliers have to start adopting a different mindset and approach to how buildings should be designed and built,” he said.

“Unfortunately, the construction sector at its current state is not there yet,” he admitted. “We are however gladdened by the steps taken by BCA to address this. An example is BCA will be launching a Good Industry Practice Guidebook on mechanical connections for precast components. This guidebook is a collaboration between Straits Construction, Greyform and other industry players.

“By adopting such connections, the precast components can be produced more efficiently in automated plants such as this one, as we can do away with the current practice of using starter bars. On site assembly productivity will be improved as mechanical joints replaces the need for in-situ wet joints, which are labour intensive. This should also lead to safer installation.”



The automated multi-level precast storage facility at Greyform Building has a capacity to accommodate up to 5,800 t of products. This automated system is capable of storing and retrieving an entire rack of precast components onto standard transport trailers. As such, it helps to shorten standby time of transport trailers and improve overall round-trip-time.

### Advanced capabilities

Greyform Building offers numerous advanced capabilities, one of which is the digital technology. The fully integrated system allows seamless flow of data from design to production, thereby enhancing productivity and precision. The use of detailed 3D digital models enables Greyform to compute accurately the quantity of materials required. The 3D models are subsequently used for the production of precast and prefabricated components.

In addition, Greyform Building has a concrete batching facility. Consisting of an underground raw material storage bunker, it is fully automated for producing ready mixed concrete. This fully enclosed facility helps to minimise disamenities generated from dust and noise. Ready mixed concrete is automatically transported by 'flying buckets' delivery system to the various precast production lines. Such system allows minimal disruption due to change in concrete mix and ensures continuous concrete supply for automated pallet circulation plant and hollow core slab production.

Another part of Greyform Building is a steel reinforcement fabrication plant. Here, the automated steel reinforcement machine allows full flexibility in product customisation to produce steel mesh, stirrup cages, cut and bend reinforcement bars and reinforcing cages.

At the automated pallet circulation plant, different stages of precast production such as cleaning and oiling of pallet, and plotting of required shape on pallet for formwork placement and concreting can now be automated and linked seamlessly. Common precast components such as columns, beams, walls and slabs can be efficiently produced using the pallet circulation system.

Greyform Building is currently the first ICPH that uses automated robotic shuttering for placement of steel magnetic formwork onto the pallet, to create the moulds for precast concrete production. After the mould is set on the pallet and steel reinforcements (produced at the second storey fabrication plant) are placed in position, concrete is poured into the mould with an



Greyform Building uses automated robotic shuttering for placement of steel magnetic formwork onto the pallet, to create the moulds for precast concrete production.

## SINGAPORE CONSTRUCTION PRODUCTIVITY ROADMAP

The first and second Construction Productivity Roadmaps set by BCA aim to raise the productivity of Singapore's construction sector by an average of 2 – 3 percent per annum over the period from 2010 to 2020. The vision is to build a highly integrated and technologically advanced construction sector led by progressive firms and supported by a skilled and competent workforce.

Since embarking on the first Construction Productivity Roadmap in 2011, BCA has observed positive signs that productivity initiatives and efforts are gaining traction. It said that annual site productivity has improved from 0.3 percent in 2010 to about 2 percent each in 2014 to 2016.

As of end Aug 2017, more than S\$480 million out of about S\$800 million under the Construction Productivity and Capability Fund (CPCF) has been committed, according to BCA, benefitting more than 9,000 firms - about 90 percent of which are small and medium-sized firms.

The second Construction Productivity Roadmap aims to drive the sector towards achieving more aggressive productivity gains

till 2020. This would require a strong productivity mindset among key stakeholders in the entire value chain to design and construct buildings with less manpower. A total of S\$450 million has been set aside from June 2015 to May 2018 for the second tranche of the CPCF to support the initiatives under the second Roadmap.

There are three focus areas that have been identified under the second Roadmap. First is higher quality workforce. The desired workforce profile for the built environment sector is one that consists of a stronger pool of PMETs to lead the advancement of the sector, and a bigger pool of higher skilled (R1) workers among the work permit holders (WPHs) to anchor the workforce by 2020. Currently, nearly 40 percent of construction workers are at the R1 level, a significant improvement from 20 percent in 2014 and only about 2 percent in 2011, said BCA.

The second area is higher capital investment. To achieve a quantum leap in productivity improvement, the industry needs to move towards widespread adoption of prefabrication technologies using the concept of DfMA. This means designing for labour-

automated concrete placement machine and spread evenly by compaction.

The heated curing chamber facility within the circulation plant also accelerates the time for concrete products to be ready for demoulding (where the precast components are removed from their mould). After demoulding, the steel formwork and the pallet are cleaned automatically for the next use.

“First in Singapore to adopt robotics in precast manufacturing processes, our pallet circulation plant’s versatile design enables production of various precast component types on a common pallet mould. Using digital modelling as our key to automation, we are now able to drive production with precision and perform production planning, delivery planning and production control,” said Mr Wong.

“In addition, this plant being highly automated requires less land area and labour to operate as compared to any existing open yard plant of the same capacity. This high level of automation will require the labour force it employs be higher skilled, more productive and naturally better paid.”

Nevertheless, being highly automated is not enough, asserted Mr Wong. “To fully maximise productivity, as in any other type of manufacturing processes, is for the product to be as standardised and as repetitive as possible.

“We must not believe that standardisation removes creativity. One



Another part of Greyform Building is a steel reinforcement fabrication plant. Here, the automated steel reinforcement machine allows full flexibility in product customisation to produce steel mesh, stirrup cages, cut and bend reinforcement bars and reinforcing cages.

only has to look at Lego. Highly standardised blocks but the ability to create, endless.”

Greyform Building also features an automated precast storage facility. On the limited 2-ha land space, the automated multi-level precast storage system can handle precast component storage needs

with a capacity to house up to 5,800 t of products. This automated system is capable of storing and retrieving an entire rack of precast components onto standard transport trailers. As such, it helps to shorten standby time of transport trailers and improve overall round-trip-time. ■

efficient construction, with as much construction works done off-site as possible.

The last area of focus is better integrated construction value chain. The industry needs to enhance the collaboration among the various stakeholders through Virtual Design and Construction (VDC). The VDC process helps integrate design, prefabrication and construction, to identify upstream design clashes and simulate downstream construction workflow. It allows construction to occur first in the virtual environment, almost like a full-dress rehearsal, before the actual on-site construction.

The use of Building Information Modelling (BIM) technology is integral to the VDC process, to surface problems and clashes before actual construction begins. BIM also supports the integrated DfMA approach where the digital model is used to drive production planning and automation. To reap the full potential of BIM, all the parties across the value chain need to leverage BIM technology, said BCA.

“In the last 15 years, the volume of our construction demand

went up by almost 200 percent from 2001 to S\$26 billion in 2016,” said Mr Heng. “The sector will continue to play a critical role in our Future Economy as we rejuvenate our city and develop new growth areas such as the Jurong Lake District, and in Punggol and Woodlands.”

The built environment sector is also set to be a key driver in the global economy, added Mr Heng, “as global capital project and infrastructure spending are expected to grow to a projected US\$9 trillion in 2025. Asia will account for more than half of this spending,” he said.

“Countries near us – China, India, Thailand, Malaysia, Philippines, Indonesia, Australia, New Zealand and other economies – have healthy demand for sustainable infrastructure and productive construction technologies. “These signal opportunities for our construction sector to expand beyond Singapore. In particular, those with innovative and productive methodologies will be better placed to create value for their partners in these markets.” ■

# BUILDING RAILWAY OF THE FUTURE

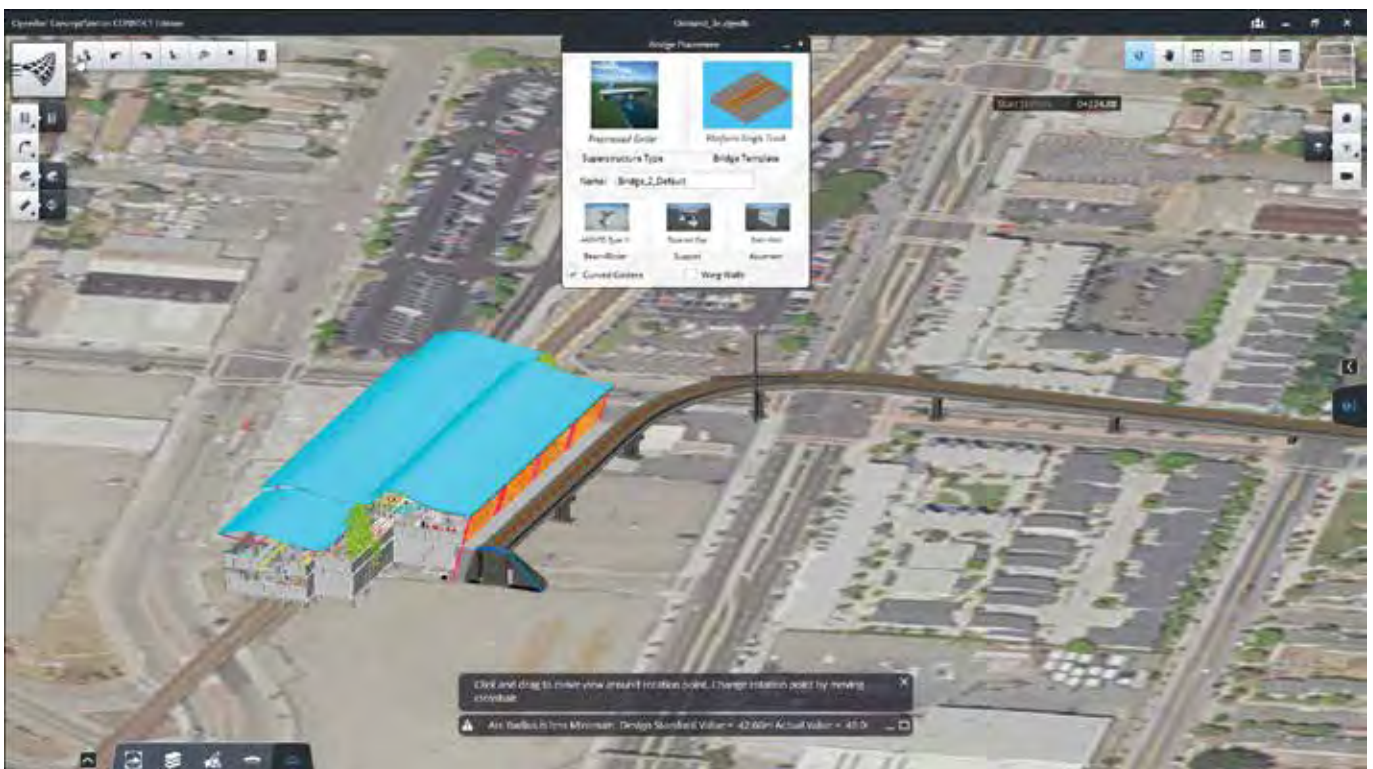
**AS RAIL AND TRANSIT IS EXPECTED TO BE ONE OF THE FASTEST GROWING TRANSPORTATION SECTORS IN THE NEXT FEW YEARS, BENTLEY SYSTEMS HAS EXPANDED ITS OPENRAIL INITIATIVE. THE NEW SOLUTION COMPRISES APPLICATIONS AND SERVICES FOR THE COMPREHENSIVE PLANNING, ENGINEERING, PROJECT DELIVERY AND OPERATIONS OF RAIL AND TRANSIT INFRASTRUCTURE, COVERING THE ENTIRE LIFECYCLE.**

The foundation of OpenRail system is Bentley's connected data environment (CDE), shared by ProjectWise collaboration services and AssetWise operations services, and for which OpenRail now brings together digital components and digital context, through digital workflows.

OpenRail applications will include OpenRail ConceptStation, now available for conceptual railway planning and design; OpenRail Designer, available in early 2018, for detailed engineering and 3D design of track, overhead line, tunnels, bridges and related civil infrastructure; and AECOsim Station Designer, for the

comprehensive modelling of rail and transit stations.

Greg Bentley, CEO of Bentley Systems said, "Most of our portfolio applications are used on rail projects, and we've advanced BIM for rail, in particular, with our Rail Track offering, rail corridor maintenance optimisation through Optram, and via ComplyPro railway requirements compliance progressive assurance. However, the conception of these specific tools for specific purposes preceded the aspiration for what we now call digital workflows, where engineering deliverables are meant to be reused throughout the asset lifecycle.



OpenRail ConceptStation – one of OpenRail applications - extends BIM capabilities to rail conceptual planning and layout. It allows users to access Components Centre so they can drag and drop digital components into the design to quickly lay out rail lines, bridges, overhead lines, signals, tunnels, etc.

“Moreover, our railway engineer users have been persuasive in making the case that a railway - more so than any other infrastructure asset - is a system of connected components, meriting a systems engineering approach from the outset. So, rail has become our company priority for putting everything together - industrialising BIM for project delivery and leveraging digital DNA for asset performance.”

Bentley’s OpenRail system is very comprehensive, due to its “breadth and depth of solutions. It manages all asset disciplines of the whole lifecycle,” said Andrew Smith, solutions director for rail at Bentley Systems. “We have built a complete system here – not just creating sleepers or signals – and this system is expected to be highly reliable that can last for many years.”

“When you can take the information and go across the entire lifecycle, the system adds extra value,” added Jeremy Shaffer, vice president for rail solution at Bentley Systems. “Railway construction is a complex matter, so our system covers more than just the design features, it also takes into account the infrastructural aspects such as the geotechnical requirements.”

Mr Shaffer said that although the OpenRail solution is quite new to the industry, its applications and services have been used individually around the world, including in Asia, such as in the Nagpur metro rail project in India (CDE) and the KVMRT project in Malaysia (ProjectWise and AssetWise).

“There is a great diversity in Asia when it comes to BIM adoption - it’s not a monolithic market,” said Mr Shaffer. “Each country, like Singapore, Vietnam, India and China, is different and presents its own opportunity.”

“The region covers huge spectrums of technology,” said Mr Smith. “When we enter a market, we need to understand the maturity level of that market, not only in terms of technology but also their railway experience and knowledge, so that we can offer the right solution for them.”

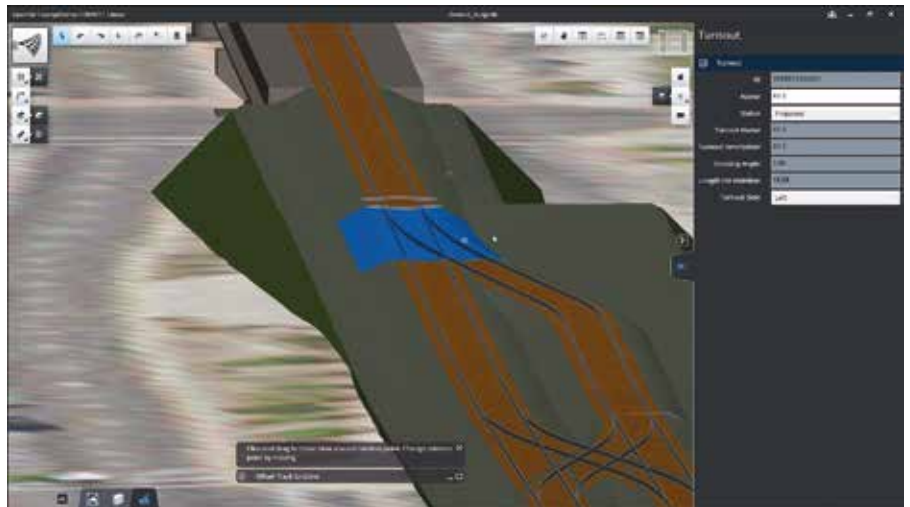
Mr Smith further asserted that the implementation of BIM technology requires a strong collaboration among the stakeholders and “it should be applied right from the start of a project to enjoy the full benefits. Our customers told us they have seen significant values and cost savings through the adoption of BIM technology.”

### Connected data environment

OpenRail is based on a connected data



ABOVE: Andrew Smith, solutions director for rail at Bentley Systems.  
FAR LEFT: Greg Bentley, CEO of Bentley Systems.  
LEFT: Jeremy Shaffer, VP for rail solution at Bentley Systems.



ABOVE AND BELOW: OpenRail ConceptStation can also create innovative designs including switches, crossings and related infrastructure.



environment, comprising the shared services of ProjectWise and AssetWise, as configured specifically for rail systems engineering workflows. During project delivery, ProjectWise facilitates the collaboration among distributed engineering teams, coordination of structured workflows and connected project visibility. For OpenRail, AssetWise provides asset lifecycle information

services for linear, network and geospatial referencing, corridor maintenance decision support, inspection workflows, and reliability and change management.

OpenRail CDE services include Components Centre for digital components, ContextShare for digital context, ComplyPro for progressive assurance, and ConstructSim Systems Completions for accessing operational readiness.

ComplyPro is a market leader in rail globally for governance of collaborative assurance systems of technical and safety requirements from concept to project handover. OpenRail extends this scope to progressive operations assurance and regulatory compliance. ConstructSim Systems Completions automates the inspections process to accelerate systems progress and validate system readiness for efficient project turnover and closeout.

### Digital components

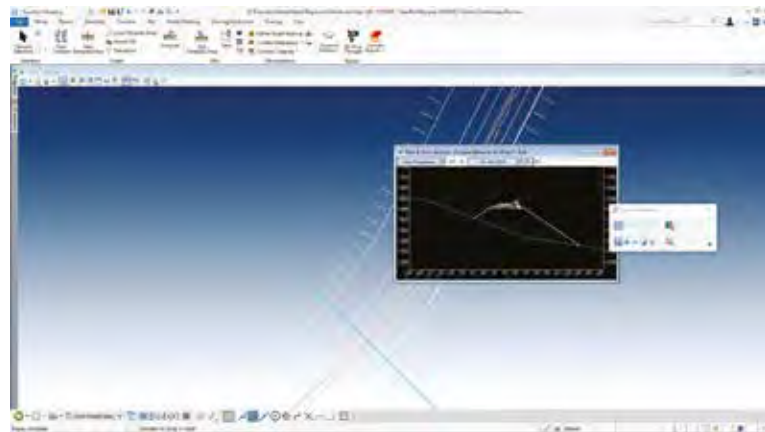
ComponentsCentre is an Azure cloud service of libraries which align, across disciplines and applications, the semantic content of catalogued components, potentially including vendor data, fabrication details, component requirements (for example, electrical specifications and connections), reliability characteristics and representational views required for documentation (e.g. 3D, plan, schematic, etc). A digital component is reused across BIM workflows in design modelling, analytical modelling, construction modelling and asset registries - from catalogued component, to engineered component, to installed component, to operated component.

The OpenRail Components Centre is being initialised with libraries of generic rail components with appropriate intelligence, and libraries from significant providers such as Siemens, but is intended to be maintained and extended by user organisations.

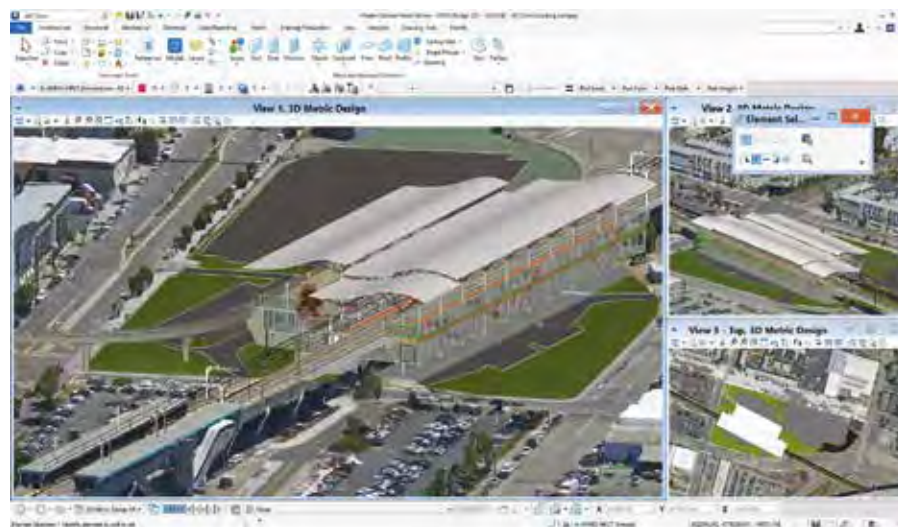
### Digital context

Reality modelling incorporates digital context in the rail infrastructure workflow. Bentley's ContextCapture processes digital photography and/or laser scans, from UAVs or hand-held or train-mounted devices, to produce an engineering-ready 'reality mesh' accurately representing the continuously surveyed conditions of a railway corridor, site or station.

Throughout detailed design, the reality mesh, for example, can be used to consider sight lines for signal siting. Because the reality mesh can be captured continuously, construction progress can be tracked and compared to the expected progress of the detailed design. In operations, the reality mesh can be used to compare the as-operated 3D model with the as-designed model, and serve as an immersive 3D environment with hyperlinks to equipment sensors for operations visibility and emergency response training.



LEFT AND BELOW: Another OpenRail application, OpenRail Designer, enables detailed engineering and 3D design of track, overhead line, tunnels, bridges and related civil infrastructure.



### OpenRail ConceptStation

OpenRail ConceptStation, enabled by the combination of OpenRail's digital components and digital context, extends BIM capabilities to rail conceptual planning and layout. Working in the 3D design environment of the geo-coordinated reality mesh as the digital context of the rail corridor, the user can access Components Centre to drag and drop digital components into the design to quickly lay out rail lines, bridges, overhead lines, signals, tunnels, etc.

With the context of the terrain, and the intelligence of the digital components, OpenRail ConceptStation can quickly calculate quantities of railway elements such as track, ballast, sleepers, contact and catenary wire, equipment, bridge decking, concrete and steel, as well as the cut-and-fill earthwork required for the conceptual design, and interactively produce a preliminary cost estimate to evaluate feasibility. All the design information, components and context in the conceptual design can be reused in a digital workflow to OpenRail Designer for detailed design of the railway infrastructure.

### Digital workflows

In digital workflows, data captured or created for one purpose is accessed by computer programmes for other purposes, saving time, minimising rework and improving data quality over the asset lifecycle. Digital workflows can also converge the work of different disciplines for additional advancements in project delivery and asset performance. Examples enabled by digital workflows include conceptioneering, constructioneering, inspectioneering and operationeering. Each of these workflows represents new opportunities for engineers and their work to add value beyond their traditional role in design, to include contributions to construction, inspections and operations.

The advancement of digital workflows in OpenRail will help users to achieve faster delivery, system-wide visibility, assured compliance and better decisions in design, construction and operations of rail infrastructure. ■

Website:  
[www.bentley.com/en/solutions/industries/openrail](http://www.bentley.com/en/solutions/industries/openrail)

## MALAYSIA'S RAILWAY PROJECT HONOURED FOR BIM ADVANCEMENTS

The Klang Valley Mass Rapid Transit (KVMRT) Sungai Buloh-Serdang-Putrajaya Line in Kuala Lumpur, Malaysia, has won the Be Inspired Award 2017 for BIM Advancements in Rail and Transit.

The Be Inspired Awards programme is designed to honour the extraordinary work of Bentley users that advance the infrastructure design, construction and operations throughout the world. It is held as part of Bentley's annual Year in Infrastructure conference. In 2017, the event took place in Singapore in October – the first time it was held in Asia.

The KVMRT Sungai Buloh-Serdang-Putrajaya is the second mass rapid transit line being developed for the Greater Kuala Lumpur-Klang Valley region of Malaysia, and the first metro project in Asia to adopt a BIM Level 2 strategy. The MYR 32 billion railway project spans 52.2 km, of which 13.5 km is underground, includes 35 stations, and upon completion will serve approximately two million people.

MRT Corporation (MRT Corp) mandated a BIM methodology, including 3D photogrammetry for verification at critical milestones

to improve design collaboration, construction feasibility and accuracy of as-built information, and ensure sustainability of asset information throughout the project lifecycle.

MRT Corp used ProjectWise as the common platform to streamline the design process among the numerous design disciplines and AssetWise for lifecycle information management. Bentley applications provided a connected data environment for all disciplines to work dynamically using a federated model for coordinated design, and enabled the integration of design and asset information with the operation and maintenance system to ensure optimal asset performance throughout the project lifecycle.

The team used ContextCapture to verify design accuracy, importing point clouds into the 3D construction models to reference existing conditions. Bentley's BIM advancements reduced rework and improved design collaboration by 35 percent. ■

**Project Playbook:** AssetWise, ContextCapture, ProjectWise, STAAD.Pro.



© Mass Rapid Transit Corporation Sdn Bhd

The KVMRT Sungai Buloh-Serdang-Putrajaya is the second mass rapid transit line being developed for the Greater Kuala Lumpur-Klang Valley region of Malaysia, and the first metro project in Asia to adopt a BIM Level 2 strategy.

# WHEN 'MINI' RULES

WITH THE INCREASING USE OF MINI CRANES IN CONSTRUCTION PROJECTS ACROSS SINGAPORE, JP NELSON NOW OFFERS SPECIALISED TRAINING TO HELP RAISE THE COMPETENCY OF MINI CRANE OPERATORS. SOUTHEAST ASIA CONSTRUCTION RECENTLY MET UP WITH THE COMPANY TO FIND OUT MORE ABOUT ITS TRAINING PROGRAMME AND THE BENEFITS OF THESE COMPACT MACHINES.



TOP AND ABOVE: The Maeda MC-405C is one of JP Nelson's popular mini cranes in Singapore market. The machine has a compact dimension and can be folded up to enable it fit through a standard doorway.

## Small and efficient

JP Nelson Equipment Pte Ltd is the exclusive distributor of Maeda mini cranes in Singapore. In 2016 the company was appointed by the Building and Construction Authority (BCA) as an approved training and testing centre for mini crane operation, and it started its first training course in 2017.

"As our demand for mini cranes increased over the years, we initiated a discussion with the government on the importance of differentiating mini cranes from the larger mobile cranes. Our effort finally paid off and a new guideline was recently implemented, which categorises mini cranes as mobile cranes with a capacity of not more than 5 t," explained Andrew Tan, general manager of Antar Cranes Services Pte Ltd, a subsidiary of JP Nelson.

"The mini crane sector has been booming in Singapore since mid 2000s, and many of them are now working on the MRT projects. In the past five years, our rental sales have grown by almost 50 percent."

Mini cranes can perform lifting tasks on various construction sites, such as buildings, railways, power stations, tunnels and underground sites, among others. “We see a big potential for mini cranes in Singapore and across Southeast Asia, as customers are looking for a more efficient and effective lifting method,” said Mr Tan. “Mini cranes are an ideal solution, because they are small in size and can manoeuvre into tight and narrow areas where larger cranes are not practical. Thus the machines can go nearer to the designated point of offloading and installation, and this allows the operator to have a good view of the work being carried out and in turn enhances the safety of the lifting process.

“Spider mini cranes can also be folded up to enable them fit through a standard doorway. Quick setup time is another advantage of mini cranes; it only takes up to 15 minutes.”

**Continuously improved**

Maeda mini cranes have been continuously improved and adapted to changing needs. The machines meet the latest emission regulations, which take into account the environmental impact. They are powered by both diesel engine and electric motor, reducing gas emissions.

The mini cranes can also be operated by a remote control, so that the operator can move closer to the load, making it more convenient and further enhancing the safety of the work process.

In addition, Maeda has introduced a fly jib to extend the crane’s boom for maximum reach. “The fly jib is an optional feature on several models, which can be fitted to the boom to give additional lateral movement. It makes it easier for the crane to go inside the building, for example,” said Mr Tan.

Two of the well-known models in Singapore include the Maeda MC-405C and MC-305C CRME spider mini cranes, said JP Nelson. The new CC985S-1 mini telescopic crawler crane is also expected to be popular in the market.

The Maeda MC-405C has a capacity of 3.83 t x 2.7 m, maximum working radius of 16 m x 0.21 t, maximum lifting height of 16.8 m



The new CC985S-1 is the latest addition to JP Nelson’s Maeda mini crane range.



ABOVE, LEFT AND FAR LEFT: Mini cranes can perform lifting tasks on various construction sites. They are also ideal for use indoors or in a tight and narrow areas, where larger cranes are not able to access.



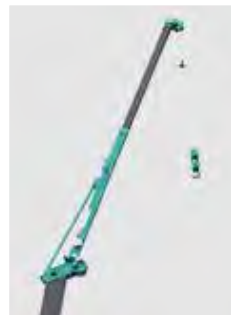
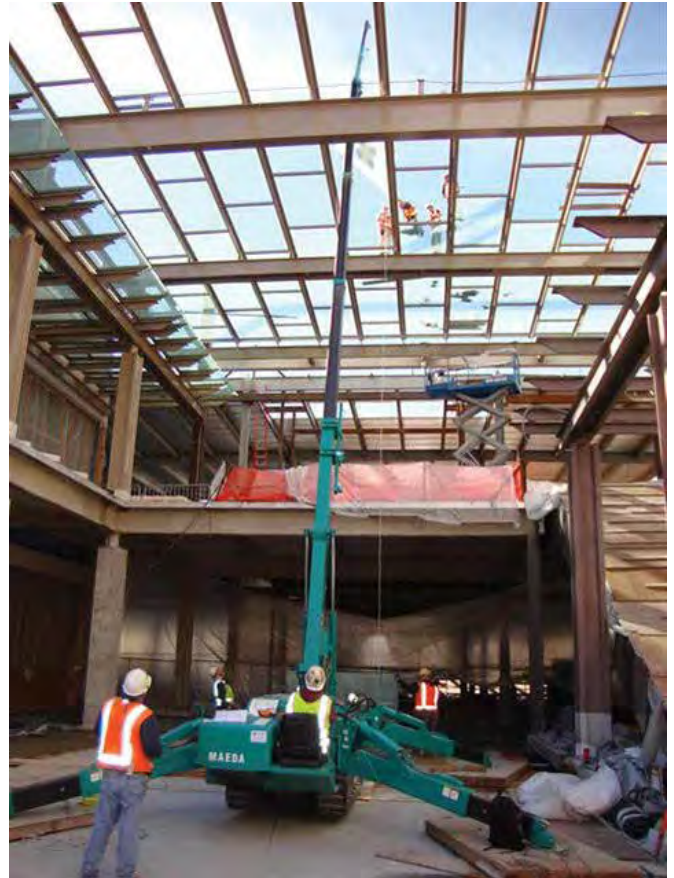
Andrew Tan, general manager of Antar Cranes Services Pte Ltd, a subsidiary of JP Nelson Equipment Pte Ltd.

(20.7 m with fly jib) and pick & carry capacity of 500 kg. The crane weighs about 5,600 kg (5,750 kg with electric motor), and features 4,980 mm long, 1,380 mm wide and 1,980 mm high. Its travel speed is 0-3.3 km/hr and maximum reach below ground is -20.5 m.

The MC-405C delivers a gradeability of up to 20 degrees and is powered by a 21.4 kW diesel engine, with a 7.5 kW electric motor. The maximum extended width for its outrigger is 5,786 mm (lateral), 5,118 mm (front) and 5,520 mm (rear). The crane's fully automatic five-section telescopic boom offers a length from 4,735 to 16,475 m.

The Maeda MC-305C CRME has a capacity of 2.98 t x 2.5 m, maximum working radius of 12.16 m x 0.26 t and maximum lifting height of 12.52 m. At 3,900 kg (4,080 kg with electric motor), the crane features 4,285 mm long, 1,280 mm wide and 1,695 mm high. Its travel speed is 0-2.8 km/hr and maximum reach below ground is -16.09 m.

The MC-305C CRME delivers a gradeability of up to 23 degrees and is powered by a 15.2 kW diesel engine, with a 5.5 kW electric motor. The maximum extended width for its outrigger is 4,888 mm (lateral), 4,504 mm (front) and 4,396 mm (rear). The crane is also equipped with a fully automatic five-section telescopic boom of 3,695 to 12,485 m in length.



ABOVE AND LEFT: Fitted with a fly jib (left), Maeda mini cranes become more versatile on a jobsite. The fly jib is an optional feature on several Maeda cranes, which gives additional lateral movement to the boom.

BELOW: Maeda mini crane operates inside a tunnel.



The new Maeda CC985S-1 mini telescopic crawler crane recently arrived in Singapore. The machine has a capacity of 4.9 t x 2.1 m, maximum working radius of 14.67 m x 0.20 t, maximum lifting height of 16.50 m (20.2 m with an optional fly jib) and pick & carry capacity of 2 t. At 9,450 kg (9,630 kg with the fly jib), the CC985S-1 features 5,190 mm long, 2,730 mm high and 2,320 mm

wide. It is designed with a minimal tail swing of 1,390 mm and boom length of 4.78 to 15.78 m. Powered by a 40.3 kW engine, the CC985S-1 delivers a gradeability of up to 20 degrees.

**Specialised training**

JP Nelson now offers a specialised training course for mini cranes, located at its headquarters on Benoi Road, Singapore. The course is divided into both theoretical and practical sessions, comprising up to 13 hours in total. These training sessions are carried out by JP Nelson, while the tests by the BCA.

“The certificate of successful completion, issued upon completion and certification, is recognised by the Ministry of Manpower (MOM) to be considered as competent to operate the mini crane,” according to the BCA.

The MOM also announced that “with the specialised training, mini crane operators will no longer be required to hold a mobile crane license from 1 January 2016. Instead, they will be required to attend the specialised training course for mini cranes recognised by the Commissioner for WSH (Workplace Safety and Health). In addition, crane operators who hold a valid mobile or crawler crane licence can also continue to operate mini cranes while aspiring mini crane operators can attend the specialised training course.”

“Mini crane operation can be quite tricky, due to the machine’s small size,” said Mr Tan. “The spider model is even more complex because of the outriggers - it is important for operators to know how to position them properly to ensure safety on the jobsite.”

“I have worked with a lot of contractors who often underestimate mini cranes, and they don’t realise that these machines can be as dangerous as larger cranes,” said Mr Sadulla, JP Nelson’s crawler crane operator with 18 years of experience in the industry. He is also a qualified mini crane operator.

“You’ll find the training course very useful, considering the wide range of topics that we cover,” added Mr Sadulla. “The theoretical aspect provides trainees with an excellent guide to operating mini cranes safely, like how to choose the correct setting of outriggers when working on difficult ground conditions, etc. The practical training is also critical, as only through practice machine operators can increase their understanding.”

Some of the essential topics include updates on the local safety requirements and code of practice, selecting the right mini cranes in lifting applications, pre-operation inspection, risk assessments and hazard identification, and conducting emergency control and procedure, to name a few.



ABOVE AND BELOW: The Maeda MC-405C crane being used for operator training at the JP Nelson facility on Benoi Road. The training programme, covering both theoretical and practical sessions, is aimed to raise the competency of mini crane operators.



JP Nelson commenced its first training course in 2017; the theoretical test took place in June and practical test in September. The company said that each class currently accepts up to six students per one trainer.

“The feedback on the training course has been positive so far, and there was an increasing demand from existing mini crane owners. We expect the number of trainees to increase in the future, as more and more customers are buying new mini cranes instead of renting them,” said Mr Tan. ■



LEFT AND ABOVE: The certificate of successful completion will be issued upon completion and certification.

For more detailed information on the mini crane training course at JP Nelson, please contact the company: [www.jpnelson.com.sg](http://www.jpnelson.com.sg)

T 236 rigid dump truck.



PR 766 crawler tractor.



TL 33-10 telescopic handler.



# GOING IN STYLE

**LIEBHERR RECENTLY INTRODUCED A VARIETY OF NEW MACHINES TO THE GLOBAL MARKET. SOUTHEAST ASIA CONSTRUCTION TOOK A CLOSER LOOK AT THESE LATEST INNOVATIONS DURING THE LAUNCH EVENT, WHICH WAS HELD AT THE ERZBERG IRON MINE IN AUSTRIA.**

## T 236 rigid dump truck

The T 236 rigid truck represents Liebherr's entry into the 100-t class. Since its global debut at the 2016 Minexpo in Las Vegas, the US, the machine has successfully completed its testing phase and recently started its first field operation trials at the Erzberg Iron mine in Austria.

"Erzberg mine was carefully and deliberately chosen as the proving ground, because it offers the T 236 a varied and interesting set of conditions for the field trials, and it has an existing fleet of mining truck models in the 100 t class for the T 236 to work alongside as direct comparison," explained Dr Burkhard Richthammer, managing director of design and engineering at Liebherr-Mining Equipment Colmar SAS.

"This alpine mine is active for more than 330 days each year and has continuous 24-hour operation. The climate conditions can vary from snow with temperatures of -20 °Celsius to summer heat, with in-pit temperatures that can reach 40°Celsius," continued Dr Richthammer. "A particularly interesting climate profile is that in a matter of hours, it will intermittently switch between rain and sunshine.

"Erzberg also offers both uphill and downhill haulage cycles, and offer challenging haulage profiles due to a constant variation of grade."

With its high take off torque and continuous power to ground capability, the T 236 is less sensitive to grade and payload variations, providing excellent productivity. According to Liebherr, it is the first diesel electric truck in its class to incorporate oil immersed braking system with four corner retarding capabilities, resulting in reliable braking technology. The machine is ideal for use at both quarries and mining sites.

"T 236 was designed around Liebherr's Litronic Plus Generation 2 AC Drive



**ABOVE: The T 236 rigid dump truck represents Liebherr's entry into the 100-t class. The machine recently started its first field operation trials at the Erzberg Iron mine in Austria.**

**LEFT: The truck's ergonomic cab and the excellent properties of the front wheel suspension system enhance driver efficiency.**

system, which introduces Active Front End technology. By making efficient use of electrical energy during retarding events, the drive system delivers controlled engine speed with almost no fuel consumption," said Dr Richthammer.

"Vertical integration of Liebherr designed and manufactured components ensures the T 236 powertrain achieves

optimal system efficiency and performance throughout the full range of applications. The truck's innovative, variable hydraulic system lowers machine parasitic losses to provide maximum power, while lowering fuel consumption when power is not required."

The in-line electrical power train layout minimises cable length, while the

maintenance-free IP 68-rated plug and-drive power modules ensure reliable operation in all-weather conditions. Combined with the extended life service intervals and minimised maintenance time offered by the ground-level service points, the T 236 ensures maximum uptime.

“The T 236’s alternator has a unique feature: when retarding, it is used as a motor to propel the engine. The active front end function allows the engine friction to be used for retarding and provides power to the auxiliary drives, reducing fuel consumption and ensuring the engine never over speeds, for increased engine reliability and safety,” said Dr Richthammer.

The truck’s ergonomic cab and the excellent properties of the front wheel suspension system enhance driver efficiency with great comfort, safety, acceleration and handling for better performance.

“Safety features in the truck’s cab, such as dual-side access and incorporation of ROPS comparable to a 150 t class truck, were engineered during the initial design process; while a recessed, full-size passenger seat allows for increased visibility,” added Dr Richthammer.

For the safety of maintenance technicians and bystanders, the T 236 is equipped with double pole battery, starter motor and hoist system isolators as standard. In addition, the machine has an innovative drive system inhibit, electrically interlocked to grounding devices for each plug and drive power module. Liebherr’s Litronic Plus Isolation system ensures the safety of maintenance personnel through the elimination of hazards by design.

**PR 766 crawler tractor**

The new PR 766 crawler tractor in the 50-t category is the successor to the PR 764 model. This latest machine is powered by a 310 kW eight-cylinder V-engine, which complies with Stage IV/Tier 4 emission standards.

Equipped with the hydrostatic drive, the speed of the diesel engine can be kept constant in practical use regardless of the required load, said Liebherr, and thus the machine always runs at the optimum efficient speed. Essential drivetrain components are developed in-house and optimally coordinated, which increases the efficiency of the system as a whole.

The PR 766 has the ‘ECO function’, allowing the driver to choose between high performance and maximum efficiency. In lightweight to moderately heavy



ABOVE AND LEFT: The T 236 is ideal for use at both quarries and mining sites. It is said to be the first diesel electric truck in its class that incorporates oil immersed braking system with four corner retarding capabilities, resulting in reliable braking technology.



With the hydrostatic drive, the speed of the diesel engine can be kept constant in practical use regardless of the required load. Therefore, the PR 766 crawler tractor always runs at the optimum efficient speed.



LEFT: Dr Burkhard Richthammer, managing director of design and engineering at Liebherr-Mining Equipment Colmar SAS.  
 RIGHT: Martin Längle, managing director of sales at Liebherr-Werk Telfs GmbH.

applications, the ECO control system ensures increased efficiency and therefore additional fuel savings compared to conventional drive concepts, according to Liebherr.

The proactive power adjustment is another highlight of the PR 766. This involves both internal engine and external machine parameters being recorded, such as the deflection of the drive joystick, and the engine power is automatically increased for a short period based on the current demand. As well as enhanced response behaviour, this results in a noticeable improvement in performance capability and torque output.

The new PR 766 Litronic is designed with an oscillating undercarriage, which enables the track rollers to be flexibly adapted to the surface. As a result, the machine's traction - and its smooth running - is significantly increased, particularly when used on stony ground. Unevenness on the ground is ironed out through the elastic suspension and impact loads are reduced to a minimum. This not only increases comfort for the driver, but also improves the service life of the undercarriage and reduces the wear on the installed components and the steel structure.

The large cab on the PR 766 is identical to the driver's platform on the 70 t PR 776 launched in 2016. With Liebherr's single-lever operation, the driver can control all driving and steering movements with just one joystick. The driver can adjust the control elements for the travel drive, blade and rear-mounted ripper to the most suitable ergonomic position for them. The desired travelling speed range can be preselected directly on the joystick. This way, control of the tractor can be apportioned precisely, especially at low speed. The joystick for the rear-mounted ripper is a new feature; this can now be adjusted in two axes and serves as a handle for the driver during the ripping process.

"The ROPS/FOPS guard integrated into the cab, edges which slope away on all sides and the all-round panoramic window, ensure ideal panoramic visibility of the land, as well as the blade and rear-mounted ripper," said Martin Längle, managing director of sales at Liebherr-Werk Telfs GmbH.

Centralised maintenance points, wide-opening access flaps and engine compartment doors, as well as a tilting operator's cab, all enable easy maintenance access. This is enhanced by engine compartment lighting as standard, which guarantees that daily checks can be performed quickly and efficiently, even in poor lighting conditions. Liebherr said that the intervals for changing the hydraulic oil on the PR 766 can be extended to up to 8,000 operating hours if the hydraulic oil is monitored accordingly.

The LiDAT fleet management system provides comprehensive



The PR 766 has the 'ECO function', allowing the driver to choose between high performance and maximum efficiency.



The machine is designed with an oscillating undercarriage, so that the track rollers can be flexibly adapted to the surface. As a result, the machine's traction - and its smooth running - is significantly increased, particularly when used on stony ground.

machine data with this advanced communication technology. This improves efficiency by enabling optimised operational planning and reliable remote monitoring. The data is updated several times a day and can be conveniently called up at any time using a web browser. An automatic alarm can be set up for important information, for example, if the machine leaves a predefined zone or if a critical operating situation arises.

### Various telescopic handlers

Between January and November 2018, Liebherr will be launching eight new telescopic handler models with 26 different versions. The machines will be available in two types: the top-of-the-range models for materials handling or for production applications (identified by the suffix S), and the simple, cost-optimised value models for stacking and lifting applications.

As of January 2018, three 7-m models with a load bearing capacity of 3.2 t, 3.6 t and 4.1 t, one 6-m model with a load bearing capacity of 3.5 t and one 10 m model with a load bearing capacity of 3.3 t will be produced in the company's manufacturing plant in Telfs, Austria. Two additional 7-m models with a load bearing capacity of 4.6 t and 5.5 t will follow in the course of the year, and a 9-m model with a load bearing capacity of 6 t will complete the extensive range of the new Liebherr telescopic handlers for the time being.

These new telescopic handlers will be powered by Deutz diesel engines that comply with Stage IV/Tier 4 Final emission standards, with a displacement of 3.6 l and 74 or 100 kW and a displacement of 4.1 l with 115 kW. For less regulated countries, Liebherr will offer telescopic handlers in emission Stage IIIA, staggered over time. The infinitely variable yet powerful hydrostatic drive produces a maximum traction of up to 70 kN, depending on the engine power available.

Maximum speed for the new telescopic handlers is 40 km/hr, but there is also a choice of 20 km/hr and 30 km/hr. The machines are braked without wear, thanks to the hydrostatic drive's self-stoppage function. The 'Liebherr hill assist', fitted as standard, ensures safety and maximum driving comfort when travelling over uneven ground; this is due to the automatic activation of the parking brake.

"In the value models, Liebherr relies on successful working hydraulics, while the S models are equipped with high-performance working hydraulics," said Mr Längle. "A powerful load sensing working hydraulic pump with an oil output of 160 l/min and a control block with load-independent flow rate distribution enable overlapping working movements and therefore dynamic and rapid operating cycles."

Different machine hitches are offered for all models in the new generation of telescopic handlers ex-works. In addition to the Liebherr quick coupler, quick couplers that are compatible with the machine hitches from manufacturers like Claas,



ABOVE, BELOW AND BOTTOM: A wide range of new Liebherr telescopic handler models with 26 different versions will be officially launched between January and November 2018.



Manitou, Kramer, JCB and Volvo are also offered. This means that customers can also use their existing tool attachments from other manufacturers on the Liebherr telescopic handlers.

The machine's new design guarantees good visibility of the load to the front for high machine productivity, as well as to the side and to the rear for optimum safety. This can be achieved because of the low linkage point of the telescopic boom and by the edges, which slope outwards, and therefore the engine bonnet, which follows the line of sight. With an all-round windscreen and the narrow internal ROPS/FOPS guard, which is adapted to the line of sight, the cab contributes to providing an excellent view of the load.





TOP RIGHT: The cab of the new Liebherr telescopic handlers is spacious and offers excellent visibility.

ABOVE: The infinitely variable yet powerful hydrostatic drive produces a maximum traction of up to 70 kN, depending on the engine power available.

ABOVE RIGHT: Alexander Katrycz, head of marketing at Liebherr-Werk Telfs GmbH, explained the benefits of the new telescopic handlers.

The spacious cab, the tilting steering column, various adjustable seat versions and the intelligently designed operating and switch system, all of which improve ergonomics and therefore create optimum comfort. This is also supported by the wide range of options available ex-works, which include the 'Liebherr comfort drive', a driving vibration damper for comfortable driving with low vibrations, as well as camera systems, lubrication systems and different lighting packages for optimum illumination of the work environment.

In addition, the 5-in-1 joystick installed in the value models, or the multifunctional joystick integrated into the S models, enables all essential operating functions to be carried out using a single-arm operation, so that the driver's left hand remains safely on the steering wheel at all times.

A wide range of additional options allows the new telescopic handlers to be configured for specific applications. For instance, Liebherr offers its customers ex-works a reversible fan for cleaning the radiator and additional safety guards or covers for the travel drive and mainframe.

Automatic pressure relief for the working hydraulics in order to make replacing tool attachments simple, an additional hydraulic circuit for actuating further functions on the boom head and a separate control option for the hydraulic oil flow rate in the working hydraulics are also offered.

In March 2015, Liebherr-Werk Telfs GmbH entered into an OEM partnership with the Claas Group. This collaboration

involves the development, production and supply of significant quantities of telescopic handlers. As a result, in the future Liebherr will be able to access additional sales potential in the agricultural sector, in addition to the traditional target segments of the construction industry. The first telescopic handlers are expected to be delivered to Claas in January 2018. ■

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



Liebherr's new machines made their appearance at the Erzberg iron mine in Austria.

# NEW CHAMPLAIN BRIDGE



Opened in 1962, the Champlain Bridge is one of the main road links in Montreal and is also said to be Canada's busiest bridge, with an average of 136,000 crossings per day. Due to the extreme climate conditions in Montreal, as well as the use of road salt on the pavement, the bridge is suffering a progressive deterioration that different maintenance and repair plans have not been able to prevent. Thus, the Canadian Government decided to build another bridge as a replacement.

Since 2015, the Signature on the Saint Lawrence Group, formed by SNC-Lavalin, ACS and Hochtief, has been working on the New Champlain Bridge construction, located in parallel and just a few metres away from the current bridge, which is still open to traffic. The new bridge is expected to be completed by December 2018, upon which it will feature a spectacular 170-m-high main pylon.



Montreal's New Champlain Bridge is currently under construction and is expected to be completed by December 2018. A Linden Comansa 21LC550 tower crane can be seen here helping to build the bridge's main pylon, which will be 170 m in height.

© Paul Eiert

### Lifting solution

A Linden Comansa 21LC550 tower crane is being used to help build the main pylon of the New Champlain Bridge. The unit arrived at the jobsite in early September 2017 and was erected on the deck of the bridge with a height under hook of 67.8 m.

When the crane has completed its job, it will be 180 m in height from the base of the pylon and 123 m from the deck of the bridge. The 21LC550 has a maximum load capacity of 25 t to lift large precast concrete structures and heavy formwork panel. Another version of this crane is available with a maximum load capacity of 20 t. ■

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



© Mike Kenma / ICA

The new bridge is being constructed just a few metres away from the existing damaged Champlain Bridge.

# NEW ROADWAY IN OMAHA



Charles Vrana and Son Construction Company based in the city of Omaha, Nebraska, the US, has been involved in a variety of construction projects since 1990 and one of its specialties is civil and heavy highway construction. The company was recently commissioned on a new commercial development in Sarpy County, located in the south of the city, to slipform a new roadway as well as the entrance into the development.

“It’s booming in Sarpy County right now and for this 16.2-ha site we’re paving 975 m on Schram Road and we have 640 m on 150th Street,” said Jarrod Ryan, project superintendent of Vrana. “On Schram Road we’re paving 7.6 m wide with integral curb on the right. When we go down 150th Street, we have a 12.8 m wide slab, but we’re going to break it into two 6.4 m pours for the crowning. We’re also going to pour the entrance for the development while we’re here and that’s 7.9 m wide and a third width.”



TOP AND ABOVE: Charles Vrana and Son Construction works on a new commercial development in Sarpy County, Omaha, slipforming a new roadway as well as the entrance into the development. The company deploys its Gomaco GP3 paver with a 5400 series mould and bar inserter.

**Efficient paving**

To help complete the job, Vrana opted for a Gomaco GP3 paver. On the machine's first pour on the new development, the company slipformed 487.7 m of 7.6 m wide, 229 mm thick pavement with a 152 mm integral curb. Paving production averaged up to 191 cu m per hour, which is the production limit of the ready-mix plant.

"We went with the GP3 with a 5400 series mould spec'd out to 7.9 m wide," said Don Sell, equipment manager of Vrana. "The mould has telescoping end sections in it because we do a lot of paver width changes from one job to the next with 0.3 to 0.6 m increments. The versatility of not having to drop that mould to make a paver width change is something we can do in an hour versus half a day."

The GP3 is also outfitted with a rear loading and front inserting 5400 series bar inserter. The inserter uses a bar loading chain system so the bars travel in a flat, straight path for maximum placing efficiency. A bar box mounted on the rear of the GP3 holds extra bars for easy access and loading of the inserter's bar magazine. A G+ control box for the 5400 series bar inserter is mounted to the rear of the paver and manages the bar placements.

"We have 15 ready-mix trucks supplying us and we're shooting for 191

cu m an hour," said Mr Ryan. "That's the best ready-mix can do, but we can go faster than that with this paver." The ready-mix trucks dump the concrete into the hopper of a Gomaco 9500 placer working from the haul road in front of the GP3 paver. The concrete mix design is a city of Omaha standard 6.5 sack mix. Slump averages 64 mm.

The 5400 series bar inserter is placing a 762 mm long, #5 bar every 838 mm into the new slab. The road is being built with future expansion in mind. The left side of slab has a keyway so dowel bars can be drilled and inserted to scab-on an additional two lanes. The 7.6 m wide pavement has a 1.8 m offset crown and the 6.4 m wide pavement will have a 2.4 m offset crown to accommodate the future lanes. The offset crowns are managed with the 5400 series mould's self-supported, computerised power transition adjuster (PTA).

The GP3 is equipped with advanced technologies, including telematics and Gomaco Remote Diagnostics (GRD). This allows Gomaco's service technicians in Ida Grove, Iowa, to monitor and troubleshoot machines in the field. It was a helpful feature for Vrana when it was preparing the GP3 for a pour and a steer sensor went out. Gomaco was able to troubleshoot and diagnose the issue and then have a new sensor in Vrana's hands in Omaha within

two hours.

Vrana has several projects planned for the GP3 within and around Omaha, along with more work in Sarpy County. The company will be moving the paver around a lot on jobsites and loading it up on a lowboy for it to be trucked from project to project. The loading is made easier with the GP3's Transport Mode. The operator just drives the paver's four legs and tracks around to the transport position, and then switches G+ from travel to transport for complete control.

"I like the versatility of the machine and the ease of mobility on site where you can counter-rotate the machine right in its own tracks," said Mr Sell. "The slew drives on the steering and those pivot arms are phenomenal. It just gives us so much more room to negotiate the machine around a jobsite, especially at 7.6 m wide."

He added, "When it's time to transport it, we just fold it up into transport mode. We swing the legs, walk them right around, switch from pave mode to transport, and load it on the lowboy. It takes us about 15 minutes tops to get it from pave to transport mode. We're able to transport it with the mould underneath it. All we do is fold up the work bridge, swing the wings in, and we're ready to go and legally haul it for width and height." ■

*Website: www.gomaco.com*

The operator of the Gomaco 9500 uses the placer's remote control to move the placing belt as it puts concrete on the grade in front of the GP3 paver.



LEFT: The GP3 with 5400 series mould produces a smooth, clean and sharp edge and keyway on this new roadway project.



**BOTH IMAGES:** The new 7.9-km-long Canal General drainage tunnel in Mexico is designed to prevent flooding in the Valle de Chalco area, as well as in the metropolitan area of Mexico City.



*The article courtesy of Realta Mapei Internacional no. 64*

# CANAL GENERAL TUNNEL

The Canal General drainage tunnel in Mexico has been under construction since 2015, designed to prevent flooding in the Valle de Chalco area - with a population of around four million - as well as in the metropolitan area of Mexico City. Owned by the National Water Commission (Comisión Nacional del Agua), this underground tunnel will be 7.9 km in length, with a diameter of 6.7 m during the tunnelling phase and 5 m once the walls have been completed. The initial investment in the project was approximately MXN 1,139 million and it was scheduled for handover at the end of 2017.

The tunnelling operations were carried out by the main contractor, Ingenieros Civiles Asociados (ICA), using two full-section EPB (earth pressure balance) type TBMs (tunnel boring machines), which have been specifically designed to operate in areas with water under high pressure. There were four shafts in total, each featuring a diameter of 12 m.

## Tunnel waterproofing

Mapei took part in the project by supplying its admixtures and waterproofing systems for the tunnelling work with TBMs. The products consisted of Mapeblox T tail seal grease to block the inflow of material from the tail end of the machine, Mapeblox H bearing sealant, Mapeblox PKG packing sealant for TBM shield tunnelling, and Mapeblox EP grease for TBM tunnelling to help minimise the wear of the boring head.

According to Mapei, due to the presence of water on the walls of the tunnel the job was particularly difficult. Therefore, the company also used its Mapedrill M1 synthetic liquid polymer for water-based fluids in tunnelling and drilling work.

Other Mapei products applied in the project included Resfoam SS 75 polyurethane resin to help waterproof and stabilise the earth, Planitop X mortar to repair and skim the walls of the tunnel, Dynamon NRG 1014 super-plasticiser and accelerator for concrete, Dynamon Xtend W500 R acrylic plasticiser for concrete, and Dynamon SW modified acrylic polymer-based admixture. ■

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



ABOVE: The tunnelling operations were carried out using two full-section EPB tunnel boring machines, designed specifically to operate in areas with water under high pressure.

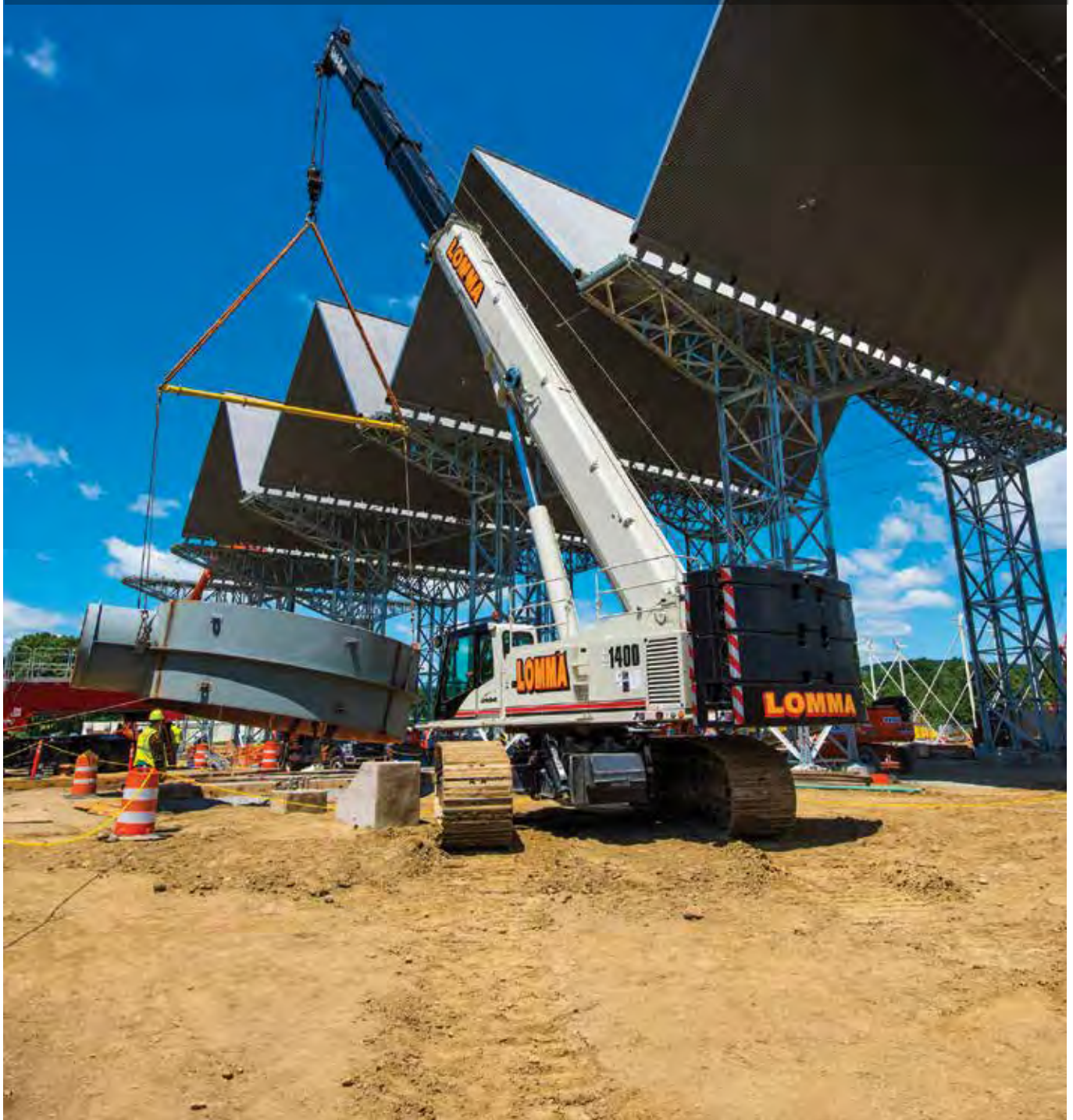
LEFT AND INSET: Mapei supplied its admixtures and waterproofing products for the tunnelling work with TBMs.



ABOVE LEFT AND LEFT: The tunnel lining rings were assembled at a manufacturing plant for precast concrete segments, and then delivered to the jobsite. Mapei systems were also applied during the production of these lining rigs.

# CPV VALLEY ENERGY CENTRE

A joint venture between Skanska, Burns & McDonnell and ECCO Enterprises is currently building CPV Valley Energy Centre in Lower Hudson Valley, northwest of New York City, the US. The combined cycle power facility is expected to have a gross capacity of 675 MW, producing enough electricity for 600,000 homes and over 400 commercial entities. The green technology is being used with two Siemens F Class combustion turbine generator sets and one steam turbine for the nearly US\$1 billion project. The steam turbine generator will have natural gas-fired duct burners for additional electrical production during peak periods of energy demand. ACC (air cooled condenser) piping up to 7.3 m in diameter and up to 45.7 m long will be used for the combined cycle power facility.



**Time saving machines**

Two Link-Belt TCC-1400 and one TCC-1100 telescopic crawler cranes are used to unload, sort, and assemble the piping shells at various locations on the project. The TCCs have complete 360-degree pick-n-carry charts to easily manoeuvre around the jobsite. While relocating ACC pipe sections, the TCC-1400 proved itself when having to work its way between concrete pipe footing pedestals. Pipe sections weighing between 12,700 and 21,772 kg were lifted at a radius up to 12.1 m with 25.8 m of boom.

“I do all the specs for a project. Once I understand a project team’s needs, I bring in the cranes available to supply those needs. Many times, team members don’t realise the advantages and benefits of a telescopic crawler crane,” said Joe Uva, Skanska’s regional crane director, who was also responsible for bringing in the Link-Belt TCCs for the project.

“From past experience, I know what I can get out of cranes like this when I have low angle work, as I have on this job, beneath unfinished construction or buildings. The (TCC) crane’s mobility, and the amount of time that the company saves in moving in and setting up, and their low boom angle chart really brings a lot to the table. So I need to go with these machines,” added Mr Uva.

It is believed that Link-Belt telescopic crawler cranes also sit wider on outriggers than the competition for solid self-



assembly. Both the TCC-1100 and TCC-1400 have tapered axles instead of traditional stub axles, which allow for easier side frame install.

“We used the TCC-1100 for a project under the Brooklyn Bridge. We took it off the trailer, set it up, and had it working within an hour. I did my drilled shafts and got out of there in minimal time. With the other TCC-1400, it’s virtually the same process, it just needs more counterweight, so it just takes a little more to set it up, but that’s it,” continued Mr Uva.

When not assisting the TCC-1400 dedicated to lifting ACC pipe, the TCC-1100

travels to the far end of the complex to offload skids and transport trailers loaded by the second TCC-1400 at an off-site laydown yard. The skids include large duct shells that weigh as much as 19,050 kg.

“The TCC cranes are versatile and easy to move around the job. You cut down on set up time and the need for extra men to move around outrigger pads. The operator is not worried about telescoping out, and setting up in the right place. He just moves quickly to the right position. There is a tremendous amount of savings by using these machines,” concluded Mr Uva. ■

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



TOP AND LEFT: Link-Belt TCC-1400 and TCC-1100 telescopic crawler cranes being used on the CPV Valley Energy Centre project to unload, sort, and assemble the piping shells at various locations.

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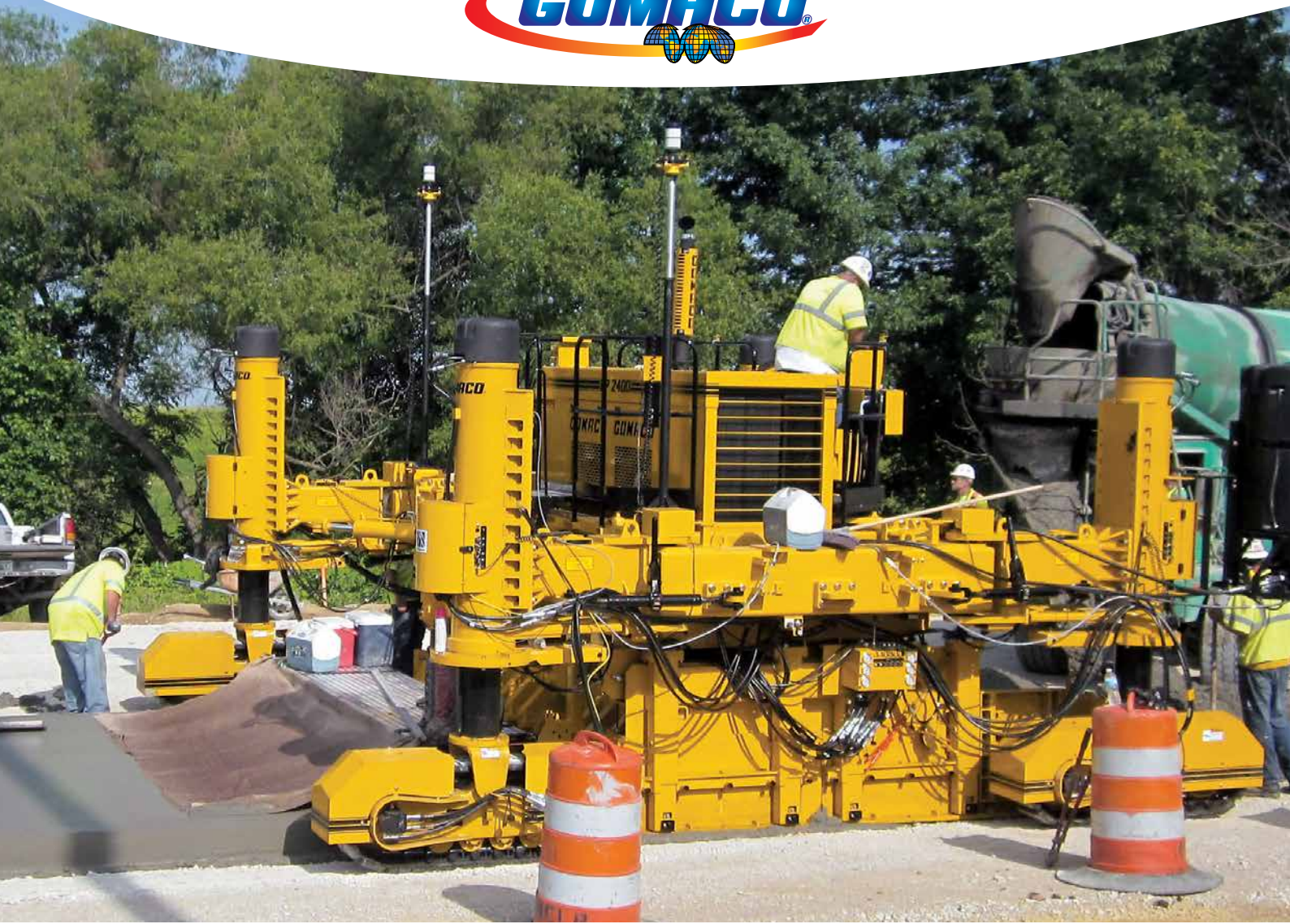


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