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**CONSTRUCTION**

MAY - JUNE 2018



**Cover Story:**  
**Shanghai-Nantong Yangtze River Bridge**

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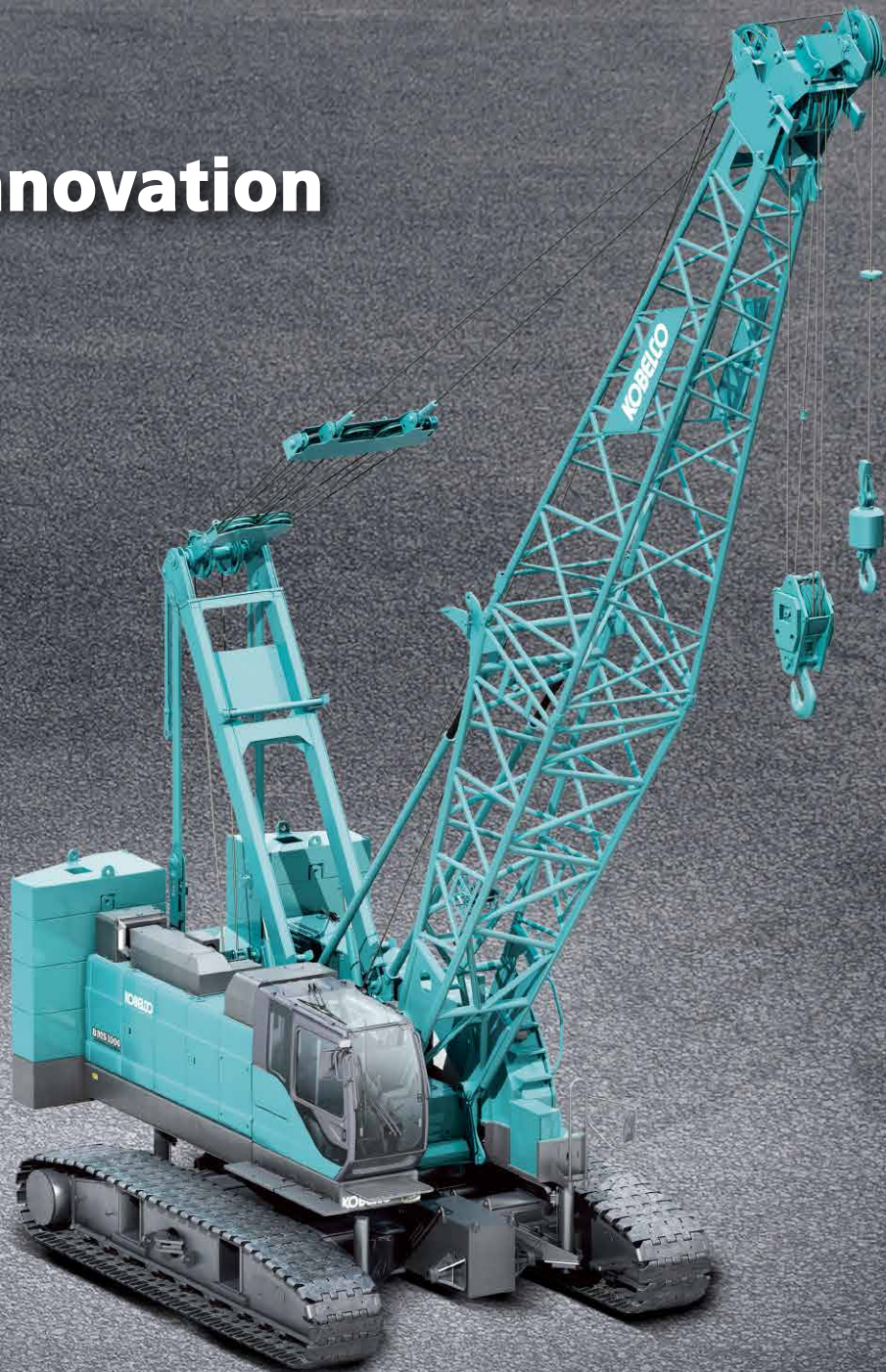


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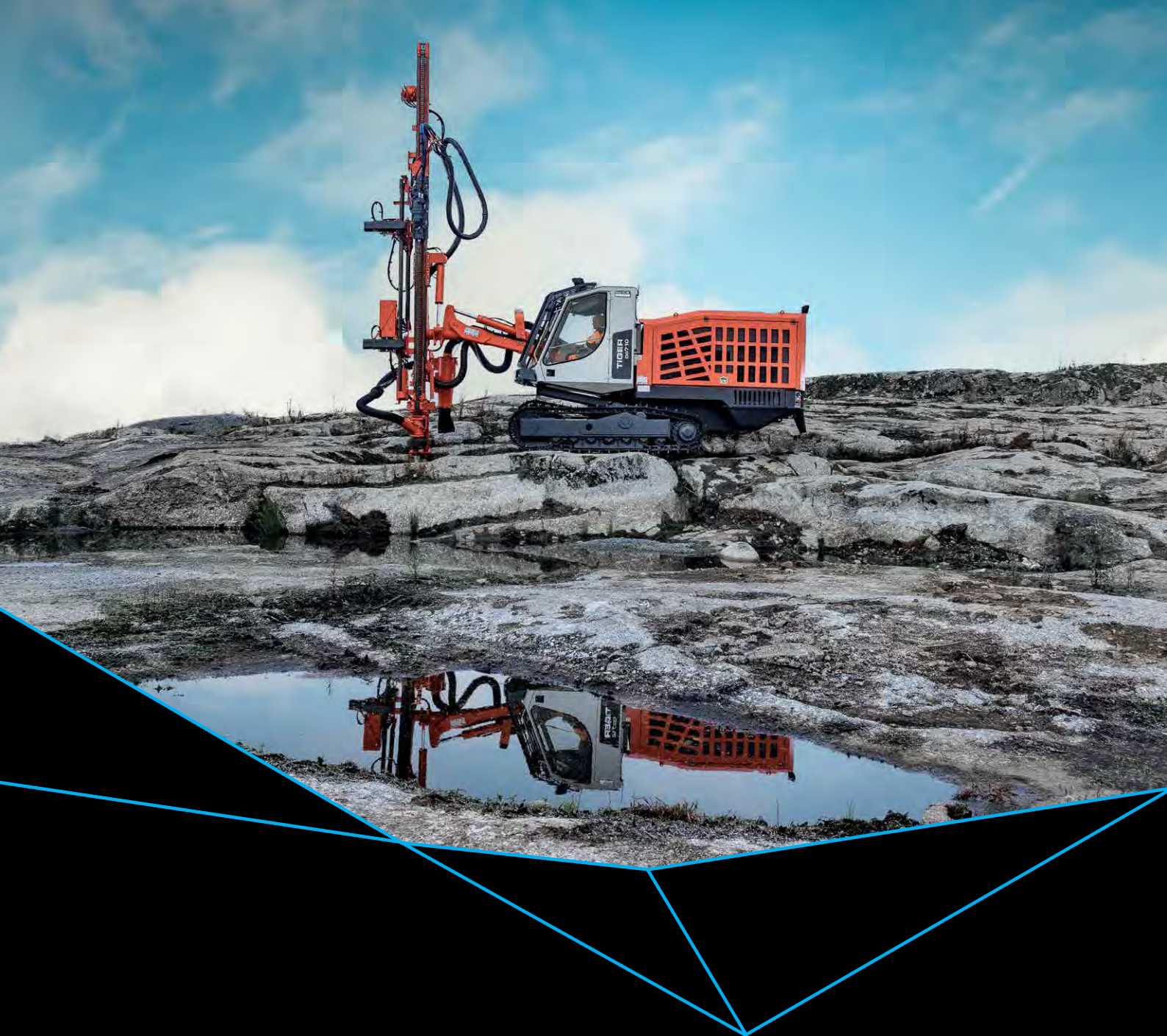
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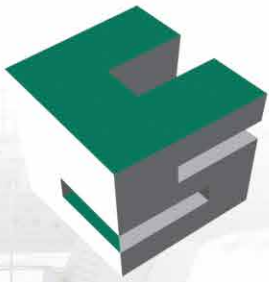
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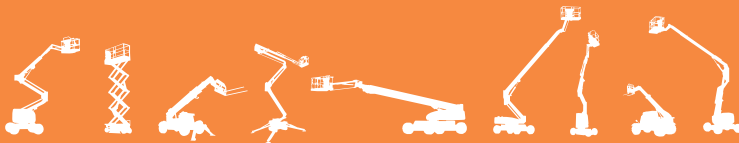
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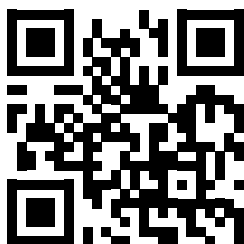
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**Correction:** In the SEAC Mar/Apr 2018 issue (page 20, first story), we incorrectly stated the name of the development in the headline. It should have been 'Paya Lebar Quarter', not 'Paya Lebar Square'. We apologise for the error.



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## Samsung C&T secures power plant contract in Indonesia

Samsung C&T has been awarded an engineering, procurement and construction (EPC) contract to build a 1,760 MW combined cycle power plant in Indonesia. The US\$1 billion project, located in Cilamaya, will be developed by PT Jawa Satu Power, a consortium of PT Pertamina (Persero), Marubeni Corporation and Sojitz Corporation. Samsung C&T will form a joint venture agreement with General Electric (GE) Power and PT Meindo Elang Indah (Meindo).

The new Jawa 1 power plant is part of the government's 35,000 MW electrification programme, and is set to be the biggest combined cycle power plant in Southeast Asia. Upon completion, the plant will supply electricity to about 11 million homes.

"We are very pleased to take part in the Jawa 1 power plant project, which will contribute to energy development in Indonesia," said Sechul Oh, head of Samsung C&T's Plant Business Unit. "Based on Samsung C&T's core values of quality and safety, we look forward to delivering a successful project together with our partners." Samsung C&T has completed various power plant projects around the world, including Muara Tawar power plant



The new 1,760 MW Jawa 1 power plant in Cilamaya, Indonesia, is expected to be the biggest combined cycle power plant in Southeast Asia.

in Indonesia, Dongducheon CCPP and Kumho CHP-S1 projects in Korea, EMAL Phase 2 CCPP and Shuweihat 2 CCPP in the UAE. ■

## Sunseap and InfraCo Asia to build solar power project in Vietnam

Sunseap International, the international arm of Singapore's clean energy provider Sunseap Group, has signed an agreement with InfraCo Asia Development Pte Ltd to jointly develop a 168 MegaWatt-peak (MWp) utility-scale solar power project in Vietnam. Located in the Ninh Thuan province, it is expected to generate electricity for up to 200,000 households in the country.

The project is scheduled to reach commercial operation by June 2019. During the construction phase, it could create jobs for more than 200 local workers and approximately 30 long-term jobs will be sustained when the project is in operation, said the joint venture.

InfraCo Asia, an infrastructure development and investment company of the Private Infrastructure Development Group, will bring its leadership expertise and provide funding for the development phase of the project. Sunseap International will continue to hold a majority stake in the project, while InfraCo Asia will take a minority stake alongside Sunseap's existing partner, CMX RE Canada.

"We see huge potential for solar energy development in Vietnam and are excited to bring affordable and reliable clean

energy to the country," said Lawrence Wu, co-founder and director of Sunseap. "Sunseap International remains focused on developing innovative solar energy solutions that benefit communities in the region while saving the environment. We hope that our solar power project will help to promote more green energy investments in Vietnam and the Indo-China region."

Allard Nooy, CEO of InfraCo Asia added, "The Ninh Thuan project will be one of the first large-scale solar projects in the country to go online. It will support Vietnam – which is currently reliant on coal – in creating a cleaner energy mix for the future." He further stated that such a project "creates a 'demonstration effect' that serves as a beacon for future development."

Electricity demand in Vietnam is reportedly growing 1% annually. According to the Vietnamese government's targets, solar power is expected to become the main new renewable energy source in the future, with installed capacity to be increased from around 6-7 MW at end of 2017 to 850 MW by 2020, accounting for 1.6% of the country's power generation and 12,000 MW by 2030 or 3.3% of the country's power generation. ■

## Alstom to bid for KL - Singapore HSR project

Alstom has teamed up with Siemens, Ferrovie dello Stato Italiane, George Kent and Porr to bid for the AssetsCo (Assets Company) tender for the Kuala Lumpur – Singapore High Speed Rail (KL – Singapore HSR) project. They will work together to prepare a joint offer encompassing engineering, procurement and construction (EPC) and operations & maintenance (O&M) for the tender.

The companies said this partnership would result in a powerful team combining European technology and project experience with the best local expertise. The two manufacturers, Siemens and Alstom, have decades of technology leadership and excellence in

delivering complex cross-border high-speed railway projects. In the past, both of them have also worked on similar complex private public partnership (PPP) projects across the globe. Ferrovie dello Stato Italiane brings expertise in railway operation and a vast global footprint. These three European companies are joined by George Kent, a Malaysian company offering significant construction experience in rail transportation projects and a strong local knowledge of the Malaysian market. Porr is a highly experienced track work provider offering an advanced slab track technology proven in operation on high-speed railways. ■



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## Kobelco expands hydraulic excavator factory in India

Kobelco Construction Equipment India Pvt Ltd (KCEI), a subsidiary of Kobelco Construction Machinery Co Ltd, is expanding the production capacity of its hydraulic excavator factory in India to cater to a strong demand in the country.

India's economy has reportedly been enjoying a strong growth, as infrastructure investments by the government have continued to increase. As a result, demand for hydraulic excavators has also continued to increase and is expected to remain strong, said Kobelco. KCEI started out with a production capacity of 1,200 units per year in 2011 and has increased it to 2,000 units per year through various measures, such as layout changes to accommodate the growing demand. This time, KCEI will carry out a full-scale expansion to push production capacity up to 3,000 units per year in order to fully accommodate the rising demand in India, as well as the increased production of machines for export.

Construction work is expected to be completed at the end of January 2019. It will cover expansion of the buildings, revision of production processes in general such as improvement of assembly and paint processes, as well as enhancement of cooperation with the crane factory, improvement of safety and creation of a better work environment.

KCEI manufactures construction machinery, including 14- to 50-t-class hydraulic excavators and 55- to 260-t-class crawler cranes, as well as sales and service of the products in India and



Kobelco is carrying out a full-scale expansion on its hydraulic excavator factory in India, pushing the production capacity up to 3,000 units per year in order to meet the increasing demand in the country.

Nepal. The company is headquartered in Noida, Uttar Pradesh, and the factory is located in the Sri City industrial park, 75 km north of Chennai, Andhra Pradesh. The building area for the hydraulic excavator factory is currently 13,900 sq m and upon expansion, it will cover 20,900 sq m. ■

## Kobelco CKS3000 crawler cranes go to Indonesia

Indonesia-based company PT Guna Teguh Abadi (GTA Construction) is expanding its crawler fleet with the addition of two new 300-t CKS3000 lattice boom crawler cranes from Kobelco Construction Machinery. This is said to be the first overseas delivery for the model.

An official handover ceremony took place in February at the Kobelco factory in Japan. The CKS3000 was scheduled for delivery in March 2018 and is expected to be put to work in April. The crane has a maximum lifting capacity of 350 t with SHL attachments.

"I am very proud to be here today to participate in this exhibition ceremony of the CKS3000, with which I have been involved from the development stage to offer my opinions and proposals," said Kaoru Hirota, president director of GTA Construction. "Also, I am very grateful that this is the first unit to go abroad."

"The CKS3000 is the masterpiece that we have made while receiving the suggestions from Mr Hirota," added Shinsuke Izumi, executive officer at Kobelco. "The CKS3000 is the largest model of Kobelco's multi-purpose crawler crane line up, while also offering large-sized model features as well. The business relationship between GTA Construction and Kobelco has been growing these past 20 years. We look forward to a continuing business relationship for more than one century." ■



ABOVE AND LEFT: **GTA Construction** has acquired two new Kobelco CKS3000 lattice boom crawler cranes.



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## Another iconic building for Singapore's CBD

Work on a new 280-m-high mixed development in Singapore's central business district (CBD) has recently started, scheduled for completion in the first half of 2021. Developed by a joint venture of CapitaLand Limited, CapitaLand Commercial Trust (CCT) and Mitsubishi Estate Co Ltd (MEC), the former Golden Shoe Car Park will be transformed into a 51-storey building comprising 635,000 sq ft of Grade A office space, a 299-unit Citadines serviced residence to be managed by The Ascott Limited and ancillary retail space. Main contractor on the project is Dragages Singapore Pte Ltd.

According to CapitaLand, it will be the first mixed development in Singapore to adopt prefabricated modular mechanical and electrical (M&E) services, including vertical risers and horizontal services. The M&E service modules will be fabricated at an off-site factory and transported on site for assembly, thus achieving significant site productivity improvement through better coordination, workmanship and safety.

Digital construction technology and integrated digital delivery, from Building Information Modelling (BIM) to virtual design and construction and 3D printing, will also be applied for improved collaboration, added CapitaLand. Drones will be used as well to monitor construction progress and virtual reality will allow for more efficient design review, reducing the need for physical mockups and material wastage.



All images © CapitaLand

LEFT, TOP AND ABOVE: Work on the former Golden Shoe Car Park in Singapore has recently started. Once completed, it will feature a 51-storey building comprising 635,000 sq ft of Grade A office space, a 299-unit Citadines serviced residence and ancillary retail space.

The concept architect for the project is Bjarke Ingels Group (BIG), in collaboration with Carlo Ratti Associati. The project architect is RSP Architects Planners & Engineers (Pte) Ltd.

This new mixed development is set to be one of the greenest buildings in the Raffles Place area with a four-storey Green Oasis, which will have a jungle gym, treetop cocoons, sky hammocks, a café and a spiral

stairway set within a botanical promenade. Complementing the government's strategy for a car-lite Singapore, the development will also incorporate a cycling path in its perimeter, 165 bicycle lots and end-of-trip facilities for users. What's more, CapitaLand said the charm and heritage of the former Golden Shoe Car Park will be preserved, with the return of Market Street Food Centre. ■

## CapitaLand to develop more projects in Singapore and Vietnam

CapitaLand Limited has acquired a prime site for a new mixed development in Vietnam's capital city, Hanoi. Featuring 25 storeys, it will comprise a 380-unit residence including SoHo apartments, around 230,000 sq ft of office space and over 208,000 sq ft of retail space. This US\$217 million development will stand on an approximately 0.9-ha site in Tay Ho District, which is less than a 20-minute drive away from Hanoi's Noi Bai International Airport.

In Singapore, CapitaLand has also acquired the Pearl Bank Apartments situated on Pearl's Hill in Outram Park. This prime site has a land area of 82,376 sq ft, which is planned to be transformed into a high-rise residential development comprising around 800 units. It is targeted for completion by early 2023. ■



Both images © CapitaLand

ABOVE: An artist's impression of CapitaLand's new mixed development in Hanoi.

ABOVE RIGHT: Singapore's Pearl Bank Apartments have been acquired by CapitaLand. The site is planned to be transformed into a high-rise residential development.



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## Ammann expands Australia facility

Ammann has expanded its facility in Australia with the relocation of its headquarters, warehouse and training centre from Narangba to about 10 km north in Caboolture, Queensland. "This move is a reflection of Ammann's growth in the region, and our commitment to serving customers through training, service, and product and parts availability," said Hans-Christian Schneider, CEO of Ammann. "We have grown and become a leader in that market, and this investment reflects that."

The new facility includes a 40% larger warehouse and a 50% increase in office space, as well as a new and improved training centre. This training centre features classrooms and space for hands-on lessons, with training aids consisting of: interactive 3-D modelling; access to purpose-built animations; plant component availability for maintenance demonstrations; and a fully functioning as1 Control System simulator.

"The training centre concept incorporates shared learning and exchange of best practices in the plant industry," said Scott Rickards, after-sales and product support manager for Ammann Australia. "This new centre is a continuation of what we started a few years ago. We developed an innovative training programme, and the response has been so strong that we opted for the new facility."

Ammann said that many customers have sought a standardised solution to customer training, which the company first provided in Australia in 2014. "Prior to that, there were limited training opportunities for people working around asphalt plants," said Mr Rickards, who also is a key trainer. "The status quo commonly saw training handed down from operator to operator, or companies investing to send staff internationally abroad to gain detailed knowledge."

The training now is closer to the customers to improve access and reduce travel time and costs. The convenience also ensures more operators can participate. The simulator is a particularly popular training tool, according to Ammann. "This simulator allows the student to gain valuable operational experience in a



ABOVE: Strong growth led Ammann Australia to move to its new, expanded home in Caboolture.

LEFT: The new location features a larger warehouse to ensure product and parts availability.

safe and controlled classroom environment, without the stress and pressure of having to learn during real production," explained Paul Vandersluis, managing director of Ammann Australia. "Ammann's highly experienced training staff can remotely provoke plant faults and errors on the control system during the simulator training, so the trainers can gauge how the student reacts and deals with such a problem in a real-life situation. Now employers have another avenue to train their staff, without the possibility of wasting product or having unnecessary plant downtime." In addition, the interactive courses are available from basic introductory content to advanced, detailed explanations of asphalt plant processes and functions. ■

## PT Saranabaja Perkasa orders first Grove all-terrain cranes

PT Saranabaja Perkasa has received three new Grove all-terrain cranes, including two GMK4100Ls and one GMK5220 - all were purchased from local dealer PT SH Machinery Indonesia. The GMK4100L is a four-axle, 100 t capacity crane with a main boom of 60 m. The GMK5220 has a maximum capacity of 220 t and a main boom of 68 m, which can be extended to 108 m with a jib.

Based in Tangerang, West Java, Grove dealer PT SH Machinery Indonesia is a wholly-owned subsidiary of Sin Heng Heavy Machinery, an equipment sales and rental company with operations in Singapore, Malaysia, Myanmar and Vietnam. "Grove all-terrain cranes are known for their powerful lifting, superior off-road mobility and industry-leading reliability," said Hidayat, president director of PT Saranabaja Perkasa.

These latest acquisitions for PT Saranabaja Perkasa are the company's first all-terrain cranes from Grove, although it does own seven Grove rough-terrain cranes. These include the RT600E, RT650E, RT700E, RT745, RT750 and RT890E. The company also runs earthmoving and other equipment. In addition to its rental fleet, PT Saranabaja Perkasa works as a contractor. ■



Indonesian rental company PT Saranabaja Perkasa has received its first all-terrain cranes from Grove, including two GMK4100Ls and one GMK5220.

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## Work on The Hari Hotel in HK starts

Construction work has commenced on The Hari Hotel in Hong Kong, which is scheduled to open in early 2020. Atkins, a member of the SNC-Lavalin Group, was appointed by Origin One Ltd of the Harilela Group as the lead consultant to design and deliver this project.

Once completed, the 210-room luxury hotel will also bring an upmarket F&B offering to Hong Kong with a large open terrace overlooking the street below. Care has been taken to integrate this project within the city, said Atkins. For example, the modular facade design maximises off-site production and assembly, reducing the impact of construction noise and congestion to the community during installation. Atkins brought in specialist facade consultants, Inhabit, to help realise this design and delivery objective. ■

RIGHT: An artist's impression of The Hari Hotel in Hong Kong, which is planned to open in 2020.



## Leighton wins expressway project in the Philippines

Leighton Asia has been selected by MPCALA Holdings to construct the Cavite Laguna Expressway project (Cavite section) in the Philippines. Construction is scheduled to commence in the second quarter of 2018 and be completed by 2020.

Revenue to Leighton Asia, which is part of CIMIC Group construction company CPB Contractors, is approximately A\$182 million. Works consist of the construction of a 28-km four-lane expressway including bridges, interchanges, toll plazas and ancillary facilities.

The Cavite and Laguna regions are said to be the most industrialised and urbanised areas in the Philippines, housing diverse international and multi-national electronic, automotive and manufacturing companies. On completion, the expressway is expected to reduce travel times from Cavite to Laguna by approximately 45 minutes. ■

## Tianjin Prosperity Bai-Li gets first Skyjack lifts

Chinese equipment rental company Tianjin Prosperity Bai-Li has just added a fleet of Skyjack SJIII 3219 DC scissor lifts to its existing product lineup. "This is the first time we've purchased Skyjack machines, but we have been hearing a lot about Skyjack from our partners abroad and they are very well known," said Du Xuemin, general manager at Tianjin Prosperity Bai-Li. Skyjack made the delivery in January 2018, and Tianjin Prosperity Bai-Li has already found jobs for the fleet.

According to Skyjack, the SJIII 3219 scissor lift has consistently seen a strong demand in markets worldwide. With a maximum working height of 7.62 m and stowed height of 1.99 m, the model is

ideal for a wide range of projects. "Tianjin Prosperity Bai-Li is a flagship MEWP (mobile elevating work platform) company in North China. This partnership with them is a sign of strong growth for Skyjack within this market," said Jack Dai, Skyjack's account manager of sales in Asia.

Tianjin Prosperity Bai-Li is an IPAF member and also a training centre for local construction associations. Headquartered in Tianjin, the company has established branch offices in Binhai and Beijing. With other offices throughout Shijiazhuang, Zhengzhou, Wuhan, Changsha, Chengdu, Chongqing, Dalian, Shenyang and Xi'an, the company has a comprehensive customer service network. ■

## SMEC to help develop industrial townships in India

SMEC been appointed by Model Economic Township Limited (METL) to provide project management consultancy services for the development of industrial towns covering an area of 8,200 acres in the Jhajjar district of Haryana, west of New Delhi, India. METL is a wholly owned subsidiary of Reliance Industries, one of the largest private sector companies in India.

One of the townships is envisaged as a fully integrated industrial development with the support infrastructure of a logistics hub, rail and road connectivity, and social infrastructure including residential, commercial, recreational and institutional development. SMEC's scope of work involves progress monitoring, supervision and quality control, and overall contract management services. ■



Tianjin Prosperity Bai-Li has added a fleet of Skyjack SJIII 3219 DC scissor lifts to its existing product lineup.

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## Surbana Jurong to develop Industrial New Towns in China

Surbana Jurong and Vanke Industrial Town (Midwest) Co Ltd, a unit of China Vanke Co, have signed an agreement to jointly develop Industrial New Towns in China's midwest regions. The project will feature the latest people-centric urban development model that integrates industrial developments and urban living. The aim is to create sustainable cities for residents to live and work in.

This collaboration brings together the partners' complementary strengths to provide a one-stop complete value-chain solution in urban and industrial development. It combines Surbana Jurong's global expertise in planning, design and engineering consultancy in urban and

industrial sectors, with Vanke's experience in China's real estate development and management.

The first project that both parties plan to jointly undertake will be Vanke's Jianzhou Dream Town in Chengdu, with Surbana Jurong providing the design for the city.

China Vanke Co is a leading real estate company and urban development service provider in China. In October 2017, it signed a strategic cooperation framework agreement with the Chengdu Municipal People's Government, which will see the company invest RMB200 million in Industrial New Towns in eastern and southern Chengdu.



Surbana Jurong and Vanke sign an MOU to jointly develop Industrial New Towns in China.

Further to the agreement, the partners said they will explore setting up a joint venture. ■

### Singapore consortium to participate in overseas airport projects

Surbana Jurong has joined forces with Singapore Technologies Engineering Ltd (ST Engineering) and Changi Airport Planners and Engineers Pte Ltd (CAPE) to form a consortium of Singapore-based companies to participate in overseas airport development projects and meet rapidly growing aviation needs.

The consortium plans to develop a comprehensive export strategy for this business area with a particular focus on Asia Pacific markets and cities with strong growth potential. Tapping on the strengths and complementary capabilities of the companies, the consortium plans to deliver holistic, end-to-end solutions that can transform the global airport development industry, enhance the efficiency and security of airport operations, as well as improve air travel experience. This will drive the consortium's common objective in implementing smart city initiatives worldwide that enhance standards of living and improve the lives of people.



L-R: Surbana Jurong's group CEO Wong Heang Fine; ST Engineering's president and CEO Vincent Chong; and CAPE's managing director Peter Lee.

With its expertise and proven track record in urbanisation, industrialisation and infrastructure planning, Surbana Jurong will offer its full suite of multi-disciplinary services, such as master planning of aerotropolis, large-scale infrastructure, services design, as well as building consultancy services for the aviation sector.

Harnessing its deep technological capabilities in areas such as data analytics and artificial intelligence, ST Engineering will deliver cutting-edge, next-generation solutions that power global smart cities and transform airport operations.

CAPE, the lead consultant for airfield engineering for Changi East Development, which encompasses Singapore Changi Airport's Terminal 5, will complement the collaboration with its expertise in airport master planning, airfield and engineering, terminal planning, as well as project management. ■

## Vinci to build major new motorway connection in New Zealand

Vinci Construction, through its subsidiary HEB Construction, has been chosen as part of an alliance contract to build the Northern Corridor Improvements Project (NCI Project) in New Zealand. With a total value of NZ\$700 million, it aims to create a new connection north of Auckland between the Northern Motorway (State Highway 1) and Upper Harbour Highway (State Highway 18), as well as extending the Northern Busway to Albany and add more than 7 km of new walking and cycling paths.

The project is an important link in helping to realise the full benefits of the Western Ring Route by giving users an alternative route to State Highway 1 and the Auckland Harbour Bridge. It will also create better travel choices for walkers, cyclists and users of

public transport.

The NCI Project Alliance comprises the New Zealand Transport Agency, HEB Construction, Fulton Hogan, Opus and Jacobs. The team is now tasked with finalising the detailed design and beginning construction early this year. The project is planned to be undertaken in stages over the next four years. The first steps towards construction will include road resurfacing and the installation of moveable median barriers.

According to the Alliance, it has started recruiting for more than 150 new roles including surveyors, engineers, safety advisors, machine operators, drainlayers, carpenters and general construction field staff. ■

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## New MD for JCB SE Asia



Max Lytle (left) has been appointed as new managing director for JCB Southeast Asia, and will be based at the company's regional headquarters in Singapore. He replaces Tom Cornell, who will take up the post of managing director - export sales at JCB's UK HQ.

In his new role, Mr Lytle is charged with continuing to deliver JCB's strategy in Southeast Asia. He said,

"Southeast Asia represents a very significant opportunity for JCB. There is high potential and the market is expanding rapidly. As the world's No.3 in the sale of construction machinery, we will strive to be central to that expansion. I look forward to building on the achievements of Tom and the team and continuing our commitment to provide even better support to customers in the region. My focus is to ensure that our newly expanded - and still growing - dealer network in the region can offer the very best aftermarket support to maximise uptime and help make money for our customers."

Mr Lytle will draw on experience gained during varied sales and operational achievements in his five-year tenure at JCB. This includes a stint in JCB's UK sales team, where he was responsible for the management of two of the top five performing dealers in the JCB global dealer network.

Within his most recent role of general manager for global major accounts, Mr Lytle also oversaw the building of the GMA Department at JCB with Jo Bamford - son of chairman Lord Bamford - which saw them double retail volume within three years. Consequently, he has considerable insight into the defining JCB family values, which are one of the main pillars of JCB's successful and enduring business relationships in Southeast Asia. ■

## JCB appoints dealer in East Malaysia

Pansar has been appointed as the official dealer for JCB in East Malaysia. The company will operate from nine centres across the two states of Sabah and Sarawak as well as the Labuan Federal Territory. From this extensive network, Pansar will provide its customers in plantations, construction, infrastructure and mining with access to a broad choice from the family of JCB, as well as delivering maintenance services and comprehensive spare part availability to local businesses.

"JCB is a globally-renowned, multi-product brand which has excellent existing brand recognition in our market. JCB machines have a proven local track record in difficult working conditions and have a very strong reputation for hard work and reliability," said Datuk Jason Tai, managing director of Pansar Berhad. Since a quick turnaround is crucial to avoid downtime, Pansar said it will also provide specialist technicians ready to visit customers' sites.

Pansar will offer a range of popular models from the JCB family. Central to the sales strategy are the 3CX and 3DX backhoe loaders. The range will also include tracked excavators; progressing to sales of the telescopic handler. The entire range would be provided with LiveLink. This innovative software system enables JCB owners to monitor and manage their machines remotely to help maximise machine performance and productivity.

"Pansar will continue to work closely with CN Machinery, run by managing director Alan Chia, to ensure the best support for the broad base of customers in Sarawak," said David Tai, corporate strategy head at Pansar.

"Pansar has a proud presence in Malaysia," commented Mr Lytle. "Their local experience and network in heavy machinery provides unique market insights and in-depth knowledge, which means that we can provide JCB customers with robust machines which fit their needs exactly." ■

## ADB supports Philippines infrastructure projects

The Infrastructure Preparation and Innovation Facility (IPIF), supported by the Asian Development Bank (ADB), has contracted out the first of three consulting packages to help the Philippine government prepare several complex infrastructure projects worth more than US\$11 billion.

The Philippines' Department of Public Works and Highways (DPWH) recently signed the contract with Arup. Under the agreement, the company will help DPWH prepare feasibility studies and detailed engineering designs for new inter-island bridges, tunnels and highways.

In October 2017, ADB approved a US\$100 million loan for the IPIF to support the Philippine government in accelerating the delivery of high-quality public infrastructure projects under its ambitious 'Build, Build, Build' programme. Arup was selected by DPWH using ADB's procurement standards.

"The Philippine government is embarking on an ambitious,

but much-needed infrastructure development programme," said Mark Villar, DPWH secretary. "Major infrastructure projects involving the construction of tunnels through mountainous areas and long-span bridges across islands are unprecedented in the Philippines."

The facility, 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 aims to 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 remaining two contracts covering the preparation of DPWH's flood management projects and the Department of Transportation's projects are expected to be finalised shortly. ■

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# Aurecon opens centre of excellence for digital engineering

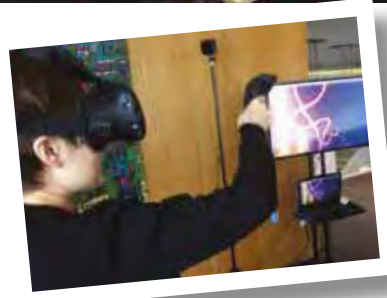
The global engineering firm Aurecon has set up a regional centre of excellence for digital engineering in Singapore. Supported by the Singapore Economic Development Board (EDB), the new facility serves as an extension of the company's Digital Futures team. It is the first of its kind for Aurecon and is dedicated to solving client challenges with emerging digital technologies and alternative business models.

"The engineering and construction industry is not spared from digital disruption, which is changing the way we work and live. The decision to extend the Digital Futures team into Asia was driven by increasing regional demand for digital transformation in the building and construction sector. Singapore's strategic location places our new centre of excellence at the epicentre of the Association of Southeast Asian Nations (ASEAN) and within touching distance of North Asia," said Paul Lombard, Aurecon's managing director for Middle East and Asia. Referencing Singapore's Smart Nation push, he further mentioned that the country's "openness to embrace innovation and its willingness to be a testbed for new ideas" make it an ideal base for the centre.

Aurecon plans to invest S\$3 million over the next three years and will focus on three areas: artificial intelligence and data analytics; the Internet of Things (IoT); and visualisation & digital collaboration. Each area of focus will have a dedicated digital specialist in charge of consolidating ideas and lessons to support priorities such as urban mobility and infrastructure within Singapore. Once adopted locally, these ideas may then be exported to other parts of Asia, or even the world, said Aurecon.

The new centre will be headed by Phil Lazarus, Aurecon's digital practice leader for Asia. He pointed out that in order to succeed in the digital future, "organisations need to fundamentally rethink their planning, strategy and business processes, create connected digital platforms, and improve their analytics and collaboration."

To deliver tangible outcomes, Aurecon has also identified four key competencies for development. The first is 3D collaborative design and BIM (Building Information Modelling) to support the coordination of construction projects. The second is based



ABOVE AND LEFT: Aurecon has established a new centre of excellence for digital engineering in Singapore. It is dedicated to solving client challenges with emerging digital technologies and alternative business models.

around enhancing personal and emotional connections using technologies such as virtual reality. The third is a proprietary design collaboration and project delivery portal called GeoDocs, which allows secure file access from anywhere. The fourth is the Smart Centre, which aligns with Singapore's Smart Nation vision and uses sensors to collect data from multiple points.

"To develop a Smart Nation, we need to reimagine engineering so as to shape and design a better future," added Mr Lazarus. "In many ways the advancement of humanity depends on the engineering and infrastructure we create. That's a responsibility we take seriously and it's also something that requires some unconventional thinking." ■

## Aurecon makes key appointments for Asia

Aurecon has made a number of key appointments to drive the company's development in the Asian market. Nigel Walker has been appointed to the position of project director - rail, where he will provide technical and project leadership in the metros and rail sectors throughout Asia, with a focus on Thailand. Mr Walker has spent the last 25 years working on the implementation of rail projects, notably BTS and MRTA Systems in Bangkok, the Palm Jumeirah Monorail System in Dubai, Education City LRT and Doha Metro in Qatar. He has also led several studies and detailed designs for heavy haul railways within Australia and Asia.

In addition, Nichol Luttig has been named energy leader for Asia. Concurrently, he will also act as the general manager for Aurecon's operations in Indonesia where he will be responsible for the strategic development and operational efficiency of this business.

Damien Kerkhof is now Aurecon's client director for property, where he will leverage his experience to provide strategic, design



FROM LEFT: Nigel Walker, Nichol Luttig, Damien Kerkhof and Johnny Lam.

and business leadership to the Aurecon's Built Environment teams working on property projects around the region.

Finally, Aurecon has appointed industry veteran Johnny Lam as managing director of Greater China. Based in Hong Kong, he will work closely with Aurecon's Asia regional leadership to spearhead the company's growth plans for the region. Prior to this, Mr Lam was AECOM's senior vice president for Building Engineering, Greater China. ■

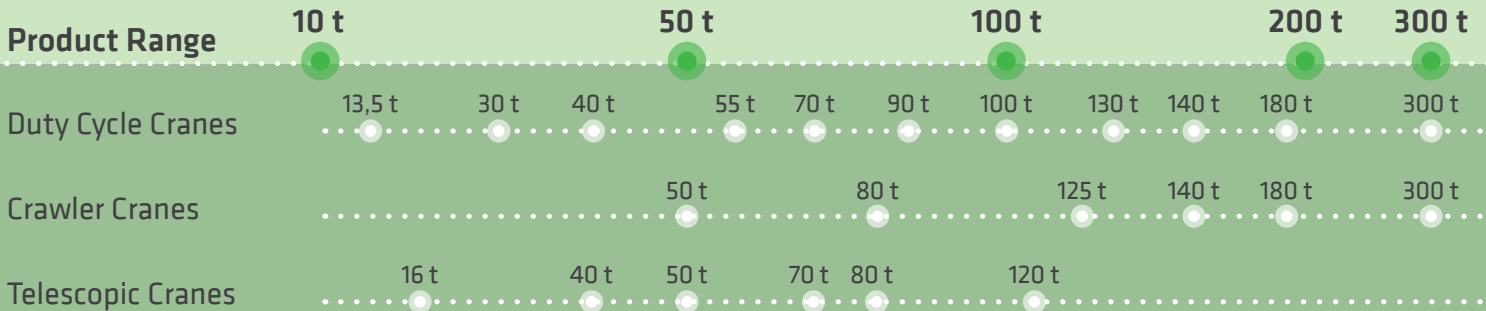
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## Robit opens production facility in Korea

Finnish manufacturer Robit has established a new production facility in South Korea, located in Foreign Investment area in Hwaseong, Gyeonggi-Do. The site covers 21,250 sq m of land size, with 9,550 sq m of building size. According to Robit, the total investment for the new plant amounts to approximately US\$ 12.4 million and it currently employs about 65 people, with three shift operations.

“Korea has been an excellent place for manufacturing drill steels. Therefore, it was easy to make the decision for the new investment. Robit has manufacturing units in Finland, UK, USA and Australia. Out of these, Korean unit was clearly the best unit last year,” said Harri Sjöholm, chairman of the board of Robit Plc.

The Hwaseong facility is designed to meet the growing demand for rods and shanks of top hammer product line. It increases manufacturing capacity in South Korea as well as automation level of the production of rod and shank products. In addition, the throughput time is expected to be significantly shortened, which in turn will improve the delivery capability and service level to customers. It is also located close to Seoul, further improving logistical connections.

The new facility is one of Robit’s six manufacturing plants worldwide. The company has top hammer line production in Finland and South Korea as well as down-the-hole line production in Australia, UK and USA. ■

RIGHT: The new manufacturing facility is designed to meet the growing demand for rods and shanks of top hammer product line.



ABOVE AND BELOW RIGHT: Robit celebrates the opening of its new factory in Hwaseong, South Korea.



## LiuGong enhances production capacity in India

LiuGong has made an investment of US\$5 million to enhance the production capacity at its factory in Pithampur, Madhya Pradesh, India. According to the company, this effort aims to embrace the ‘Make in India’ campaign and generate better local employment opportunities in the country. LiuGong expects to increase its manpower by 40% over the next two to three years, creating more manpower from local staff to support the motto of ‘Skill India Mission’.

The news was announced at the LiuGong event celebrating both its 15 years of business operation in India and 10th anniversary of its India manufacturing facility. This celebration is also part of the company’s 60th anniversary global tour that was announced last November.

LiuGong’s manufacturing facility in Pithampur is supported by R&D and training centres. The company said it has more than 4,000 machines working successfully in road construction, mining, hydropower and pipe handling throughout India. The machines that are made locally have also been tested to operate in the local conditions.

In addition, LiuGong has corporate offices in Delhi, Kolkata and Chennai, 20 dealerships with more than 50 customer touch points across India including in Nepal, Bhutan, Bangladesh and Sri Lanka, as well as spare parts warehousing in Chennai and Indore. ■



ABOVE AND LEFT: LiuGong celebrates its 15 years of business operation in India and 10th anniversary of its India plant.

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## Global construction equipment sales bounce back

Global construction equipment sales rose 28% last year to almost 894,000 units, according to Off-Highway Research. This was the highest the market has been since 2012, and was a marked turnaround from 2015 and 2016 when worldwide equipment sales bottomed-out at 702,000 units. The market was worth US\$88 billion last year, a 25% increase on 2016's figure of US\$70.6 billion.

China was the key driver of global growth last year, where equipment sales rose a remarkable 82%. This took demand back above 200,000 units for the first time since 2014, and re-established China as the largest equipment market in the world in unit terms, ahead of the US.

The newfound buoyancy in China is linked to the 'One Belt One Road' infrastructure projects, which were launched by the government towards the end of 2016. This has driven across-the-board rises in construction equipment sales, particularly larger earthmoving machines.

Robust growth also continued to be the order of the day in India last year, with a 17% increase in construction equipment sales

following on from the 36% surge seen in 2016. This took the market size to a new record level. In Japan, equipment sales were also up 14%, thanks to a sharp rise in the crawler excavator segment.

Sales in Western Europe rose 13% last year to 160,562 units, which this took demand to its highest since the global financial crisis. Significantly, all the individual countries in the region experienced increased demand last year. Among the highlights were Sweden and Norway reaching new records, while sales of equipment in Germany were their highest since the reunification boom of the early 1990s.

After a year of uncertainty in the run-up to the November 2016 US presidential election, the North American construction equipment market returned to growth last year. Sales were up 11% to 173,188 units, thanks to accelerating economic growth.

Off-Highway Research expects global equipment sales to grow another 6% this year, with the most significant growth being seen in North America, India and China. The European market is expected to level-off, while a fall in sales is expected in Japan. ■

## Mike Davis named Genie VP for product management and TBS



Mike Davis (left) has taken up the role of Genie vice president for product management and Terex Business Systems (TBS) at Terex Aerial Work Platforms (AWP). Based in Redmond, Washington, USA, Mr Davis will have responsibility for global product management for the Genie brand, and also global responsibility for the company's TBS activities, across operations and administrative functions.

According to Mr Davis, there are two distinct elements of this role. For product management, he will have responsibility for leading the Terex AWP product strategy process, working with all areas of the business to ensure that Genie has the right product at the right time to meet customer's needs. He will also be leading the company's TBS initiative, which is a long-term effort to develop team members and improve company processes to deliver more value for customers.

"The exciting part of this role for me is that it aligns our product and process efforts," said Mr Davis. "I look forward to continuing our company's legacy of bringing innovative products to market and focusing on initiatives that proactively address our customers' needs."

Mr Davis has been with Terex for 21 years, starting as a design engineer for the Genie brand and was promoted to positions of increasing responsibility. From 2012 to 2015, he served as Genie vice president and managing director for Asia Pacific, Terex AWP. In late 2015, he moved from the Terex AWP segment to the Terex

Cranes business. Prior to rejoining Genie, Mr Davis served as vice president for global strategic initiatives at Terex Cranes.

"We are customer-centric business, and our strategy continues to be to best serve our global customers' needs," said Matt Fearon, Genie president, Terex AWP. "After six years serving in international assignments, bringing Mike back to Genie in this role is specifically intended to drive this strategy. His job is to increase our capacity to bring innovative, quality products to market, as well as to improve our ability to respond to customer needs, by growing the capabilities of our team members. These activities are strategically aligned to significantly benefit our customers worldwide."

"I have spent most of my career at Genie," said Mr Davis. "It is an industry and a team I have literally grown up with and thoroughly enjoy being part of — this feels very much like coming home. The experiences I gained in the last six years have given me a more global and different perspective on many aspects of the business. I'm very excited to bring these experiences with me and once again be part of the company's future."

In addition, Terex Corporation has reported a strong finish to 2017, with net sales of nearly US\$1.1 billion in the fourth quarter, +9.1% versus 2016 thanks to improving market demand and successful implementation of the company's transformation strategy. For the full year, Terex reported net sales of US\$4.4 billion – down 1.8% from 2016 due to the sale of non-core businesses and softness in its mobile cranes business. The positive year-end momentum is poised to continue with the company reporting backlog up by 56% at year end.

Terex AWP, driven by its Genie brand, was a strong contributor to the overall Terex results, with net sales up by +18.6% in the fourth quarter and +4.7% for the full year while backlog was up by 51%. "AWP enters 2018 with clear signs that markets are improving for the first time in several years and we believe the Genie business is well positioned for the improving market," commented Mr Fearon. ■

## Rubble Master acquires Maximus

Rubble Master has become the majority owner of Maximus, a screening machine manufacturer based in Northern Ireland. Founded in 2004 and currently employing 120 people, Maximus develops and manufactures mobile tracked screens, complementing the existing range of Rubble Master products.

Rubble Master has experienced a strong growth in recent years, and this trend is expected to continue in 2018. The company's rapidly increasing sales figures and expanded team has also been enhanced with the acquisition of Maximus. The partnership between the two companies has already resulted in a joint development of the new RM HS3500M compact screen.

According to Rubble Master, both brands will remain the same and complement each other, and there will be no changes to Maximus' employees in Northern

Ireland, the company's management team and manufacturing locations, as well as its sales and service network. ■

Rubble Master and Maximus have jointly developed a new compact screening machine, the RM HS3500M.

## Tony Fassino to lead Caterpillar BCP division



Caterpillar has named Tony Fassino (left) vice president of Building Construction Products (BCP) division. Here replaces Ken Hoefling, who recently departed the

company to pursue other opportunities. BCP is a global organisation responsible for designing, manufacturing and supporting Caterpillar's line of small, versatile construction equipment and work tools.

Most recently, Mr Fassino has been the general manager for Caterpillar's forestry products group. Much of his more than 20 years with Caterpillar has been spent in roles of increasing responsibilities within the company's marketing and dealer support groups. Mr Fassino also spent five years based in Japan as a new product introduction manager for hydraulic excavators. ■

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— Better Roads with Linnhoff —

Date	Events in Asia	Organiser & Contact
24 to 26 May 2018	Concrete Show India 2018 Bombay Exhibition & Convention Centre Goregaon, Mumbai India	UBM India Pvt Ltd Tel: +91 22 6172 7155 Email: saiprasad.terde@ubm.com Website: www.concreteshowindia.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
18 to 19 Jul 2018	IPAF Asia Conference & Showcase 2018 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	IPAF Tel: +65 9686 4191 Email: raymond.wat@ipaf.org Website: www.ipaf.org/asiaconference
23 to 25 Aug 2018	LankaBuild 2018 Sri Lanka Exhibition & Convention Centre Colombo Sri Lanka	AMB Tarsus Events Group Tel: +603 2692 6888 Email: darren@ambtarsus.com Website: www.lankabuild.org
6 to 8 Sept 2018	Intermat ASEAN & Concrete Asia 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
12 to 14 Sept 2018	Cambuild 2018 Diamond Island Exhibition & Convention Centre Phnom Penh Cambodia	AMB Tarsus Events Group Tel: +603 2692 6888 Email: richard@ambtarsus.com Website: www.cambuildexpo.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
22 to 24 Oct 2018	BuildTech Asia 2018 Singapore Expo Singapore	Sphere Exhibits Tel: +65 6319 4021, Fax: +65 6319 6140 Email: buildtechasia@sph.com.sg Website: www.buildtechasia.com
8 to 11 Nov 2018	Philconstruct 2018 SMX Convention Centre & World Trade Centre Manila The Philippines	Global-Link Exhibitions Specialist Tel: +63 2 893 7973, Fax: +63 2 550 1148 Email: info@globalinkmp.com Website: www.philconstructevents.com
16 to 18 Nov 2018	Myanbuild 2018 MEP Mindama Yangon Myanmar	AMB Tarsus Events Group Tel: +603 2692 6888 Email: darren@ambtarsus.com Website: www.myanbuild.net
19 to 21 Nov 2018	World of Concrete Asia 2018 Shanghai New International Expo Centre Shanghai China	Informa Exhibitions Tel: +86 21 2326 3669 Email: info@wocasia.com Website: www.wocasia.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
11 to 14 Dec 2018	Bauma Conexpo India 2018 HUDA Ground Gurgaon, Delhi India	Messe München Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bcindia.com Website: www.bcindia.com

Date	Events outside Asia	Organiser & Contact
26 to 28 Jun 2018	Hillhead 2018 Hillhead Quarry Buxton, Derbyshire UK	QMJ Group Ltd Tel: +44 115 945 4367 Email: hillhead@qmj.co.uk Website: www.hillhead.com
26 to 29 Nov 2018	The Big 5 Dubai World Trade Centre Dubai UAE	dmg events Tel: +971 4 438 0355 Email: info@thebig5.ae Website: www.thebig5.ae
22 to 25 Jan 2019	World of Concrete 2019 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6379 Email: info@worldofconcrete.com Website: www.worldofconcrete.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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# World of Concrete Asia prepares for second edition

After its successful launch last year, World of Concrete Asia (WOCA) will be returning from 19 to 21 November 2018 at the Shanghai New International Expo Centre (SNIEC), China. The show will exhibit the latest developments across the globe on many aspects of concrete, flooring, building materials and construction technology that are applicable to the country and the region. Various education programmes will also be presented with speakers from China and all over the world, with nearly 100 sessions to be delivered onsite.

WOCA is a branch of the well-known World of Concrete (WOC) in Las Vegas, the latter of which is organised by Informa Exhibitions and regarded as the only annual global event for concrete and masonry professionals. WOCA is organised by Shanghai Yingye Exhibitions Co Ltd - a joint venture between Informa Exhibitions and Shanghai Zhanye Exhibition Co Ltd – that was specially formed to launch the WOC show in China as well as to promote the global brand exhibitions to China companies.

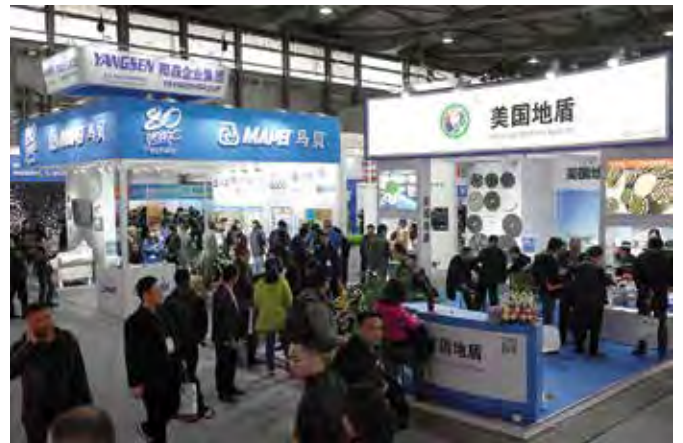
The first edition of WOCA was held from 4 to 6 December 2017 covering an exhibition area of 43,000 sq m. The show attracted 712 exhibitors from 18 countries and regions, attended by 30,900 visitors from 63 countries and regions. Many international delegations came to the show for the first time, said Shanghai Yingye. The launch of WOCA provides an excellent opportunity to build up local network, meet business partners, strengthen existing contacts and establish new ones.

WOCA 2018 aims to tap into China's 'One Belt, One Road' strategy, which has gained general acceptance globally and was repeatedly mentioned in 2018 government work report. The report also suggests promoting a completely opening-up pattern in 2018.

This year's show will have several new features. First of all, it will now occupy Hall W1 right through to Hall W5, with the Hall of Concrete to be located in Hall W5. The product groups in the Concrete Hall will be reclassified, namely concrete chemicals, concrete masonry, concrete equipment, formwork and scaffolding, as well as construction equipment and vehicle. The visitor profile will include ready-mixed concrete / precast concrete / pre-mixed mortar producers, residential building, municipal public works construction, recycled concrete, distributors, real estate development companies, concrete testing lab, association / media, landscape architect / contractor and more.

The other new feature is an interactive area and new campaign. The Interactive Area allows exhibitors to share their latest technology and solutions through presentation, live demonstration and hands-on training. The Latest Technic Campaign allows jurors from experts and trade media all over the world to rate candidate's latest research and products, and there will be an award ceremony during the show. ■

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



ALL IMAGES: The inaugural World of Concrete Asia took place in December 2017 at the Shanghai New International Expo Centre (SNIEC), China.



# Year in Infrastructure 2018 to be held in London

Bentley Systems' Year in Infrastructure 2018 conference will be held from 15 to 18 October in London at the Hilton London Metropole. Presented by Bentley Institute, the event will be a global gathering of leading industry executives and prominent thought leaders in the design, construction and operations of the world's infrastructure. The theme of this year's conference is 'Going Digital: Advancements in Infrastructure'.

The conference features nearly 70 speakers and more than 50 informative sessions, including keynotes by leading industry experts, interactive workshops, forums, panel discussions and product demonstrations. Attendees can visit the Technology Pavilion, which offers exhibits and presentations from Bentley Systems and its strategic partners (Microsoft, Siemens, Topcon and Bureau Veritas).

On the first day of the conference, Bentley Institute will host Digital Advancement Academies, delivering presentations and interactive discussions with subject matter experts who provide insights and best practices in their areas of expertise, such as reality modelling, BIM strategy and constructioneering.

The conference also includes the selection and announcement of the winners of Bentley's Year in Infrastructure 2018 Awards (formerly known as the Be Inspired Awards), which honours the extraordinary infrastructure projects by users of Bentley software throughout the world.

During six industry-focused forums featured during the conference — Buildings and Campuses, Digital Cities, Industrial Infrastructure, Rail and Transit, Roads and Bridges, and Utilities and Water — more than 55 awards finalists will present their projects to independent panels of jurors, more than 100 members of the press and conference attendees.

In October 2019, the Year in Infrastructure conference is scheduled to return to the Marina Bay Sands Expo and Convention Centre in Singapore. ■

Website: <https://yii.bentley.com>



LEFT: Bentley Systems' Year in Infrastructure conference will return to London in October 2018.

BELOW: Last year the conference was held in Singapore for the first time.



LEFT: Attendees can visit the Technology Pavilion, which features exhibits and presentations from Bentley Systems and its strategic partners.



ABOVE: The conference also includes the selection and announcement of the winners of Bentley's Year in Infrastructure 2018 Awards.

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## 'Signs of industry recovery' at bauma Conexpo Africa

This year's bauma Conexpo Africa took place from 13 to 16 March 2018 in Johannesburg, South Africa. It drew 454 exhibitors from 34 countries and 14,167 visitors - about 13% of these visitors came from outside South Africa. The top five African countries were Zimbabwe, Kenya, Botswana, Mozambique and Namibia. There were also delegations from Chile, Israel, Kenya and Turkey, and for the first time Singapore companies participated at the event.

The show is jointly organised by BC Expo South Africa, Messe München and the Association of Equipment Manufacturers (AEM). "The trade fair reflected a sense of renewed optimism and highlighted the opportunities in the industry, despite recent economic challenges," said Stefan Rummel, managing director of Messe München.

"It is significant to have a consistent and engaged presence in the region in order to take advantage of long-term business potential. bauma Conexpo Africa creates a platform to help facilitate these opportunities," added Petra Kaiser, senior director for international exhibitions & events at AEM.

Held every three years, bauma Conexpo Africa covers an exhibition area of 68,000 sq m at the Johannesburg Expo Centre (JEC). The next edition of the show is scheduled to return to Johannesburg in 2021.

### From Singapore to Johannesburg

Among Singapore companies that joined bauma Conexpo Africa for the first time were Lintec & Linnhoff Holdings Pte Ltd and Trimax Machinery Pte Ltd.

Lintec & Linnhoff Holdings Pte Ltd was represented by its subsidiary, Linnhoff Technologies Pte Ltd. The company said it had the chance to meet with potential business prospects from Botswana, Cameroon, Namibia, Nigeria, South Africa and Italy. "The exhibition provided a good platform and exposure for our company and products in the southern African region. Although the number of visitors was less than expected, we received substantial quality leads from this exhibition," said Don Chiang, senior sales manager at Linnhoff Technologies Pte Ltd.

Christabel Chan, business development executive at Lintec & Linnhoff Holdings Pte Ltd also expressed her satisfaction. "We are very pleased with the outcome of our first experience participating at bauma Conexpo Africa 2018. Our technology, design and know-how in this business, producing top-grade asphalt mixing and concrete batching plants, separates us from our competitors in this very specialised and niche market," she said. "One of our most recent prestigious projects is the completion of the 55-km Hong Kong-Zhuhai-Macau Bridge. The bridge spans 20 times the length of San Francisco's Golden Gate Bridge, which connects Hong Kong in the east of the Pearl River Estuary with Macau and Zhuhai in the west. It is expected to be officially opened for public use on 1 July 2018."

Trimax Machinery Pte Ltd also attended bauma Conexpo Africa for the first time, targeting the African market. "At our first participation at bauma Conexpo Africa 2018, we were visited by business potentials from South Africa, Mozambique, Tanzania, Kenya and even Mauritius and United Arab Emirates," said Sebastian Lua, managing director of Trimax Machinery Pte Ltd.

Trimax offers a complete range of crushing and screening machinery, and the company can deliver its products based on customers' specific requirements and needs. According to Trimax,



ABOVE AND LEFT: bauma Conexpo Africa was held from 13 to 16 March 2018 in Johannesburg, attracting 454 exhibitors from 34 countries and 14,167 visitors.



ABOVE AND BELOW: Singapore companies joined bauma Conexpo Africa for the first time, including Lintec & Linnhoff Holdings Pte Ltd - represented by its subsidiary Linnhoff Technologies Pte Ltd - and Trimax Machinery Pte Ltd.



it has carried out successful installations at quarry sites around the world under various terrains and weather conditions, including in Indonesia, Malaysia, Vietnam and also South Africa, to name a few. ■

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

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# LIEBHERR

# Soaring training demand and global reach

The International Powered Access Federation (IPAF) has experienced another year of global growth, seeing membership rise by 6.6% year-on-year, a 7.8% increase in turnover and global training delivery up by around 4%. The figures – detailed in IPAF’s Annual Report 2017, recently published in eight languages including for the first time in Chinese – show membership increased from 1,240 at the end of 2016 to 1,322 last year, extending IPAF’s footprint into 66 territories worldwide, including five new countries: Algeria, Bahrain, Iran, Iraq and Latvia.

Demand for IPAF training soared last year, with 164,662 people successfully completing an IPAF course in 2017 – 3.7% more than the 158,727 that did so in 2016. Significant training growth was experienced in the Gulf States, which was 27.2% up

on the previous year (which in turn was 49.3% higher than 2015). Training demand in Latin America was 21.8% higher, reversing a downward trend seen in previous years, while the UK saw an increase of 5% in the year. During November 2017, IPAF issued the 1.5millionth PAL Card operator licence since the initiative began – at year-end there were almost 725,000 valid PAL Cards in circulation worldwide.

IPAF invested in new staff, better technology and training systems and participated in events in more countries than ever before, including three in mainland China – hosting the IPAF Asia Conference & Showcase in Changsha, attending BICES in Beijing and supporting the inaugural APEX Asia event in Shanghai. ■

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

## IPAF Asia Conference 2018 set for Kuala Lumpur

The seventh IPAF Asia Conference & Showcase 2018 will take place for the first time in Kuala Lumpur, Malaysia, on 18 and 19 July. Hosted at the Kuala Lumpur Convention Centre in the city centre, alongside the ASEAN M&E Show 2018, it will provide an excellent opportunity to meet and network with industry colleagues and to gain valuable business insight about the powered access industry, especially in Asia.

The main conference will be held on 19 July, featuring an excellent line-up of local and international speakers on a range of different topics, including: ‘The journey of Malaysia’s MEWPs Industry’ by Kang Han Fei (Aerial Lift & Equipment); Statistical report on Southeast Asia MEWP Rental Market by Amanda Tan (IPAF); ‘MCWP for Versatility, Safety and Productivity’ by Janne Haapalainen (Scan-Rent); and ‘Is the Malaysian market for truck-mounted platforms threatened by the increasing popularity of other types of MEWPs?’ by Johnson Lai (Keng Guan Skylift).

Other speakers will include Tim Whiteman, IPAF CEO & MD; Nick Selley, IPAF president; Angel Ibanez, IPAF global representative



The 2017 IPAF Asia Conference & Showcase was held in China for the first time.

for MCWPs & related products; and Andrew Delahunt, IPAF director of technical & safety.

On 18 July there will be a welcome cocktail reception followed by a gala dinner – tickets are only available to conference attendees. The product showcase will be on both the 18 and 19 July. ■

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

## IPAF signs agreement with health & safety body in the Middle East

The recent Middle East Convention hosted by IPAF in Abu Dhabi, UAE, saw a Memorandum of Understanding (MOU) signed between IPAF and the International Institute of Risk and Safety Management (IIRSM).

IIRSM is one of the most proactive and high-profile health & safety bodies in the Middle East, while IPAF’s operations in the region and the demand for accredited training has risen sharply in recent years.

Jason Woods, IPAF’s representative in the Middle East and India said, “The IIRSM is one of the most active safety groups in the Middle East, supporting safety professionals throughout all industries.



The MOU was signed by Tim Whiteman, CEO & MD of IPAF, and Phillip Pearson, chief executive of IIRSM, at the annual IPAF Middle East Convention in November 2017.

We at IPAF are focused on mobile elevating work platform (MEWP) and mast climbing work platform (MCWP) safety and training

provision and have been working with the Institute for many years, from giving joint presentations on new standards to delivering practical safety workshops.

“I’m very pleased to say that now we have an official MOU in place, we can look forward to driving working at height to become even safer through the use of powered access equipment operated and supervised by properly trained professionals. The help of IIRSM members will be invaluable in achieving our joint goals of reducing falls from height and making the many construction sites across the region safer for all.” ■

# LET'S IMAGINE THE FUTURE



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# Sennebogen launches 140 t duty cycle crane

The new Sennebogen 6140 E duty cycle crawler crane has an operating weight of 126 t and is fitted with a 708 kW (or optional 563 kW) diesel engine. It can lift a 24 t load at a working radius of 20 m, meaning that heavy attachments can be operated and heavy loads lifted when used for gripping and lifting respectively.

The machine's high level of stability is assured by the new broad-track undercarriage, with a track width of 5.50 m – which is a 20% increase compared to similar machines on the market, said Sennebogen. Featuring 1,900 mm wide, the lattice boom is designed to meet the dynamic requirements of the machine and has a length of up to 63.5 m.

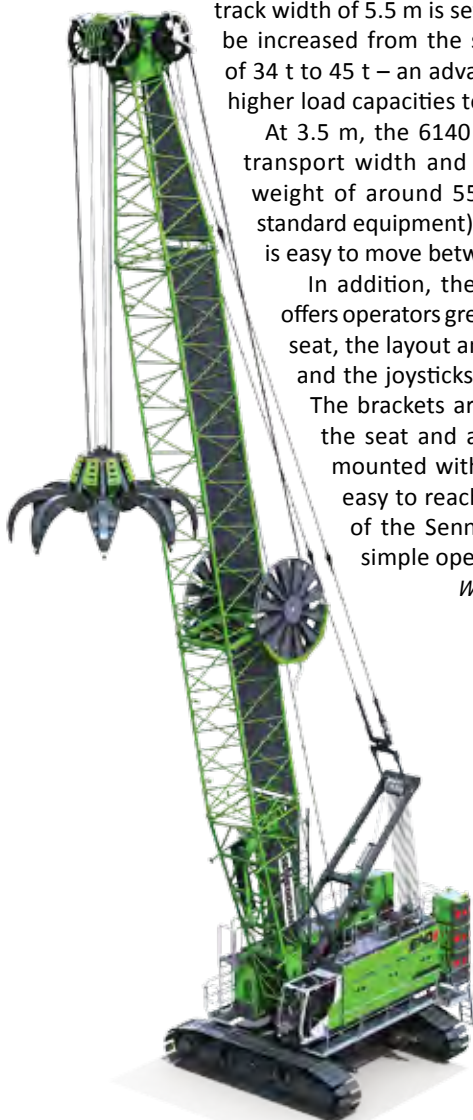
The 6140 E offers three winch options – apart from the standard 250 kN winches, it is also possible to incorporate a 300 kN or 350 kN winch. The crane is powered by high-pressure regulated variable-displacement hydraulic motors, which ensure optimum power transfer in terms of traction and speed.

The Star-Lifter undercarriage allows the track width to be easily altered between 4.6 m and 5.5 m. If the wide track width of 5.5 m is set, the counterweight can be increased from the standard version weight of 34 t to 45 t – an advantage of 11 t – enabling higher load capacities to be achieved.

At 3.5 m, the 6140 E ensures a convenient transport width and its moderate transport weight of around 55 t (basic machine with standard equipment) means that the machine is easy to move between construction sites.

In addition, the new Maxcab large cab offers operators greater comfort. Besides the seat, the layout and design of the controls and the joysticks have also been revised. The brackets are positioned directly on the seat and are therefore resonantly mounted with all operating elements easy to reach. The ergonomic design of the Sennebogen joysticks allows simple operation of all functions. ■

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



Sennebogen adds a new 140 t duty cycle crane to its product range, the 6140 E.



### GBE Crusher Buckets

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ipe-Eagle based in Singapore is the Simex Distributor for South East Asia. Stocks of machines and spare parts are kept in the head office and various branches for quick deliveries to customers. Competent sales and technical staff are close at hand to serve our customers.

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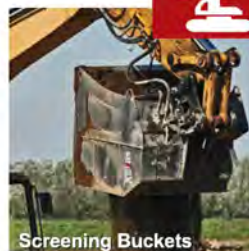
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## Skyjack's new compact telehandler and Elevate system

Skyjack has developed its first compact telehandler, the SJ519 TH, featuring a 2,500 kg lift capacity and a maximum lift height of 5.82 m. With a fully opening door, operators can access their cab with ease. At its maximum reach of 3.44 m, the SJ519 TH can still lift a rated load of 2,000 kg. The machine's major service points are also easily accessible, making it simple to maintain.

In addition, Skyjack has launched its Elevate system, a fully customised solution designed specifically for off-highway rental fleets. The system is powered by Trackunit, thanks to the partnership that began in October 2017. A key objective of this partnership has been to meet an increasing demand for machine connectivity from OEMs and to support the connected fleet goals of Skyjack's customers.

Trackunit has been providing telematics solutions specifically for off-highway and construction rental fleets for more than a decade. Working closely with Skyjack, the company has developed both off the line and retrofit solutions to add Elevate to new and existing off-highway fleets.

A main differentiator between Elevate and other off-highway products is a focus on flexibility and the dynamic needs of the customers' rental fleets, said Skyjack. Trackunit's existing ecosystem allows the customers to hit the ground running with easy integration for their entire fleet. Through the use of Elevate ON and Elevate GO apps, powered by Trackunit, Elevate provides an integrated solution for entire fleets. ■

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



Skyjack's new compact telehandler, the SJ519 TH, features a 2,500 kg lift capacity and a maximum lift height of 5.82 m.



Skyjack has introduced its Elevate system for off-highway rental fleets. Through the use of Elevate ON and Elevate GO apps, powered by Trackunit, the system provides an integrated solution for entire fleets.

## Himoinsa compact lighting tower

The new Apolo AS4005 Eco from Himoinsa has two 500-W LED spotlights, which provide a light output of 120,000 lumens with a fuel consumption of 0.83 l/h. Equipped with a 4.5 kVA Yanmar engine and a Meccalte alternator, the lighting tower weighs only 600 kg, making it very light. It also has a 114-l fuel tank that gives the tower a running time of 137 hours – this is said to be equivalent to 17 nights' work without needing to refuel.

When the generator is working at 100% load in addition to the lights being on, its fuel consumption is 1.7 l/h and it has a running time of 67 hours, almost three days of continuous work. All this makes the tower particularly attractive for the construction sector and the events industry.

The mast manually extends up to 6 m and rotates 360 degrees. Given the tower's small size (2,331 x 1,381 x 2,842 mm), up to 22 units can be transported in a trailer or a 40-ft container. In addition, the Apolo AS4005 Eco includes the new Himoinsa M7T controller, which offers important functionalities to improve the user experience. ■

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



The new Apolo AS4005 Eco from Himoinsa has two 500-W LED spotlights, which provide a light output of 120,000 lumens with a fuel consumption of 0.83 l/h.

# LiuGong introduces B170D bulldozer

The new LiuGong B170D bulldozer is available in two types, Standard and Wetland, with an operating weight of 17,500 kg or 19,500 kg and a blade capacity of 4.5 cu m. The machine is powered by a Cummins QSL9.3 engine for smooth travel and reliable operation.

The B170D is equipped with LiuGong integrated torque converter and transmission, which greatly improves its operating efficiency. The machine's speed can be adjusted automatically according to its load, and the gear can be set up in advance based on the working conditions in order to enhance efficiency and reduce fuel consumption.

The double-curve control system allows the B170D to be used for various applications. The machine has two working modes: Power (P) and Economy (E). According to LiuGong, the maximum productivity of the machine in its P mode is 30% higher than similar products, and the B170D can also achieve 25% lower fuel consumption than the market average in E mode.

The B170D features a spacious cab, which offers good visibility. It is sealed to protect the operator's safety and to reduce noise. There is also a suspension seat, an integrated air-conditioning system and a 7-in LCD screen, as well as ergonomically designed operating systems and controls for operator comfort.

The B170D is built with an integrated frame, making it stronger against impact. The new pivot design and the articulated balance beam ensure a stable and smooth operation, increasing machine reliability even under tough working conditions. Its convenient maintenance ports and easy access to the engine and hydraulic system enable simpler daily checks and maintenance.

The B170D also offers alternative configurations and attachments to meet different requirements in a variety of working conditions. ■

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



ABOVE AND BOTTOM: The new LiuGong B170D bulldozer is available in two types, Standard and Wetland, with an operating weight of 17,500 kg/19,500 kg and a blade capacity of 4.5 cu m.



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# XCMG XGC55T and XCT25L5 mobile cranes

The XCMG XGC55T telescopic crawler crane is suitable for use in various applications, such as foundation and piling work, bridge and tunnel construction, and many more. The machine offers a maximum lifting capacity of 55 t, lifting speed of 140 m/min, five-section boom (the boom bracket is 10.6-41 m) and an auxiliary boom combination length of 41+16 m.

The XGC55T's two-lattice jibs have a length of 9.5/16 m. The superstructure turntable counterweight of 0-16.7 t (full counterweight) has four compound modes and each compound has an independent lifting performance table, improving the machine's versatility. The XGC55T has a transportation width of up to 3 m and transportation weight of up to 28.6 t.

The XCMG XCT25L5 truck crane has been deployed in a wide range of projects around the world. It has a maximum lifting height of 50.2 m, together with a main boom of 42 m and an auxiliary boom of 9 m. The U-shaped main boom, with an outrigger span of 5.65 m x 6.4 m, provides a solid foundation during lifting operations. The machine also has a minimum slewing steady speed of 0.1°/s. ■

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

BELOW, BELOW RIGHT AND FAR RIGHT: The XCMG XCT25L5 truck crane has been used in many projects around the world. It has a maximum lifting height of 50.2 m, with a main boom of 42 m and an auxiliary boom of 9 m.



ABOVE AND LEFT: The XCMG XGC55T telescopic crawler crane has a maximum lifting capacity of 55 t, with a five-section boom. It is designed for various applications.



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# Innovative civil engineering solutions for Asia Pacific

Quicseal Construction Chemicals, headquartered in Singapore, is set to enter the civil engineering market through its exclusive partnership with Bluey Technologies – an Australia-based supplier of construction products for major civil engineering infrastructure works. Since 2017, Bluey has appointed Quicseal as its sole distributor for the Asia Pacific region.

Among the products that Quicseal will offer to the region is the BluCem range, an innovative solution in highly flowable and volumetrically stable cements, grouts and mortars. This range of products can be used for applications ranging from filling ducts around post tensioned cables, lightning trenches, floor levelling or even encapsulation of ground anchors to spray and trowel applied mortars and pumpable or fast setting grouts.

BluCem is fast setting with high early-strength development. As such, it is suitable for construction of roads, airports, tidal structures or associated infrastructure with limited time frames, which normally require fast setting grouts that can achieve 20 MPa in two hours. BluCem is also fully shrinkage compensated. Special cement systems, blended aggregates and advanced additives are used to form micro concrete that is C Class dual shrinkage compensated, and chloride free.

In addition, many high-performance grouts get very hot when curing, which can lead to damaging shrinkage immediately after casting and curing resulting in cracks and poor strength. BluCem has products that allow deep pour situations of more than 100 mm with low exothermic heat created, resulting in a positive outcome. BluCem also has products that are suitable for challenging environments that require special sulphate and chloride resistant cements to ensure repairs can be undertaken successfully.

BluCem HE80AG is a pourable, fast setting product suitable for civil engineering applications. It incorporates special cement systems, blended aggregates and advanced additives to form micro concrete that is C Class dual shrinkage-compensated, and chloride free. The addition of aggregate allows the product to be batch mixed in agitators for large volume applications, such as road and runway repairs including airport lighting trench. BluCem HE80AG has been used on some of Australia's largest and most important infrastructure projects where time is a critical factor.

BluCem HB50 is a trowellable, highly durable product also suitable for civil engineering applications. It incorporates marine grade cement systems and advanced polymer additives to form a cementitious mortar that is chloride and sulphate resistant, C Class dual shrinkage compensated and potable water use approved. It provides fast-setting times and high chemical resistance to ensure repairs can be undertaken within tidal zones and other applications requiring fast return to service. BluCem HB50 is considered an ideal high-performance repair mortar where engineers require a positive outcome in the most difficult application environments.

BluCem FSC is a highly durable, CSA-based cementitious powder binder, which is blended with aggregates to form a high early strength gain concrete. It is specifically designed to be applied using volumetric based continuous mixers. The powder blend has been formulated to eliminate segregation during transport and provide consistent, repeatable results throughout large volume applications. BluCem FSC is designed for use in construction of concrete structures and pavements where only a short window of time is available to complete the works and return the asset to service. ■

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



Quicseal Construction Chemicals is set to enter the civil engineering market through its exclusive partnership with Bluey Technologies.



BluCem HE80AG is a pourable, fast setting product suitable for civil engineering applications, such as road and runway repairs including airport lighting trench. The product has been used on some of Australia's largest and most important infrastructure projects where time is a critical factor.



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# Genie offers new protective solution

Available globally in the second quarter of 2018, the Genie Lift Guard Platform Mesh family of accessories is designed to prevent dropped objects falling from aerial worksites. It has three versions - half-height aluminium, full-height aluminium and removable woven screen.

The Lift Guard Platform Mesh – Half and Full aluminium accessories are available on Genie 1.82-m or 2.44-m articulated and telescopic boom platforms equipped with a swing gate. The ‘Half’ version is designed to cover the lower half of the boom platform area, from the floor to midrail. The ‘Full’ version covers all four sides of the platform, from the floor to the top rail, without obstructing the lanyard attachment points on the rail.

According to Genie, both versions will be available installed from the factory or as an aftermarket kit, which can easily be retrofitted onto existing boom platforms with swing gate in less than 30 minutes with two people. These accessories are ANSI, CSA and CE qualified and stability tested for use globally on Genie Z and S boom platforms.

An alternative to the aluminium options, the Genie Lift Guard Platform Mesh – Screen accessory is designed to encapsulate the boom platform, fully covering the bottom, sides, door and control panel. It fastens around the

platform midrails using a hook-and-loop and straps around guardrail with 0.05 m burst-resistant buckles. Operators can quickly and easily enter and exit the boom platform through the entryway. It can be folded to half configuration at height, allowing worker to gain access through the midrail and top rail at any time while at height.

When configured to full height, the Lift Guard Platform Mesh – Screen is built to sustain 15 mph winds; when folded down below the midrail, it can sustain 28 mph winds. This accessory weighs less than 9.07 kg and is constructed from a flame-retardant material. It has passed by Cal. Fire Marshal-Title 19 & NFPA 701 testing; it has also been tested to ASTM D-2135 with a low temperature rating of -40°F (40°C) and a UV Resistance of 1,200 hours ASTM G-53.

The Lift Guard Platform Mesh – Screen accessory is available as an aftermarket kit. Genie said it can easily be installed by one person without tools on Genie S-boom and ZX-135/70 platforms in less than 10 minutes or by two people in less than five minutes. It only needs to be installed once and can remain in place for up to two years of use.

To further enhance safe work practices at height, all Genie Lift Guard Platform Mesh accessories are compatible with other Genie protective and safety accessories,



Genie Lift Guard Platform Mesh - Full (top), Half (middle) and Screen (above).

including the Genie Fall Arrest Bar, Genie Lift Guard Contact Alarm and Genie Operator Protective Structure. ■

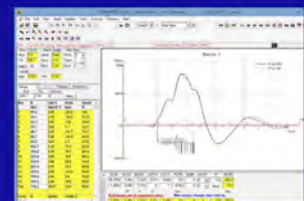
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# Ammann updates plate compactors and trench rollers

Ammann has updated the hand guides on its current APR reversible vibratory plate compactors to reduce vibration. A new mounting for the guide handle isolates vibration and prevents it from reaching the operator, significantly improving comfort and safety.

Specifically, the new mounting reduces hand arm vibration (HAV) so it is below the limit of 2.5 m/sec<sup>2</sup>. The reduced HAV value is so low that documentation of operator hours is not required, even in the most highly regulated countries, said Ammann.

The handle mountings are now standard on the Ammann APR 5920, APR 4920 and APR 3520 models. In the second half of 2018, all other APR models are expected to be equipped with the new vibration-isolated handle mountings.

The Ammann APR plates limit HAV to the operator while maximising productivity. Their twin-shaft exciter unit enables the operator to smoothly change direction in forward or reverse, or to keep the machine working on a single, tough-to-compact area. The Ammann plates can deliver reliable compaction on grades up to 35%. Their compact dimensions and easy upkeep make APR plates ideal for rental companies, construction contractors and landscapers.

In addition, Ammann has incorporated the ACE<sup>econ</sup> intelligent compaction system



Ammann has updated the hand guides on its current APR reversible vibratory plate compactors to reduce vibration.



Ammann has also incorporated the ACE<sup>econ</sup> intelligent compaction system into its ARR 1575 trench roller.

into its ARR 1575 trench roller. The system eliminates guesswork by measuring compaction progress in real time. The information is communicated to the operator via an LED display on top of the machine.

Without ACE<sup>econ</sup>, operators must estimate the compaction level, explained Ammann. If the operators overestimate compaction, they might depart prematurely and leave unfinished work behind. This can lead to quality control issues and costly rework. Likewise, productivity and profits can also be lost if operators underestimate

the progress and continues to work after compaction has been achieved. This miscalculation leads to wasted labour and fuel, and it also puts unnecessary hours on the machine.

The ARR 1575 provides excellent compaction output, in part, because it maintains constant ground contact through oscillating articulation joint. The roller also precisely directs vibratory forces to the target and features a circular vibrator and two amplitude settings. A precise infrared remote control system maximises safety. ■

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

## Ammann ServiceLink - mobile networked fleet monitoring

Ammann has also made it possible to optimise maintenance as well as fleet control and rental with an innovative system, Ammann ServiceLink, which provides practical digital control of key machine data for compactors of the APR, APH and ARW series. The system enables information on battery status, usage, maintenance intervals and documentation to be accessed via the free Ammann Service App or the Service Portal.

Ammann ServiceLink is a hardware upgrade in the form of a relay that has been integrated in all battery-powered lightweight compactors produced by Ammann since January 2018. It brings major advantages, such as simplified digital monitoring of machine data including battery status and operating and maintenance times. It also reduces downtime caused by recharging or expensive battery changes. Low battery levels are recognised promptly, enabling charging processes to be adapted to operating requirements.

The Wi-Fi-aided system has additional benefits with regard to planning construction site operations and fleet management. The app provides a clear overview of stored data – for instance in the form of an hours-run meter. Users can plan maintenance



LEFT AND RIGHT: The Ammann ServiceLink provides machine data such as battery status, usage, maintenance intervals and documentation to be accessed via the free Ammann Service App or the Service Portal.

intervals in adequate time for optimum efficiency. The system informs the dealer or user by email that the machine is due for servicing or if the battery voltage has reached a critical level.

On-site inspections become unnecessary, said Ammann. The next maintenance interval is displayed automatically when maintenance work is completed. The timing of the next maintenance is calculated on the basis of either the accumulated operating hours or the time interval. The information stored in the machine includes previous maintenance and service activities. ■

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## MTU engines certified for Stage V

Rolls-Royce's MTU Series 1000, 1100, 1300 and 1500 engines have received their EU Stage V compliance certificates from the German Federal Motor Vehicle Authority (KBA). The engines are specially designed for industrial applications in the construction and agricultural sectors and are based on commercial vehicle engines from Daimler. They cover the 115 to 480 kW power range.

According to Rolls-Royce, the first Stage V engines have been put through tough trials in what were often extreme weather conditions and altitudes, and they were subjected to systematic forensic testing in collaboration with Daimler between July and November 2017. The engines currently running have now notched up a total of 26,000 operating hours, with the longest-running unit on the go for a full 4,200 hours.

At present, the new EU Stage V standard comprises the most stringent levels for particulate and nitrous oxide emissions



MTU Series 1000 to 1500 engines, which are based on Daimler commercial vehicle engines and have been upgraded for EU Stage V jointly by MTU and Daimler, will be available for delivery as early as June 2018.

given off by mobile machinery. MTU is meeting these strict requirements by means of in-engine design enhancements, and by adding an SCR system and an extra diesel particulate filter.

The EU Stage V engines are going into series production and are scheduled to be

available to customers from June 2018, seven months before the new directive goes onto the statute books. Customers will continue to be able to source the EU Stage IV engines, which will be available alongside the new models, said Rolls-Royce. ■

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

## New buckets for Bobcat compact excavators

Bobcat has expanded its current attachment line-up with the newly redesigned trenching buckets and all-new grading buckets for the E26 through E85 compact excavators.

The grading buckets – available in 36-, 48- and 60-in widths – share the same profile as the trenching buckets and will not have internal centre gussets. The design gives a larger capacity than the current grading buckets and allows for more material to be moved in one cycle of the excavator work group. These grading buckets are also equipped with waffle plates to add extra strength and rigidity to the bottom of the bucket for longer life.

The trenching buckets – available in 12-, 16-, 18-, 20-, 24-, 30- and 36-in widths – feature a replaceable cutting edge, leaving a

smooth work area when the job is completed. A toothed version is also available, which uses the same teeth as the previous bucket model so customers and dealers do not have to stock two types of teeth. Additionally, a scalloped cast side cutter has been added for improved durability and functionality.

Both trenching and grading buckets will be optimised to fit the standard clamp and the optional Pro Clamp System, allowing operators to better move and grab more materials. The Pro Clamp grading tool can serve as a smooth cutting edge when grading or trenching with a toothed bucket. It can also be reversed to serve as a clamshell when paired with a smooth lip bucket. ■

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



FAR LEFT AND LEFT: Bobcat has expanded its current attachment line-up with the newly redesigned trenching buckets and all-new grading buckets for the E26 through E85 compact excavators.

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# XCMG XGC88000 performs heavy lifting in Dalian

The 4,000-t XCMG XGC88000 crawler crane has recently completed a major lifting operation at one of petrochemical industrial parks in China. The complex is currently under construction in the city of Dalian, and the crane is also helping with other lifting works on site.

The use of XGC88000 is said to have overcome many technical difficulties, such as double link jib or transfer with heavy load and dual-crane teamwork. Through a combination of components, the crane can be transformed into a 2,000-t unit. This feature improves the efficiency of the entire machine and maximises its benefits for the customers.

The XGC88000 has a maximum load moment rating of 88,000 tonne-metres. The crane is suitable for lifting operations at large-scale nuclear power plants, petrochemical plants, thermal power plants and coal chemical plants, especially for lifting high and large components.

XCMG's large cranes have been widely used to lift heavy structural parts, some of which have reportedly set new world records. Among them are the 4,000-t crawler crane together with a 1,100-t tailing machine, which have worked together in over 60 lifting operations totalling 1,500 t in Shandong, Fujian and Ningxia, and their total lifting weight was more than 30,000 t – this has created a new world record in engineering application of a single mobile crane that lifted 2,300 t at a time, said XCMG. ■

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



ABOVE, LEFT, BOTTOM AND BOTTOM LEFT: The 4,000-t XCMG XGC88000 crawler crane carries out a major lifting operation at one of petrochemical industrial parks in Dalian, China. The crane has a maximum load moment rating of 88,000 tonne-metres, and through a combination of components, it can be transformed into a 2,000-t unit.



# Goldhofer to join Kuala Lumpur metro project

Malaysia-based transport company Xin Hwa Holdings has won a contract to deliver components to Kuala Lumpur's MRT construction project. Work on the rail network for the Malaysian capital, which will include an underground line, began in 2011. On completion, which is scheduled for 2021, it will form the backbone of the city's public transport system and will link the existing rail network with the Klang Valley Integrated Transit System.

Xin Hwa has been contracted to deliver a large number of huge concrete beams weighing up to 160 t each to various MRT construction sites, starting next year. The company will be using a Goldhofer vehicle combination ordered specially for this purpose. The order comprises more than a hundred of THP/SL axle lines and additional spacer. The THP/SL vehicle combination with the extendable spacers is an ideal solution for transporting very



long concrete beams. The model offers big advantages in terms of flexibility for on-road and inside-plant operations and on construction sites. ■

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

ABOVE: The Goldhofer THP/SL vehicle combination with the extendable spacers is an ideal solution for transporting very long concrete beams.



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## Demag AC 300-6 cranes meet challenges in Kuwait

The Kuwaiti government's Sheikh Jaber Al Ahmad Al Sabah Causeway Project is currently among the world's largest infrastructure projects. The highlight of this 36-km-long road connection is said to be the bridge over Kuwait Bay, which boasts a length of 27 km. Participating in this major project is the Kuwaiti logistics service provider Integrated Logistics Company (ILC), which by order of the Kuwaiti construction ministry had to bring pre-assembled concrete supports to a construction site near Sabiya. For this task, ILC relied on the performance of its new Demag AC 300-6 cranes – which celebrated a double premiere in the process.

For ILC was not just using its new Demag AC 300-6 all-terrain cranes for the first time, these were also the first Demag cranes of this type delivered by the German plant in Zweibrücken to an international customer. The cranes had to lift precast concrete components from a hydraulic dolly-type trailer with turntable system and place them at their pre-planned position. Because the steel-reinforced concrete elements weighed 105 t each, were approximately 37 m long, 1 m wide and 2.3 m tall, the work was best done with a tandem lift.

However, before the lifting could be done, the two Demag AC 300-6 cranes had to be brought to the construction site. The cranes were accompanied by four tractor-trailer rigs, which transported the required counterweight of approximately 50 t. The crane operators needed just two hours with the help of two riggers apiece to set up the cranes.

For the subsequent tandem lift, the cranes were outfitted with 24.4-m-long main booms, a counterweight of 26.7 t and an 80-t hook block with seven-part reeving. An outrigger support base of 8.68 x 8.48 m provided the required stability. Rigged this way, the cranes were prepared to lift the two 105-t concrete beams from the lowbed trailer in two steps in a tandem lift, swivel them sideways in a radius of 9 m, and lower them at the specified place in the desert sand. Thanks to the cranes' quick working speed, their excellent manoeuvrability, and their fast setup even with just a few people, the ILC team was able to complete the job in just one day.

ILC is active across the entire Middle East. Its focal points are in Kuwait, Saudi Arabia, Qatar and the UAE. For large projects, ILC has a comprehensive fleet



TOP, ABOVE AND LEFT: ILC relied on its new Demag AC 300-6 cranes on the Sheikh Jaber Al Ahmad Al Sabah Causeway Project in Kuwait. The cranes had to lift precast concrete components and place them at their pre-planned position. As the elements weighed 105 t each, were approximately 37 m long, 1 m wide and 2.3 m tall, the work was best done with a tandem lift.

comprising cranes with lifting capacities up to 2,300 t, excavators, compactors and bulldozers, among others. In addition to construction equipment and machine

rental, ILC's service offerings include extensive project support including engineering and assembly services. ■

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

# Ammann plays major role in Turkish highway project

A large part of the Northern Marmara Motorway project in Turkey, which serves as a bypass of Istanbul, has been completed. Handling a good deal of the remaining work is Nalbantoğlu İnşaat, a family-owned business founded in 1995. The company has carried out numerous high-profile projects, including creating mix for 70% of the roads in Kayseri, the city where it is based.

The Northern Marmara Motorway is much of the company's focus through the end of 2018. Nalbantoğlu İnşaat is producing a lot of mix for the fourth section of the highway, which will be connected to the Osmangazi Bridge. The company's portion of the work is a 36-km stretch that has been under construction for about three years. When completed, travel to Istanbul's third international airport will be much faster, and traffic relieved in some high-congestion areas.

For the project, Nalbantoğlu İnşaat initially utilised a single Ammann ABA UniBatch asphalt-mixing plant. It was chosen because of its low operational costs and high capacity. The optional additive system, which enabled use of FiberTEK, was another consideration.

So successful was the first ABA UniBatch that Nalbantoğlu İnşaat recently purchased a second such plant for the project, said Ammann. In addition, the company acquired an ABA UniBatch 340 with RAH 50 recycling dryer for use near Kayseri.

Nalbantoğlu İnşaat also purchased an Ammann MechTEK mechanical stabilisation plant to produce 2.5 million tonnes of cold mix for the job. According to the



company, the cold mix plant has many benefits including high capacity, precise dosing, an ability to handle a wide range of additives and operator-friendly software that enables recipe storing, statistical reporting and customisation.

Using a plant dedicated to cold-mix production has helped keep the project on track, said Nalbantoğlu İnşaat. The plant can produce large output in a short time, uses less power and the fact that it is a separate operation helps with jobsite logistics. The wearing parts have long life, and therefore reduced maintenance costs. What's more, the company can also remotely connect to the equipment to monitor daily operations. ■

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



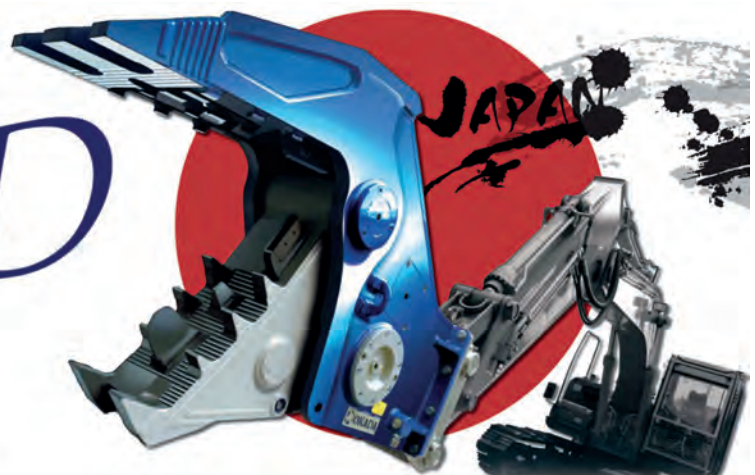
TOP AND ABOVE: Ammann ABA 340 UniBatch asphalt-mixing plant being used by paving company Nalbantoğlu İnşaat to help with the construction of the Northern Marmara Motorway in Turkey.

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# Liebherr fleet excels in Moscow and Zurich projects

The construction of a new, modern bus terminal on the Sholkovskoye Chaussee in Moscow, Russia, is under way. When completed, it will have a capacity of approximately 1,600 bus services and 15,000 passengers per day, and about 1,000 passengers per hour at peak times. The development features 11 stories of modern glass design, combining shopping and entertainment facilities with the bus terminal in one complex. It was designed by the architect Werner Sobek, and the contractor Fensma is executing it with the help of Liebherr equipment.

The deep foundation work for the new building is being carried out by a fleet of eight Liebherr machines, including seven duty cycle crawler cranes - with lifting capacities ranging from 70 to 120 t - and one piling and drilling rig type LRB 255. Cast-in-place slurry walls with a total of 310,000 sq m and 3,500 t of reinforcement cages are being installed as a lining wall for the foundation pit. For this purpose, two carrier machines are fitted with hydraulic grabs and four with mechanical grabs. These are applied as necessary and are interchanged between the duty cycle crawler cranes.

The slurry wall has a maximum depth of 52 m and is 800 mm thick. Eighteen hours are required for the excavation of one bite with a length of 2,800 mm. A delivery pipe is used for filling the concrete. In addition to the slurry wall, the Liebherr fleet is inserting 154 individual barrette piles for foundations. One barrette has a depth of 52 m and a volume of 110 m concrete. A total of 800 t steel is being installed.

The new complex is due to be completed in 2019, with a construction period of only two years. Fensma is not only faced with this time constraint, but also difficult soil conditions including loam, sand, clay and groundwater. The cost of the development amounts to €73 million, one-fifth of which is said to be attributed to the deep foundation work.

Meanwhile in Switzerland, a Liebherr HS 8100 HD duty cycle crawler crane is being used by Implenia Switzerland AG to help with the redevelopment of Zurich Insurance Group Ltd's headquarters on the Mythenquai.

The facility is surrounded by buildings from different eras. Three of them are listed in the art and cultural heritage protection catalogue. A particular challenge is the



The deep foundation work for a new bus terminal in Moscow, Russia, is being carried out with the help of eight Liebherr machines. These include seven duty cycle crawler cranes and one LRB 255 piling and drilling rig.



Liebherr HS 8100 HD duty cycle crawler crane works on the redevelopment of Zurich Insurance Group Ltd's headquarters on the Mythenquai, Switzerland.

excavation of prehistoric stilt dwellings, which were found within the jobsite. Therefore, archaeological excavations are being carried out by Zurich's Department of Archaeology during the course of the construction.

The Liebherr HS 8100 HD is performing the current slurry wall work using a grab. The slurry wall is 600 mm thick and 25 m deep. At times during the installation work the grab is working only 20 cm away from

the facade of the listed buildings, making it quite tricky. Following the excavation of the slurry walls, the reinforcement is inserted with the aid of the duty cycle crawler crane.

The new Zurich headquarters is expected to be opened in 2020 following a construction period of two and a half years. However, due to the excavation of the 3000 to 5000-year-old stilt dwellings delays cannot be entirely ruled out. ■

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

# Gomaco GP4 goes to work on Arizona runway

A Gomaco GP4 slipform paver has been working on a new runway at the Phoenix-Mesa Gateway Airport in Mesa, Arizona, USA. Its paving passes are 11.4 m wide and 483 mm thick.

The GP4 is the second paver in Gomaco's new family of slipform concrete pavers featuring the company's next generation technology. It is the next step up in size to the GP3 and features the same revolutionary technology, but it has the ability to pave up to 12.2 m wide.

The GP4 paver has a dual-telescoping roller frame with Smart Cylinders and Smart Telescoping for accurate frame widening and automatic width reference for easy and accurate steering setup. The modular roller frame telescopes up to 2.1 m on each side for a total of 4.3 m of telescoping ability.

The paver is equipped



with Smart Pivot Arms for leg positioning, as well as Smart Track Steering technology. It has Extreme Steering capabilities that work together with the paver's G+ control system, so G+ knows each track's location and position. For easy transport, the operator simply puts the paver into Transport Mode by driving the legs around to the transport position with the GP4's full-steer tracks and slew drives on the pivot arms.

G+ Connect allows all the smart accessories and guidance systems for the Gomaco paver to be easily interfaced. In addition, Gomaco Remote Diagnostics (GRD) gives owners the visibility of how, when and where their equipment is being used. ■

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

**Gomaco GP4 paver is slipforming a new runway at the Phoenix-Mesa Gateway Airport in Arizona.**

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# Herrenknecht achieves milestones in Egypt

Egypt is expanding its infrastructure network by building new road tunnels. Two of them are built north of Ismailia and run under the old and new Suez Canal; the other two cross beneath the canal south of Port Said. The project is designed to link the Sinai Peninsula more closely to the Egyptian heartland, opening up new economic opportunities for the country. Instead of spending up to days in the car and ferry, crossing the Suez Canal via the efficient tunnels could only take 10 minutes in the future.

For the project, the government of Egypt ordered four identical advanced tunnel boring machines (TBMs) from Herrenknecht, the S-958 - S-961. Towards the end of December 2017, the third Herrenknecht Mixshield S-960 (with a 13.02 m diameter) completed the final drive for the road tunnel at Ismailia on the Suez Canal.

Under the direction of construction companies Arab Contractors/Orascom Joint Venture and Petrojet/Concord/CMC Joint Venture, the TBMs worked at depths of up to 60 m with a water pressure of up to 6 bar. They bored and built the 15.3 km of new tunnel for 19 months.

To enable a smooth progress during such complex tunnel operations, Herrenknecht trained 40 Egyptian engineers in Schwanau (Germany) and on the jobsites. For optimal support of the tunnelling processes, the company also provided the tunnelling teams with comprehensive services and supplied key peripheral equipment through its subsidiaries: VMT, MSD, Formwork, H+E and TMS. ■

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



ABOVE: In mid December 2017, the Herrenknecht Mixshield S-959 celebrated its final breakthrough. The TBM drove one of the tunnel tubes at Port Said with top performances of up to 128 m per week.

LEFT: Egypt's President H.E. Abdel Fattah al-Sisi and Dr.-Ing. E.h. Martin Herrenknecht, chairman of the board of management of Herrenknecht AG, were present at the final TBM breakthrough of the Mixshield S-960 at Ismailia.

BELOW LEFT, BELOW AND BOTTOM: A total of four TBMs were supplied by Herrenknecht for the construction of new road tunnels under the Suez Canal. The Mixshields with a diameter of 13.02 m created over 15 km of new tunnel for the large-scale project.



# Sandvik drill rigs show versatility in Germany

Sächsische Sandsteinwerke GmbH is currently involved in the Berlin City Palace project, delivering engineered stone to help with the reconstruction. The company operates quarries in Lohmen and five other between Bad Schandau and Pirna, with the expertise in carrying out mechanical and manual processing of extracted raw blocks. The traditional construction material is quarried to meet specific requirements. For the City Palace project, coarse-grained sandstone from Lohmen is preferred along with the slightly softer stone from the quarry in Reinhardtsdorf.

Sandvik drill rigs are the main players in the block extraction process. The operator's plant currently includes five of these rigs. Two of them – a Commando DC302 and a Commando DC130Ri – are being used on different beds at the Lohmen quarry.

The Commando DC130Ri offers an excellent off-road capability and versatility for vertical and horizontal line drilling. The machine's optimised centre of gravity means it can reach steep slopes without any problems. Its roll-over system also provides significant time savings when drilling horizontal holes.

In another project, the Commando DC130Ri was recently used during backfilling operation at the former potash mine in Teutschenthal, located in the Saalekreis district.

The site is currently operated as a stowage mine for non-mining mineral waste. Backfilling of the voids created in the course of room-and-pillar mining is important for safety reasons. The rock burst of September 1996, which led to the collapse of the entire eastern part of the potash mine, was a catastrophe that must not be repeated, and this has expedited the process of systematically backfilling these voids.

The company charged with this task was GTS Grube Teutschenthal Sicherungs GmbH & Co KG. To access the closed chambers and tunnels during the backfilling process, the operator called on the expertise of TS BAU GmbH. Supported by three mobile Sandvik drill rigs – two Commando DC125 models and one of its successors, the DC130 – the crew opened up the closed areas and widened them for subsequent backfilling.

The Commando DC130Ri top hammer drill rig quickly demonstrated its



Sächsische Sandsteinwerke employs a total of five Sandvik drill rigs. Two of them, a Commando DC302 and a Commando DC130Ri, are currently used for block extraction on different beds at the Lohmen quarry.



The Commando DC130Ri drill rig features an excellent off-road capability and versatility for vertical and horizontal line drilling. The machine's optimised centre of gravity means it can also reach steep slopes without any problems.

performance enhancements when used underground. Equipped with an energy-efficient hydraulic hammer, ergonomic controls and dust extraction, the machine performed well, even when breaking through occasional clay veins. The feed-percussion follow-up for the automatic adjustment of the drilling energy to varying rock conditions compared with basic rotary drilling during driving quickly paid for itself. The roll-over drill feed delivers flexibility in

areas that are difficult to access. Another highlight is the much neater hosing and electrical wiring on the boom of the DC130Ri compared with its predecessor.

Holes for blasting were placed at the removal hot-spots in each layer. The dust seal was positioned close to the wall and thus made a clean job of air-flushed drilling. Blasting was then performed to widen voids or to access closed chambers. ■

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

# Game of Thrones: Winter is coming

The SnowVillage is a seasonal resort in remote Lapland, Finland, covering an area of about 20,000 sq m. It consists of Snow Hotel (with snow rooms and suites), Ice Restaurant, Ice Bar and Ice Chapel.

The hotel itself is constructed each year using 20 million kilos of snow and 350,000 kilos of ice by an international team of ice sculptors, before it finally all melts away again to be reconstructed the following year.

This year, the hotel was built in collaboration with HBO Nordic, featuring the theme of 'Game of Thrones'. Within the hotel there is a life sized iron throne with swords, a Braavosi Hall of Faces and even a white walker with glowing blue eyes. Here, Auger Torque and its Scandinavian partner, Avant Tecno Finland, deployed their equipment to help complete the project.

Auger Torque helped Avant to design and build a special ice auger and frame to suit the Avant 760i loader – it was used together with the Auger Torque 4500 MAX earth drill – in order to drive through the heavily packed snow and ice wall. The team came up with the innovative Avant XHD92 auger drive, which performed just as well in sub zero temperatures as it would have in the soaring temperatures of the Australian environment it was originally designed to cope with.

In the past it took about 10-12 hours to make a passage through the heavily packed snow and ice wall, said Avant, and with a thickness of about 2-3 m, this used to be done by a two-man team using chain saws and therefore was quite time and labour intensive. The company explained that using the auger, the first cut can now be completed in only about five minutes, and in the end it could save manpower worth three months as the whole layout was planned around the new auger attachment. ■

Website: [www.augertorque.com.au](http://www.augertorque.com.au)



ABOVE, LEFT AND BELOW (LEFT AND RIGHT): Auger Torque helped Avant to design and build a special ice auger and frame to suit the Avant 760i loader. They were used together with the Auger Torque 4500 MAX earth drill to drive through the heavily packed snow and ice wall.



FAR LEFT AND LEFT: The Snow Hotel in Finland, at the SnowVillage, has been built in collaboration with HBO Nordic featuring the theme of 'Game of Thrones'. The hotel is constructed each year using 20 million kilos of snow and 350,000 kilos of ice by an international team of ice sculptors, before it finally all melts away again to be reconstructed the following year.



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# Recycling organic waste for building materials

By: Guglielmo Carra, Europe Leader Materials Consulting, Arup

**ORGANIC WASTE<sup>1</sup> FROM OUR CITIES AND THE COUNTRYSIDE, TRADITIONALLY MANAGED THROUGH LANDFILL, INCINERATION AND COMPOSTING, COULD BE DIVERTED – AT LEAST IN PART – TO BECOME A RESOURCE FOR THE CREATION OF CONSTRUCTION ENGINEERING AND ARCHITECTURE PRODUCTS BEFORE BEING FED BACK IN THE BIOLOGICAL CYCLE AT THE END OF THEIR SERVICE LIFE. THE USE OF ORGANIC WASTE IN CONSTRUCTION WOULD POSSIBLY ALLOW THE EXPLOITATION OF ITS UNTAPPED VALUE WITH A POSITIVE IMPACT NOT ONLY FROM AN ENVIRONMENTAL PERSPECTIVE BUT ALSO FROM A TECHNICAL, SOCIAL AND ECONOMIC STANDPOINT. IN THIS REPORT, A NUMBER OF ORGANIC WASTE STREAMS HAVE BEEN IDENTIFIED, TOGETHER WITH THEIR APPLICATIONS IN BUILDING CONSTRUCTION AS PRODUCTS.**

Although data collected in this report refer to the European context, reusing organic waste for construction purposes is a global opportunity that can be exploited locally depending on country specific and regional circumstances, both from an environmental standpoint - such as climate - and a socio-economic standpoint when considering the supply chain.

## Environmental perspective

A Life Cycle Assessment (LCA) approach has been used to assess the impact of the different waste management processes for organic waste. Datasets related to each of the three waste management categories (composting, incineration and landfill) have been compared in terms of their environmental footprint. The main conclusions are:

- Composting of biological and green waste generates about 0.15 kg CO<sub>2</sub> eq / kg - much less than landfilling it.
- If the waste was incinerated rather than landfilled, data for incineration of waste food - the most similar dataset to vegetal waste - indicate that 2.15 kg CO<sub>2</sub> eq / kg waste could be saved.
- Landfilling of organic waste generates about 2.75 kg CO<sub>2</sub> eq / kg as an average across the European countries. If this waste could be used as fertiliser in agriculture, this value reduces to about 0.005 kg CO<sub>2</sub> eq / kg.

When comparing the reference values in terms of environmental emissions, it appears that composting has the least impact while landfilling – when not used for agricultural purposes - has the highest impact. The point is to assess whether diverting such a waste in alternative

processes would make sense from an environmental standpoint.

A relevant aspect to be considered relates to the need to maintain an effective cycling of nutrients in the biosphere. Thus when considering alternative uses of organic waste, it is also important to consider that such products - as nitrogen, phosphorus, potassium - shall return to the soil where both plants and animals can take it again for their own benefits.

## Economic benefits

Most organic waste currently has useful end of life scenarios from an environmental impact perspective. On the contrary, just a small part of organic waste – used for backfilling - could be better diverted into different exploitation models that would realistically reveal to be a better use from an environmental standpoint - such as the production of biological construction products.

However, when considering other factors - in addition to the environmental profile - alternative exploitation models



Table made of natural fibres.

could become more attractive from an economic standpoint. Organic waste – when used to make building construction components – is exposed to a functional upgrade that increases its value. This is due to the higher commercial price associated to a kilogram of material used for construction purposes with respect to compost or incineration for energy recovery.

<sup>1</sup> Organic waste is defined as “vegetal wastes from food preparation and products, including sludges from washing and cleaning, materials unsuitable for consumption and green wastes. They originate from food and beverage production, and from agriculture, horticulture and forestry. Vegetal wastes are non-hazardous.”

A kilogram of waste incinerated for energy recovery would have a commercial price of about of €0.85 / kg. On the other hand the same material used, as an example, for interior cladding would have a selling price somewhere between €5 and €6 / kg. This depends on several factors, including the quality of the cladding, its physical features, the market maturity and more.

This gap between the commercial value of organic waste in the current disposal scenario with respect to the proposed one could trigger the flourish of an entire new economy. In fact, more competitive business models could be identified to capture and maximise the embedded value of these waste streams when used for construction purposes.

It is important to stress that the potential increase in value for organic waste would not come at the expenses of the traditional end of life models for landfill, incineration and composting. Natural resources transformed into construction products will get back in to the biological loop - at the end of their engineering service life. They can actually get even more loops into the technical cycle when repurposed or remanufactured, therefore

prolonging their life and generating exponentially more value through several loops.

Some limitations apply to products made of organic waste to be reintroduced in the biological loop after technical exploitation. These materials should be free from chemical contamination after manufacturing and use.

### Acceptance and limitations for use

Technical performance and competitive price range will be key in determining the potential success of construction products based on organic waste. Additionally codes, standards and regulations will be instrumental in supporting product adoption and allow wide market acceptance.

Currently the use of waste in products in Europe is governed by the Waste Framework Directive (2008/98/EC). It states that certain specified wastes shall cease to be a waste and obtain material or product status only when it has undergone a recovery or recycling operation and complies with specific criteria, known as end-of-waste criteria, which have been agreed with the environmental regulator.

## CASE STUDIES

### Sugarcane



Company: Crustell BV, NL

Bagasse is generated from harvesting of sugarcane. When mixed to binders it can be pressed to generate stiff boards.

Application in construction: internal use, floors, fibreboard and furniture.

Technical properties: high strength, excellent durability and flawless finish.

Recyclability and remanufacturing potential: might be limited depending on binders.

Information: <http://msonsgroup.tradeindia.com>

### Peanut



Company: Kokoboard Co Ltd

These boards are made by repurposing waste from peanut shells. The peanuts shells are turned into particle boards by a hot press procedure and the use of a formaldehyde-free adhesive.

Application in construction: internal use, floors, ceilings, walls and furniture.

Technical properties: resistance to moisture, flame retardant and low cost.

Recyclability and remanufacturing potential: formaldehyde free.

Information: <http://www.kokoboard.com>

### Rice



Company: Watershedmaterials

Products are made by mixing rice husk ash with cement to reduce the need for fillers. Rice can be also used as raw material for boards production as showcased with other plants previously.

Application in construction: cement, bricks, ceramic glaze and insulator.

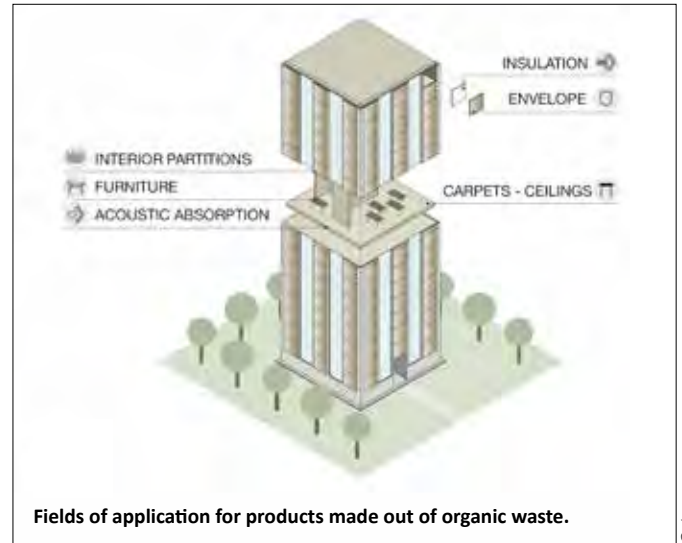
Technical properties: lower density with respect to traditional concrete blocks, better environmental footprint and highly durable.

Recyclability and remanufacturing potential: low recyclability and downcycling.

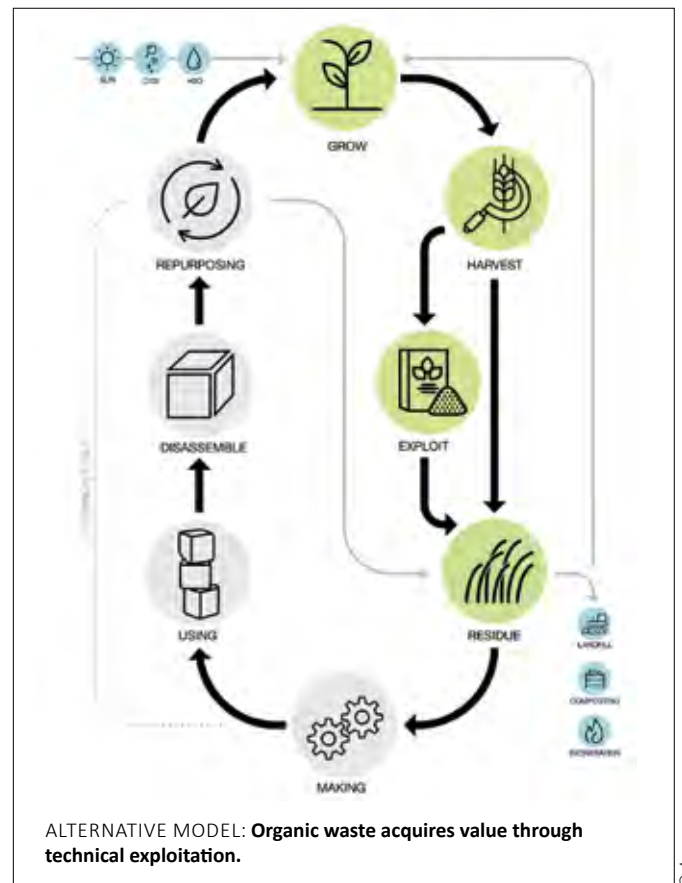
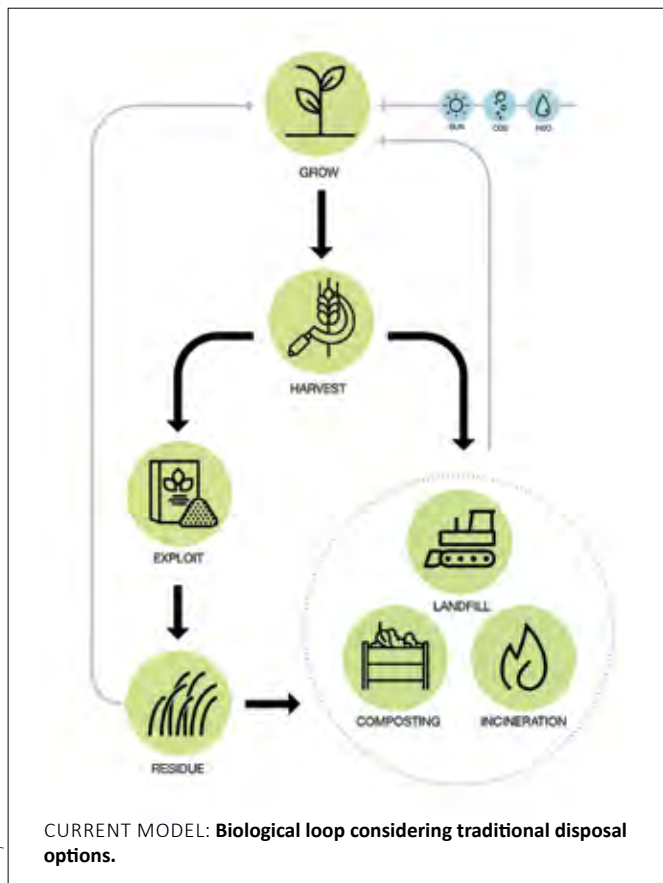
Information: <http://ecorglobal.com>; <https://watershedmaterials.com>

End-of-waste criteria must be developed considering that materials or products are commonly used for specific purposes. There also needs to be an existing market or demand for them. Their use shall be lawful, meaning that materials or products shall meet the technical requirements for the specific purposes and meet the existing legislation and standards applicable to the products. Finally, their use will not lead an increase in adverse environmental or human health impacts.

It will be necessary to liaise with governance groups and potential stakeholders at many levels to allow organic waste to comply with the end-of-waste criteria – where this compliance is not proven yet. The use of Health Product Declarations, or the Declare label could be beneficial to demonstrate appropriate health and safety requirements with respect to the absence of harmful toxic constituents. Moreover, products performance shall be as good as or better than traditional materials with respect to relevant issues such as durability, fire and insect resistance to prevent their use leading to potential premature failure.



**IT IS IMPORTANT TO STRESS THAT THE POTENTIAL INCREASE IN VALUE FOR ORGANIC WASTE WOULD NOT COME AT THE EXPENSES OF THE TRADITIONAL END OF LIFE MODELS FOR LANDFILL, INCINERATION AND COMPOSTING. NATURAL RESOURCES TRANSFORMED INTO CONSTRUCTION PRODUCTS WILL GET BACK IN TO THE BIOLOGICAL LOOP - AT THE END OF THEIR ENGINEERING SERVICE LIFE.**



## Building applications

A wide range of applications currently exists for products based on natural resources. Six main fields of applications have been identified:

- *Interior partitions and finishes.* These are flat boards - featuring decorative layers where needed. Some organic waste streams could be used for such applications as bagasse, cellulose, seeds, stalks, or peanut shells. These products are generally characterised by low specific weight - therefore are easy to handle – and are sufficiently stiff to ensure appropriate resistance to impacts.
- *Furniture.* Natural fibres and small residual particles can be shaped in complex forms for chairs, tables and more generally for any interior application. A variety of surface finishes would provide a strong aesthetic appeal.
- *Acoustic absorption.* High porosity materials – such as bio-foams – can be obtained from soy residue. Furthermore, fibres of different

types can be combined to create insulation material with good sound absorption properties.

- *Thermal insulation.* A number of natural fibres obtained from agricultural harvesting can be used. These provide low thermal conductivity and some of them are characterised by good fire performance and are water repellent such as potato peelings and cork.
- *Carpets and moquette.* These are based on a large variety of natural fibres, such as those obtained from residue of bananas or pineapple harvesting, and other flexible, strong and lightweight fibres.
- *Envelope systems.* To some extent natural fibres can be combined with biopolymers to obtain stiff end-products that can be employed for both interior and exterior applications. In this last case, chemical additives – that are likely to be required to improve durability and fire properties – might jeopardise the reintroduction in the biological loop. ■

## ARUP'S BACKGROUND

In recent years, Arup has been involved in various projects where alternative materials have been utilised for realising building systems. This provides a sufficient level of confidence that high value technical solutions can be created relying on the embedded potential of natural resources.

The BIQ Hamburg is the first facade system in the world to cultivate micro-algae to generate heat and biomass as renewable energy sources. In this project, structural glass photo bioreactors are used as external cladding elements and dynamic shading devices. These are fully integrated in the building services system to harvest, distribute, store and use the solar thermal heat on site.

The Mushroom tower is the first example of a structure - albeit temporary - made by using mushrooms as base materials. In fact, mushrooms bricks have been used to create the structure of three towers for an installation for the MoMa in New York City, the US. The mycelium, the base material for the bricks, is a microscopic, fibrous fungus that binds itself to its food source to create a strong, resilient matrix in any shape desired. The raw materials needed to produce them - mushrooms and corn stalks (waste material from farms) that the spores feed on - are



© International/SCG

**BIQ HAMBURG: Facade panels filled with algae contribute to net-zero energy buildings.**



© Andrew Nunes

**MUSHROOM TOWER: Mushrooms can grow from organic waste and be used for building purposes.**



© Lichtzeit

**BIOBUILD: Biocomposites made of natural textiles and biopolymers can be used to stiff components for construction.**

as eco-friendly as they come. Bricks can be grown in just five days, and the process produces no waste or carbon emissions. When the structure is taken down, they can be composted and turned into fertiliser.

The BioBuild project explored the use of natural based composites to create the first worldwide biocomposite system for structural facades. Biocomposites are composed of natural fibres such as flax, hemp and jute and natural resin derived from residual waste from sugarcane and

corn harvesting. These are fast growing plants that regenerate in short cycles. With appropriate processing they can be converted into lightweight and durable products with good mechanical behaviour.

Biocomposites can also reduce the embodied energy of building components when compared to conventional construction materials, and produce no increase in cost. At the same time, they increase the thermal performance of the building. ■

**Note:** The information and images in this article are taken from the report titled 'The Urban Bio-Loop: Growing, Making and Regenerating', published by Arup in October 2017. To read more case studies on other organic waste streams and to find out further benefits of reusing organic waste, download the full report: [www.arup.com/publications/research/section/the-urban-bio-loop](http://www.arup.com/publications/research/section/the-urban-bio-loop)

# SHANGHAI-NANTONG YANGTZE RIVER BRIDGE



Construction of the Shanghai-Nantong Yangtze River Bridge in China's Jiangsu province, north of Shanghai, is currently under way. Due for completion in 2019, it is set to be the world's biggest cable-stayed bridge with a total length of 11,072 m, 1,092-m-long span and 325-m-tall pylons.

The bridge has two levels, including a six-lane highway on the upper level and a four-line railway on the lower. The new traffic link is part of the efforts to create a new economic zone around Shanghai, China's trade centre and home to some 25 million people. When completed, the bridge will cut the journey time between Shanghai and Nantong from two hours to one.

The south bridge is a cable-stayed structure with steel framework, spanning the main channel of the Yangtze River. The north bridge crosses the Tiansheng Port channel, featuring a rigid

steel girder structure and a flexible arch with a main span of 336 m. In addition to being the world's biggest cable-stayed bridge, it is also expected to be the longest steel railway bridge in the world. The steel arch weighs 32,400 metric tons, roughly the equivalent of three Eiffel Towers.

The pylons are being constructed in one of the largest and deepest (115 m) cofferdams ever built. The enclosed area is about the same size as 12 basketball courts, and a little more than 147,000 cu m of concrete are needed for one pylon. Developer and contractor of the project is MBEC No.4, No. 2, while the architect is China Railway Major Bridge Engineering Group.

#### Formwork solution

Doka provided its SKE100 plus automatic climbing formwork,



and it is used in combination with the Top 50 large-area formwork to construct the bridge pylons. Some of the major challenges included difficult weather conditions (with wind speeds of up to 72 km/h), climbing in 55 pouring steps without major alterations to the working platforms and progressive re-use of the formwork sheets.

“Height of more than 300 m and poor, foggy weather conditions are the biggest challenge for this jobsite,” said Yuan Bo, principal engineer of China Railway Bridge Bureau. As such, the construction



All images © Doka

managers opted for the SKE100 plus automatic climbing formwork system, which is designed to ensure smooth progress on the project even when outdoor conditions are extreme.

With the SKE100 plus in operation, adapting to the changing geometry of the pylon legs is easy. Besides meeting the highest safety standards, a single V140 hydraulic unit can climb all 30 automatic climbing units on each pylon foot at once.

Featuring a rated lifting capacity of 10 metric tons per climbing unit, the SKE100 plus is highly suitable for the pylon structure with its high ratio of reinforcing material. This automatic climbing system is combined with the Top 50 large-area formwork to give the concrete its shape.

**MAIN IMAGE:** Work is under way on the Shanghai-Nantong Yangtze River Bridge, which is set to be world's biggest cable-stayed bridge upon completion, featuring a 1,092-m-long span and 325-m-tall pylons.

**ABOVE:** Doka's SKE100 plus automatic climbing formwork is being used in combination with the Top 50 large-area formwork to construct the bridge pylons.

The Top 50 system is mounted on travelling units on the platforms, and thus forming times are fast and the formwork can be opened and rolled well back for plenty of clearance. A total of 900 sq m of the large-area formwork is being used. ■

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



# TEXRAIL

**T**EXRail is a new 27-mile (43.5-km) commuter rail system in the US that will operate between downtown Fort Worth, Texas in Tarrant County and Dallas/Fort Worth (DFW) International Airport. The project has been broken down into three sections, with Segment 2 considered the most tedious and difficult and also the shortest (less than 4 mile/6.4 km in length).

This segment begins at the existing Texas & Pacific Station and winds through downtown stopping at the ITC Station. From there it passes through a highly technical spot called the 'hole in the wall', where four Union Pacific and Burlington Southern Santa Fe rail lines and eight lanes of TX 280 all intersect. After that, it travels north up to Peach Yard before crossing Choctaw Bridge and east over the Trinity River.

Contract for the project was awarded to the Archer Western - Herzog joint venture for US\$998 million. "Of the three segments, Segment 2 is easily the most complicated," said Joseph Coke, quality control inspector for the joint venture. "Taking into account the existing right of way from the other rail companies, crossing multiple bridges – both over and under, and adding to that manoeuvring around existing utilities to form foundations for the piers in spots where the rail is elevated – this stretch north of downtown has kept us busy."



TOP: TEXRail is a new commuter rail system in the US that will operate between downtown Fort Worth, Texas in Tarrant County and Dallas/Fort Worth (DFW) International Airport.

ABOVE: Segment 2 of the project is considered the most tedious and difficult, and also the shortest.

LEFT: Link-Belt TC-2500 crawler crane being used in the project. Here, the machine lifts bridge beam section in Peach Yard.

## Bridge beam placement

Davis Motor Crane Service of Irving, Texas, has been selected as the contractor for bridge beam placement on the project. "We needed a solution for a 250-ton-class (230-mt) crane that could walk with a load. Multiple rail closures and tight setups also meant that we could not use a crane that needed the time and space to set outriggers. The final requirement was a crane that gave us the necessary headroom clearance under existing overpasses," explained Wes Dowd, operations superintendent at Davis Motor Crane Service. "We first began in Peach Yard, just northeast of downtown Fort Worth, and worked south from Chockaw Bridge setting beams parallel to the existing BNSF and Union Pacific line."

Tandem picks were made with two Link-Belt telescopic crawler cranes: the 230-mt TCC-2500 and 100-mt TCC-1100. The cranes lifted at a steady pace of 16 beams per day on four consecutive days in order to complete the section adjacent to Peach Yard. Right-of-way space required by existing rail companies meant that Davis Cranes had a narrow boundary zone to setup, unload and place the 27.4 m long, 44,452 kg beams.

"We started out with trucks coming in here close to the rail with the TCC-1100 and TCC-2500 tying into the beams. Because of the small road we had to coordinate how to get the cranes in here, position with the trucks, and then set the beams," said Lucas Williams, the TCC-2500 operator for Davis Cranes. "The TCC-2500 is easy to operate; multiple list charts come in handy where we may be flat one minute and then 1, 2 or 3 degrees off the next move around these pier caps."

## 'Hole in the Wall'

In order to place four 68-ft-long (20.7-m), 120,000-lb (54,431-kg) concrete box beams below TX 280 and above an active Union Pacific rail line meant first closing the Union Pacific line for a four hour window from 4am to 8am. "They backed the beams down the hill as far as they could over the tracks, and then I scoped out with the TCC-2500 and the TCC-1100 grabbed hold on his side as we lifted up," explained Mr Williams.

The crew had a very tight margin of room to work from with the overhead bridge at 14.6 m above grade and the newly built pier caps at 6.7 m. "We worked together to lift up, suck in, boom up and track back so that we could clear the caps to get the booms set, because we had probably 5- or 6-ft of head clearance on top by the time we got the beams on top of the caps," continued Mr Williams. "The beams had to be set in about two and a half hours, so the contractor could come in and pull the boards off the rails."

According to Mr Williams, one of the most difficult parts of the 'hole in the wall' job was actually travelling down the makeshift road to get down into the hole. "It was a really tight fit, and I didn't have a whole lot of room to manoeuvre back and forth on my end. That's why we put the bigger crane on my side, so that I could reach across the tracks and grab the beams. The TCC-1100 had a little bit more room to walk back and forth if he had to. Pretty much once I got down in there I could only travel about 10 ft forward and backwards," he explained. "I've always been impressed with Link-Belt's crawlers. Their lower has always been stout. I've run some other cranes and their torque won't climb up hills or get through soft spots like these Link-Belts do." ■

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

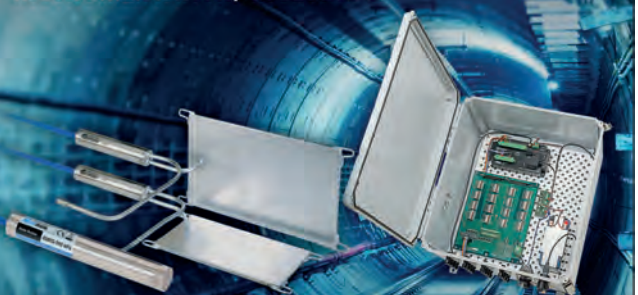


ABOVE AND LEFT:  
The TCC-2500 works on the project together with the Link-Belt TCC-1100 crawler crane.

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# SAINT PETERSBURG STADIUM

Construction of the Saint Petersburg Stadium in Russia was completed last year and it has been used to host some of the matches for the 2017 FIFA Confederation Cup. The venue is now being prepared for the upcoming 21st FIFA World Cup in June 2018.

Located in the western area of Krestovsky Island, the stadium is home for the FC Zenit Saint Petersburg football team. It is designed by Japanese architect Kisho Kurokawa, featuring a height of 75 m without pylons and a capacity of approximately 68,000 seats. With a total area of 287,600 sq m, the stadium is intended to be multi-purpose and used all year round. Metrostroy was appointed as the main contractor to complete the project.

## New technologies

The Saint Petersburg Stadium was built with innovative, advanced technologies. Among them is a special rolling-out field: the football pitch is able to 'travel' outside the arena on special rails, so that it can be ventilated. This is apparently because the weather conditions in Saint Petersburg are not suitable for the growth of grass in winter, and the city is the northernmost member of the Russian Premier League. The technology is designed to keep the surface quality at a high level.

Furthermore, the roof of the stadium can slide and cover the field during bad weather and the cold season. The entire set of engineering solutions used at the facility makes it not only one of the most high-tech stadiums in the world, but also safe and convenient for visitors.



The Saint Petersburg Stadium was completed in 2017, and is now being prepared for the upcoming 21st FIFA World Cup in June 2018.

**Concrete repair**

A total of 486,000 cu m of concrete was required during the construction of the stadium. Mapei offered a comprehensive solution to create a high-quality surface, in line with the level of the project. The company's products, supplied by its local distributor X-Trade, were involved in the levelling of the stands substrates, preparation of the substrate in the common areas and installation of the stone covering.

*Continued overleaf...*

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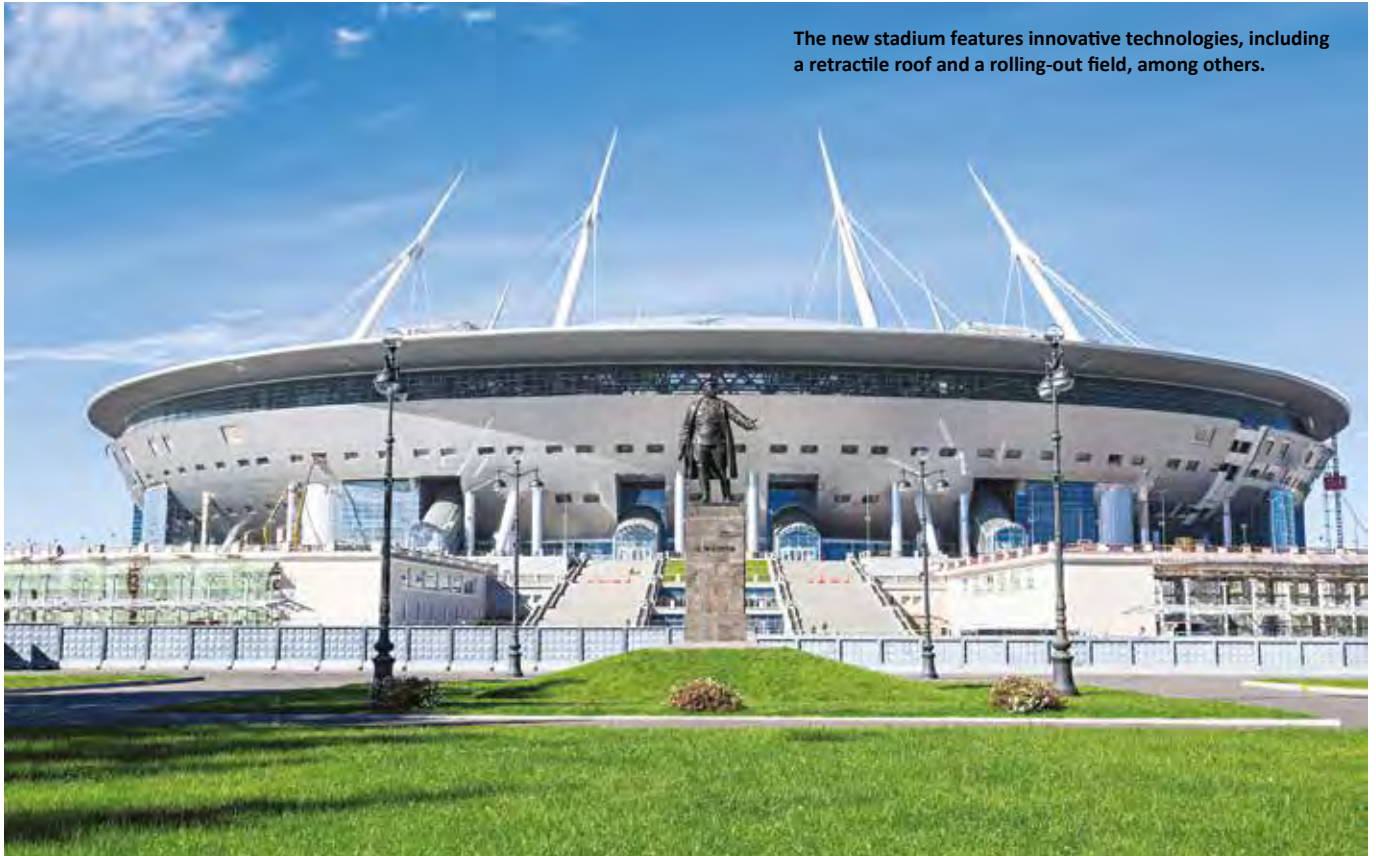
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The new stadium features innovative technologies, including a retractable roof and a rolling-out field, among others.

Since construction work on the project started over 10 years ago, a number of rundown concrete areas needed repair and Mapei provided its Mapegrout 430 fine-grained, fibre-reinforced, normal-setting thixotropic mortar for levelling and repairing concrete structures. Thanks to this product, it is possible to eliminate any surface defects and fill rigid joints. In the hardened state, Mapegrout 430 is a medium-strength mortar that has excellent adhesion to steel and concrete, as well as high water-resistance.

To eliminate the defects of concrete surfaces, the Monofinish one-component cementitious mortar was applied. The product is characterised by high mechanical strength, provides an ideal grip with all concrete surfaces and forms a durable coating. In order to prepare the stands substrates for laying the subsequent coating, Primer G, a water dispersion primer based on synthetic resins,

was used. After drying, it forms a thick film that reduces water absorption of porous substrates and strengthens them.

For levelling off the stands substrates, ultra quick-setting, self-levelling very low VOC mortars Ultraplan and Ultraplan Eco were employed on an area of 2,500 sq m and 300 sq m respectively. When facing the 400 sq m of the common areas, for the 60x60 cm natural granite slabs the contractor chose Kerabond T, a cementitious adhesive without vertical slip, Keracolor FF grout and Ultracolor Plus mortar, both high-quality, cement-based, polymer-modified products with water repellent DropEffect, which makes joints less prone to dirt collection and more durable. ■

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



ABOVE AND LEFT: Mapei products have been used to repair and level the concrete, prepare the substrates of the stands and for installing natural stone.

INSET: The Ultraplan system was specifically applied to level off the stands substrates.



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# TRENCHLESS AFFAIR



TOP AND ABOVE: The Vermeer D220x300S drill rig is seen here working on a Thailand project. The machine delivers a maximum thrust/pullback force of 100 t, making it suitable for various ground conditions and settings. With a small footprint, it can also operate in congested areas.

The Vermeer D220x300S and D130x150S horizontal directional drill (HDD) rigs have been involved in various trenchless projects across Asia. Both machines are suitable for use in rough terrains and harsh conditions, delivering increased productivity and efficiency.

The D220x300S offers a maximum thrust/pullback force of 100 t (220,000 lbs), enabling operators to work in a variety of ground conditions and settings. With a small footprint, the machine is also ideal for use in congested areas while allowing operators to move it around jobsites easily and quickly.

The D220x300S has a spacious cab and an operator station with intuitive dual joysticks for simple operation. The rig provides a 40,675 Nm of rotational torque in low speed and can stage five rods at a time, minimising jobsite time spent loading rod.

A sliding vise helps clamp the rod connection at different positions, allowing operators to utilise the vise for maximum efficiency when reaming or pulling product.



**ABOVE:** The optional telescoping crane on the D220x300S reduces the amount of support equipment needed onsite.

**LEFT:** The D220x300S has a spacious cab and an operator station with intuitive dual joysticks for simple operation.

**BELOW LEFT:** The D220x300S is able to stage five rods at one time, increasing boring efficiency by minimising rod loading time.



**ABOVE AND BELOW:** The Vermeer D130x150S drill rig offers 59,000 kg of pullback force and 20,337 Nm of torque.

The optional telescoping crane reduces the amount of support equipment needed onsite.

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

The D130x150S has an open-top vise and three spindle rotation speeds, allowing operators to select the appropriate speed to effectively complete a wide range of bores. Furthermore, planetary transmission with steel tracks provides stability and power when traversing challenging terrain conditions. ■

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



# TOWER OF STRENGTH



Fitted with the new CUBE cab, the 21LC1050 is the latest addition to Linden Comansa flat-top tower crane range. It is available in three maximum capacities: 25 t, 37.5 t and 50 t.

AS SINGAPORE'S BUILT ENVIRONMENT SECTOR MOVES TOWARDS THE ADOPTION OF PREFABRICATED PREFINISHED VOLUMETRIC CONSTRUCTION (PPVC) METHOD, CRANE CAPACITIES HAVE ALSO BEEN INCREASED TO TACKLE HEAVIER LOADS. LINDEN COMANSA SHARES WITH *SOUTHEAST ASIA CONSTRUCTION* THE LATEST TOWER CRANE DEVELOPMENTS THAT ARE WELL SUITED FOR SUCH A NEED. THE COMPANY IS WORKING CLOSELY WITH ITS LOCAL DEALER, ACCESS SYSTEMS TECHNOLOGY PTE LTD (AST), TO BRING THESE INNOVATIONS TO THE MARKET.

### Flat-top tower cranes

The new 21LC1050 tower crane from Linden Comansa has been designed based on the company's successful model, the 21LC750. It also took into account the needs of Singapore market, says Eleazar Raya, Linden Comansa's group sales director. "There has been a trend in Singapore's industrial, residential and high-rise building projects towards the use of large steel beams, heavy precast concrete elements and volumetric modules (better known as PPVC). This results in increasing demand for heavy-capacity cranes."

The 21LC1050 has three maximum capacities - 25 t, 37.5 t and 50 t - as well as a maximum jib reach of 80 m and a maximum freestanding height of 73.3 m with standard mast. The jib configurations range from 30 to 80 m, in 5 m increments. The crane's 110 kW hoist mechanism provides a maximum speed of up to 101 m/min.

At the same time, Linden Comansa's 21LC750 tower crane has been upgraded to feature larger capacities. It is now available in 25 t, 37.5 t and 50 t - increased from 24 t, 36 t and 48 t respectively.

The 21LC750 can also be climbed with a maximum 80 m jib, with jib configurations ranging from 30 to 80 m, in 5 m increments. The crane has a freestanding height of 78.8 m with standard mast.



TOP: Linden Comansa 21LC750 (second unit on the background) works on the Lake Grande condominium project in Singapore.

ABOVE: The 21LC750 is also available in three maximum capacities and can be climbed with a maximum 80 m jib. This model will be fitted with the new CUBE cab as well.

"The 21LC750 is one of our best sellers," reveals Mr Raya. "This model is ideal for use not only in commercial construction, but also for public works, industrial construction and mining projects, as well as infrastructure developments."

Both the 21LC1050 and 21LC750 feature ease of erection as their 'cat-head' has been removed. Due to this special design, the cranes' jib and counterjib are joined together on the turntable, without any apex section. Their standard mast sections have a width of just 2.5 m.

The two models can be equipped with an optional 110 kW hoist motor and a hoist-drum capacity of 1,570 m of rope. They will also be fitted with the new CUBE cab (see *The CUBE*). What's more, the cranes incorporate the PowerLift system, which improves the load chart by 10% at reduced speeds, as well as the Effi-Plus system for high speed, optimum efficiency and faster working cycles.

### Luffing-jib crane

Linden Comansa's LCL700 luffing-jib tower crane is available in two versions for the global market: 64 t and 50 t. These maximum capacities can be reduced to 32 t and 25 t respectively, by easily changing from a two-fall system to single pull line, thus increasing hoist speed and productivity.

"Luffing jib cranes provide an ideal solution in large cities and congested jobsites, where space is limited. They are getting popular in many countries around the world," explains Mr Raya.

The maximum radius of the LCL700 is 65 m, which can be reduced in increments of 5 to 30 m. The 64 t LCL700 can lift up to 7.2 t at maximum reach, while the 50 t can lift up to 7.5 t. Both cranes have a minimum reach of just 4 m.

The LCL700 boasts an 'out-of-service' jib radius of between 20.4 and 17 m, depending on the maximum reach, providing a higher level of safety on the construction site when the crane is not in use.

The radius of the counterjib is also short, just 9.5 m, with the possibility of being reduced to 8.7 m by assembling the crane with steel counterweights instead of standard concrete counterweights. Despite its size, the counterjib is spaciouly distributed, enabling the operator to perform maintenance tasks easily.

The maximum freestanding mast height of the LCL700 is 69.8 m. The crane's tower sections, with a 2.5-m wide frame, are the same as those for the luffing-jib LCL500 and the flat-top 21LC750. As such, owners of those models do not need to reinvest in new tower sections or a climbing cage.

The LCL700 is fitted with a 200 kW hoist motor that enables it to reach high speeds: up to 134 m/min for the 64 t version, and up to 170 m/min for the 50 t. The hoist speed with maximum capacity is naturally reduced, but remains highly competitive: the 64 t LCL700 can lift 64 t with a speed of 17 m/min or 32 t with 34 m/min, while the maximum speed for the 50 t LCL700 is 22 m/min when lifting 50 t loads and 43 m/min for 25 t loads.

Both versions of the LCL700 can feature an optional high-capacity Lebus hoist cable drum, allowing the cranes to be used to construct buildings of over 1,000 m high when using a single pull line, and over 500 m high with a double line. The LCL700 will also come with the new CUBE cab.



ABOVE: Linden Comansa LCL700 has a minimum reach of just 4 m and maximum reach of 65 m. The model comes in two versions: 64 t and 50 t.

LEFT: The LCL700 can feature an optional high-capacity Lebus hoist cable drum, which enables the crane to construct buildings of over 1,000 m high when using a single pull line, and over 500 m high with a double line.

### Towering above Singapore

Access Systems Technology Pte Ltd (AST) is a Linden Comansa dealer for the Singapore market. The company specialises in tower cranes and passenger & material hoists, and also provides related services such as installation, climbing/jacking, maintenance and dismantling of equipment.

AST was established in 1983 as a trading company for heavy equipment and construction materials. Today, it is one of the major industry players in Singapore, with sister companies in Indonesia, Malaysia and Hong Kong.

AST acquired the 21LC750 from Linden Comansa several months ago to meet the rising demand for larger-capacity cranes, says James Tan, senior manager of marketing at Access Systems Technology. "This flat-top tower crane is increasingly popular in the local market, as it is considered an ideal solution for lifting heavy prefabricated elements," he explains. The 21LC750 is currently being used on the Lake Grande condominium project in Singapore.

AST has also ordered some units of the new 21LC1050 flat-top tower cranes, adds Mr Tan. "Two units of 21LC1050 have been committed to a local contractor, Wee Hur Construction Pte Ltd. They are our first customer in Singapore for this new model."

According to AST, Dragages has also confirmed three units of 21LC1050 for rent to be used in Woodleigh Lane condominium project.

"Our cranes have been working across Singapore on various hospital, hotel and residential developments. With the recent industry trends moving towards the PPVC construction method, the materials we are lifting become heavier and heavier," explains Mr Tan. "They can weigh up to 30 to 40 t, with a radius of about 30 to 35 m, so bigger-capacity cranes are now in a higher demand."

### The CUBE

Linden Comansa has developed a larger and more spacious cab to improve operator comfort and visibility. Named the CUBE, it is currently available in two sizes - L and XL - and fitted as standard on most of the company's tower cranes, except the smaller range (11LC132 and 11LC90) and the LC500 range.

As Linden Comansa's cranes are operated around the world, the new cab has been designed to meet the extreme thermal requirements, both hot and cold. It is also simple to maintain - for example, the windowpanes are easy to replace when



LEFT (L-R): Eleazar Raya, group sales director, Linden Comansa; Budiman Saputra, managing director, Access Systems Technology (AST); and Andy Lu, deputy director for projects, Wee Hur Construction.

BELOW: Team members from Linden Comansa and AST.



ABOVE (LEFT AND RIGHT): Linden Comansa and AST recently organised a product launch event to introduce the 21LC1050, 21LC750 and LCL700 tower cranes to the Singapore market.

LEFT: The new CUBE cab from Linden Comansa is larger and more spacious, designed to improve operator comfort and visibility.

necessary and they can be bought anywhere in the world, says Linden Comansa, as they do not require a mould, unlike curved windowpanes.

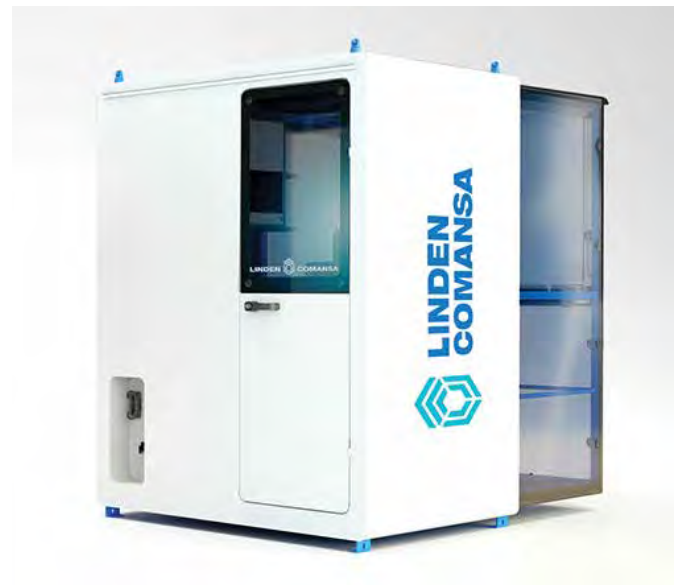
The cube-shaped design with flat glass panes is also intended to maximise the use of space, which is not possible with curved front panels or tilted windows, adds Linden Comansa. With this cube design, all of the elements can be distributed in a more intelligent way and there is extra space for operator ergonomics, and even some room to comfortably fit a second person in the XL size of the CUBE cab.

“Compared to the panoramic cab, the new CUBE cab allows the operator to get closer to the working area, giving a better visibility and sense of control of the job,” says Mr Raya.

Designed by a Spanish industrial design studio, BigD, the CUBE cab recently won an iF Design Award under the vehicles and automotive category. It was recognised for its objective to improve the working conditions of the crane operator.

“The CUBE cab offers an innovative aesthetic design, very different from what the market offered so far, and includes all of the technical requirements that we needed to add to the cabin as a fundamental part of the crane,” says Alberto Munárriz, Linden Comansa’s general manager.

Adrián Larripa, CEO of BigD added, “What the jury appreciated isn’t only the purely aesthetic appearance, but the whole project. The CUBE cab is a small portion of the product (tower crane), but it is its nerve centre in the handling and control of the loads. Thanks to a comprehensive analysis of the experience of use of the crane operator, we created a completely user-centred cab design, providing huge comfort and increasing the cab’s capacity to implement new crane functions that could arise for future needs. This project also led us to engage with suppliers to achieve these improvements with a reasonable impact on the cost of the cab.” ■



TOP AND ABOVE: The CUBE cab is available in two sizes - L and XL - and fitted as standard on most of Linden Comansa’s tower cranes.

LEFT: Designed by a Spanish industrial design studio, BigD, the CUBE cab has just won an iF Design Award under the vehicles and automotive category. It was recognised for its objective to improve the working conditions of the crane operator.

*Note:* All of the tower cranes mentioned above are available from Access Systems Technology Pte Ltd. For more information on the products, contact AST (sales@ast.com.sg; www.ast.com.sg) or Linden Comansa (www.comansa.com).

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# INDONESIA ADVENTURES

## Morowali airport

Before 2017, Morowali Regency in central Sulawesi, Indonesia, was only accessible via land or sea. That all changed recently when the first airport was completed. Now, to accommodate larger aircrafts, the airport's single runway is being expanded from 1.3 to 1.8 km. The expansion will also help prepare for greater flight demands in the future.

In this project, four Volvo EC210D crawler excavators are being used by PT Putra Morowali Sejahtera to help complete the job. The company bought the machines from PT Intraco Penta Prima Servis (IPPS), the distribution partner of Volvo Construction Equipment (Volvo CE) for the Sulawesi region.

"We are working under a tight five-month deadline to complete the runway extension, so we need durable machines with high efficiency - that's why we selected the EC210D excavator," said Ahmad Hakim Abdul Rauf, director and owner of PT Putra Morowali Sejahtera. "The Volvo excavators consume less fuel and provide superior performance. Plus, the aftermarket support from our dealer gives us the peace of mind we need."

Designed to increase productivity and reduce fuel consumption, the robust crawler excavator features a maximum bucket capacity of 1.22 cu m, a maximum slew speed of 12.3 r/min and a maximum slew torque of 76.7 kNm. The machine is equipped with a four-cylinder Volvo D5E engine.

## Bengkulu quarry

The quarry owner CV Ocbama Group has also chosen a Volvo EC210D excavator for use at its Air Muring site in Bengkulu, Sumatra. With such a remote location, repairs and downtime have a particularly negative effect on operations. Therefore, the machine had to be reliable as well as strong enough to cope with the strong currents of the Seblat River, from where the material is extracted.

"The EC210D from Volvo is strong and reliable enough for this work, while its low levels of fuel consumption help keep costs down," said H Yurman Hamedi, owner of CV Ocbama Group. "We also like the fact our local Volvo dealer has a facility close by



TOP, ABOVE AND LEFT: Sulawesi's Morowali airport is currently expanding its single runway in order to accommodate larger capacity planes. Here, Volvo EC210D crawler excavators help PT Putra Morowali Sejahtera to complete the job.

and when we made the decision to invest in the EC210D there was already a machine in stock.”

The 20-t EC210D excavator was purchased through Volvo CE dealer PT Indotruck Utama. It is loading up to 500 cu m of rock per day, which is then transported by truck to a nearby stone crusher. From here, it is processed before being delivered to construction projects in the surrounding area. The EC210D works for seven to eight hours per day and is expected to work in its current location until the end of 2019. It was delivered in September 2017.

For fast cycle times and optimum fuel consumption, the EC210D is equipped with intelligent work modes, including the new G4 work mode. Operators can choose the best mode to suit the task, selecting from I (Idle), F (Fine), G (General), H (Heavy) and P (Power max) mode. The machine is also designed for optimum profitability, with excellent fuel efficiency and Volvo’s ECO mode. ■

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



Volvo EC210D excavator works for CV Ocbama Group to extract material from the Seblat River in Bengkulu. The machine is loading up to 500 cu m of rock per day, which will later be processed for use in construction projects in the surrounding area.

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# SMART PAVING

The mega port in Tuas is one of Singapore’s ambitious projects that will play an important role in shaping the future of the country. Many roads and infrastructure need to be put in place to support this major development once it is fully operational. To begin with, roads have been designed and built in Tuas South, catering to the construction of container ramp up access buildings. Jurong Town Corporation (JTC), who manages such industrial projects, has signalled using machines to innovate new construction ideas, in order to increase productivity. One of these projects has been awarded to main contractor Quek and Quek Civil Engineering Pte Ltd.

The company sought Wirtgen Singapore for a discussion on the possibility of using a Wirtgen slipform paving machine for its road construction project in Tuas South. After a few meetings and presentations to JTC and consultants, both companies came to a mutual agreement that they would jointly carry out a project trial using Autopilot system and training of paving crew.

A Wirtgen’s offset slipform paver model, the SP15, was chosen for the trial. This machine is capable of paving concrete curb at about 1 m/min and its working distance is limited by factors such as worksite spatial availability, right mix of concrete supply and fuel. With the Wirtgen Autopilot system, there is no need for stringline set up and formwork of traditional methods, which in turn saves time and avoids overloading of the surveying team in the process.

## Autopilot system

The Autopilot system enables a surveyor or one of the paving crews to create a virtual stringline with a Field Rover marking out stake points for SP15 to follow, while laying down concrete finishing of curb and base to specified dimensions required by LTA (Land Transport Authority). The advantages of the Autopilot system include ease of use and ability to correct the line of travel automatically.

Using the Autopilot and intelligent drive system, the traction, height and steering of the slipform paver are always maintained. This leaves the main operator to focus on the controlling of



Wirtgen Singapore worked with main contractor Quek and Quek Civil Engineering Pte Ltd to carry out a road paving trial in Tuas South, Singapore.



ABOVE: The Wirtgen SP15 slipform paver was chosen for the trial. The machine is equipped with an Autopilot system, thus it does not require any stringline set up and formwork of traditional methods. This saves time and avoids overloading of the surveying team in the process.

BELOW: Adjustments can also be done on the fly, so paving is not disrupted.



The conventional slipforming method would have taken a longer time, as shown in this image.



rate to mould concrete supply and the vibrators' frequency on the concrete mix, thus ensuring high-quality concrete finish is achieved during paving. According to Wirtgen, this accomplishment has given Quek and Quek Civil Engineering enough confidence to participate in similar projects in the future.

It was deemed necessary to conduct some trials to fine-tune a workable mix design and obtain an optimum position of the vibrators. Ready mix suppliers were called for discussion and to provide proposed mix design during trials. The main challenge was to get the right slump

as Singapore's climatic condition, distance of concrete plant to the jobsite and source of raw materials are varying, explained Wirtgen. However, after several attempts a workable mix was successfully decided.

There were a number of trials conducted between August and October 2017, after which Phase 1 of the project began and was finally completed in January 2018. Despite the difference in design of drop inlet chambers versus K2A curb and base design, only some manual work was required to insert the drop inlet chambers into place. ■

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



LEFT: Initial practice trial was also conducted for paving team and supervisors, so that they could understand the workability of low slump concrete's challenges.

BELOW AND BOTTOM: After a number of trials, the project began and was completed in January 2018. These images show the completed curb and base set for the asphalt course to be laid. The turf has also been completed.



ABOVE: Surveyor marks out points first and then cross checks with Field Rover again, after stakes are setup during training.



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# PERTH CONNECTION

The new Forrestfield-Airport Link in Western Australia is currently under construction. Upon completion, it will offer public transport options to and from Perth's eastern suburbs, and also reduce the strain on current transport infrastructure due to anticipated passenger growth. By 2021 the line is expected to generate 20,000 passenger trips on the suburban rail network every day – increasing to 29,000 daily by 2031.

In addition to providing strategically located stations at Belmont, Airport Central and Forrestfield, the new train line is expected to alleviate road traffic and thus reduce travel times, enable continued growth of Perth Airport, and also encourage domestic and international tourism with improved access between Perth Airport and the city.

Regarded as one of Western Australia's most transformational public transport projects, the Forrestfield-Airport Link includes: 8-km twin-bored tunnels through soft ground conditions below groundwater; a total of 9,000 concrete rings tunnel lining, built with 54,000 segments; environmental value by complete underground tunnelling beneath Swan River; bus/train interchanges at Belmont and Forrestfield; tunnel cross passages and egress shafts; rail infrastructure and operating systems; and three new stations (Belmont, Airport Central and Forrestfield).

The project is being designed and constructed by the Salini Impregilo-NRW (SI-NRW) Joint Venture for the public Transport Authority of Western Australia.

## Tunnel segment production

Boral Australia was subcontracted by the SI-NRW Joint Venture to supply concrete for the tunnel lining segments. The company provided more than 180,000 cu m of concrete to the project.



TOP RIGHT: Upon completion, the Forrestfield-Airport Link will offer public transport options to and from Perth's eastern suburbs, and also reduce the strain on current transport infrastructure.

ABOVE: The project is being designed and constructed by the Salini Impregilo-NRW Joint Venture, and Boral Australia has been commissioned to supply concrete for the tunnel lining segments.

Approximately 87,000 cu m of highly specified, fire-resistant concrete is being supplied from a purpose-built batch plant to form 54,000 precast concrete tunnel segments. These eight-milometer tunnels will connect with existing rail services and when complete in 2020, will more than halve the current travel time from the city to Forrestfield and the airport in the east of Perth.

Boral is also supplying 93,000 cu m of concrete for the construction of two underground and one aboveground rail stations and associated structures; this work commenced in November 2016.

A Forrestfield warehouse has been transformed by SI-NRW and Boral Construction Materials into a facility to batch the concrete and produce the tunnel



ABOVE AND ABOVE RIGHT: **MCT Italy, in collaboration with Bennett Equipment, delivered a special concrete batch plant to Boral specifically designed to produce the concrete for the tunnel segments.**



line segments. The segments are trucked for temporary storage to the Forrestfield construction site, from where they are delivered into the tunnel boring machines (TBMs).

MCT Italy, in collaboration with its Australian partner Bennett Equipment from Adelaide, delivered a special concrete batch plant to Boral specifically designed to produce the concrete for the tunnel segments. The high-quality concrete containing 40 kg of steel and 1.5 kg of polypropylene fibres per cubic meter is batched by no. 2 Eurostar planetary mixer 3000/2000. The concrete has undergone a series of tests to ensure it meets the required standards for strength and durability. Restricted tolerances lower than 1% on all dosed components assure the success on the most severe test, including fire testing held in Germany and Victoria, Australia.

Transport Minister for Western Australia Rita Saffioti had the opportunity to tour the SI-NRW segments plant. Speaking about the high quality of the entire process, she said, "Once the tunnel segments are demoulded, they are loaded on to specialised multi-service vehicles at the Forrestfield site, driven into the excavated tunnel and slotted in to place by the high-tech tunnel boring machines. Creating the individually cast segments through a complete automated concrete batching plant is a highly precise process. This ensures that the segments are durable and strong enough to enable trains to run through them for many decades to come."

Gabriele Falchetti, executive Australia sales manager of MCT Italy, further expressed his optimism in Australia's infrastructure developments. "Infrastructure projects are increasingly opening up opportunities," he said, "and for this reason MCT Italy's plant in Perth draws the attention of the National Precast Association of Australia, which is organising a factory visit during their next meeting in February 2018. Construction of new tunnels for trains and metros are expected in the near future and we are ready to put our technology, expertise and after sales support at the service of our new customers."

Websites

[www.boral.com.au](http://www.boral.com.au) / [www.marcantonini.com](http://www.marcantonini.com)

**Continued overleaf...**



LEFT (L-R): **Steve Brian, Boral's procurement manager for Western Australia; Gabriele Falchetti, executive Australia sales manager of MCT Italy; Gavin Main, Boral's operation manager for major project; Carl Wildman, Bennett Equipment's manager; and Wayne Manners, Boral's executive general manager for Western Australia.**

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## TBM assembly

Construction of the underground rail system employs several TBMs - each weighs over 160 t and measures 7 m in diameter - and they were delivered to the site by truck. Tutt Bryant Heavy Lift & Shift has been tasked to provide the lifting power to build one of the TBMs, and the company opted for its 650-t-capacity Manitowoc MLC650 crawler crane to handle the job. The machine was used to assemble and lift into position one of the TBM units, working on an 8 km stretch of the tunnel that will link Perth's foothills with the city's downtown area. Drilling began in July 2017 and is expected to last two years.

Employing one of the largest crane fleets in Australia, Tutt Bryant Heavy Lift & Shift currently operates over 150 units, including pick-and-carry, rough-terrain cranes, truck-mounted cranes, all-terrain and crawler cranes. "The Manitowoc MLC650 made assembly of this giant TBM seem easy and effortless," said David Taylor, business development manager at Tutt Bryant. "The crane's unique VPC gave us ample lift ability, positioning the counterweight automatically and offering unmatched versatility."

Manitowoc's VPC system automatically positions the counterweight to fit the required lift. The counterweight moves along the rotating bed and is positioned based on changes in boom angle and lift load. Advantages for customers include reduced ground preparation, lower ground-bearing pressure and less counterweight, without sacrificing capacity. ■

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



ABOVE: Tutt Bryant Heavy Lift & Shift operates its Manitowoc MLC650 crawler crane to build one of the TBMs, which will be used in the construction of the underground rail system.

BELOW: A highlight of the crane is its VPC system, which automatically positions the counterweight to fit the required lift. The counterweight moves along the rotating bed and is positioned based on changes in boom angle and lift load.



For more information on the Forrestfield-Airport Link project and SI-NRW joint venture: [www.si-nrwjv.com.au](http://www.si-nrwjv.com.au)

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# WOC HITS NINE-YEAR HIGH

**W**orld of Concrete (WOC) concluded its 2018 edition, from 23 to 26 January, as the largest edition in nine years. It drew 58,222 registered professionals and featured more than 1,567 companies (including 302 brand new companies) exhibiting across more than 747,411 net sq ft of exhibit space.

“This has been an incredible year – the success of World of Concrete 2018 helps solidify it as the only annual event for concrete and masonry professionals,” said Jackie James, group director for World of Concrete. “Having our largest event in nine years proves that the construction sector is going strong worldwide. Participants, both domestic and international, experienced the very best the industry has to offer in terms of suppliers, products, services and education, and we look forward to an even larger event at WOC 2019.”

Kevin Archibald, show manager for World of Concrete added, “We saw great attendee numbers, exceptional exhibits, and a very

solid rebook rate of 566,000 net sq ft of exhibit space, rebooking 76% of the total 2018 square footage onsite for next year’s show.”

International delegation leaders and delegates from across the globe also made it to the show, including a large delegation from India organised by the American Embassy in New Delhi. WOC once again partnered with the US Commercial Service to support US exhibitors interested in expanding their international sales and to recruit international attendees to the show.

In addition, WOC 2018 established the Bob Weatherton Award to honour his contributions to the concrete industry. The award includes a US\$2,500 scholarship and a US\$200 gift card, which was presented at the CIM National Board Meeting at the show. This year’s recipient of the Weatherton Award was Damien Bonis, who attends California State University - Chico. His presentation was ‘A Concrete Advantage: How the CIM Programme Fosters Unique Research and Internship Opportunities.’



Concrete Industry Management (CIM) is a business programme that has been developed specifically for the concrete industry to provide students with a four-year Bachelor of Science degree in Concrete Industry Management. The programme gives students entering the concrete workforce industry experience early in their careers.

### CIM auctions

CIM held its 13th annual unreserved silent and live auctions at the show. These auctions raised gross revenues of just over US\$1.1 million, setting a record for funds raised at WOC, and bringing a total of over US\$7 million to the CIM programme in the past 13 years.

The signature item this year was a

Mack Granite Axle Back model mounted with a McNeilus M77 paver mixer, donated by Mack Trucks and McNeilus, a division of Oshkosh Truck. An addition to the list of industry items donated to the annual auction this year was a 2018 T880S bridge formula truck with a rear discharge BridgeKing mixer, which was donated by Con-Tech Manufacturing and Kenworth and Kenworth.

This year CIM had record proceeds from the silent auction. Auction items included cement, concrete saws, drills, mixers, vibrators, safety equipment, screeds, fibre transport systems, dust collectors, decorative concrete tools, water meters, pumps, generators, training sessions and reference books, to name a few. ■

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



ALL IMAGES: This year's World of Concrete, held from 23 to 26 January, was the largest edition in nine years. It drew 58,222 registered professionals and featured more than 1,567 companies (including 302 brand new companies) exhibiting across more than 747,411 net sq ft of exhibit space.

## LIEBHERR

Liebherr introduced its new 50 M5 XXT truck mounted concrete pump to the public for the first time. The machine features a vertical reach of 49.1 m and a horizontal reach of 44.4 m. Its multi-folding five-section boom is easy to operate with excellent kinematics. The alternating pipework close to the boom ensures uniform movements over the construction site.

One of the highlights is the newly developed boom pedestal. Despite considerable weight reduction, its stability has been increased. The slewing ring and drive are proprietary Liebherr components that play a crucial role.

There are four different pump unit options for the 50 M5 XXT. This enables outputs of 138 to 167 cu m per hour. Two of these variants are long-stroke versions with a conveyance stroke of 2,400 mm, making them smooth and efficient.

Depending on the chassis, the total length of the machine is around 12 m in the transport position. The new boom is particularly compact and has virtually no projection. This guarantees safe driving properties and exceptional handling on the construction site.

Liebherr is believed to be the only manufacturer that supplies the XXT narrow



Liebherr 50 M5 XXT truck mounted concrete pump.

support, which is stable and warp-resistant. The front and rear support arms are affixed directly to the distributor boom pedestal, which directs the forces from the boom into the supports directly without deviations. All four support arms are pivotable, allowing high flexibility and a wide working range for distributor boom on narrow supports. This results in a major benefit on construction sites with limited space.

According to Liebherr, chassis from

different manufacturers can be used for its truck mounted concrete pumps. Various optional accessories and equipment are available for the 50 M5 XXT. Customers can choose from additional storage compartments, a modular water tank or additional steps on the left hand side. A high pressure cleaner makes cleaning easier and a pneumatic hose end air cuff prevents concrete from running out when the pump unit is stopped. ■

## GENERAL

Ideal for use with its extensive line of surface grinders, planers and other surface preparation solutions, the new VS220 dust collector from General Equipment Company offers an effective dust control system that balances power, performance and utility.

Featuring a 99% efficient at 0.5 micron pre-filter and a 99% efficient at 0.3 micro HEPA secondary filter, the VS220 captures fine dust particles, allowing users to comply with OSHA respirable crystalline silica exposure regulations (OSHA 29 CFR 1910.1153). The unit includes separate 2- and 3-in diameter dust port connections for either simultaneous or independent operation. According to General, this delivers greater versatility over single-port designs and better accommodates specific dust control requirements.

Constructed of high-density polyurethane with a heavy-duty welded steel frame, the VS220 is

easy to manoeuvre with 5-in diameter casters. It is designed with a low centre of gravity, providing greater stability over traditional vertical, canister style vacuums that are prone to tipping over and being damaged when pulled by the hose, said General.

Emptying the dust collected simply requires engaging the foot-operated hopper release lever. The integral clean filter indicator gauge makes it obvious when filter cleaning is required. In addition, the manual filter shaker system design is user friendly, reliable and durable.

The VS220 is powered by two, 115 VAC, 60 Hz single-speed electric motors, which produce a peak of 2.6 hp. It produces an airflow volume of 220 CFM and water lift suction of 2,794 mm. Overall filter size is 1.7 sq m and the dust hopper capacity is 47.3 l. ■



General VS220 dust collector.

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## CHEMGROUT

ChemGrout's CG-460/2X8 high-pressure colloidal series is specially designed for the grouting of hollow bars, tiebacks and ground anchors. The CG460 features two high-shear colloidal 70-gallon (265 l) mixing tanks, and a double acting, high-pressure plunger type grout pump.

The dual colloidal mix tanks allow for independent mixing of flushing and structural grouts. Each mixer is equipped with variable speed, high-efficiency, high-shear disks, rotating at speeds up to 3,000 rpm that provides rapid and thorough mixing. The tank outlet valves are a large 4-in butterfly type that assures full material flow into pump suction. The grout pump is a double acting, positive displacement plunger style that delivers 15 gpm (57 l/m), 2,000 psi (138 bar).

The CG460 series is available in a variety of power options, including air, hydraulic, electric/hydraulic (25 hp electric motor), and diesel/hydraulic (33 hp Kubota engine). Both electric and diesel models require a separate skid-mounted power pack. The rugged steel frame stands up to the toughest conditions on the jobsite. Operator controls are centrally located for efficient



ChemGrout CG-460 grout pump.

production. All components are easily accessible for operating, cleaning and maintenance. ■

## NOMACO

Nomaco has unveiled its Nomaflex cutter, designed for concrete professionals to save time, labour and material costs when creating expansion joints in pavement and construction jobs. As the latest addition to the Nomaflex joint filler system, this scoring tool enables installers to create a void when sealant is required, eliminating the need for a separate void cap system.

Nomaflex joint filler is a semi-rigid polypropylene foam product, which is available in plank and sheet form. It is swiftly gaining popularity in the US, displacing asphalt impregnated fibreboard, according to Nomaco. The Nomaflex cutter enables concrete installers to trim Nomaflex joint filler on the jobsite to create a void for sealant.

Installers simply align the Nomaflex joint filler within the cutter's channel and pull the cutter to score a tear strip. Nomaflex is then installed and concrete poured. Once the concrete cures, the tear strip is removed and the sealant is applied.

Using Nomaflex and the Nomaflex cutter eliminates additional material costs of an additional void cap system, potentially saving as much as 50% of the material costs for a job, said Nomaco. Plus, Nomaflex joint filler is an inherent bond-breaker, so no additional bond breaker is required, added the company.



ABOVE: The new Nomaflex cutter scores Nomaflex joint filler to create a void for sealants. No separate void cap system is required.

TOP AND TOP RIGHT: Nomaflex joint filler can be used in straight and curved applications, as a filler or a form. It is available in planks and sheets.

Unlike other void cap systems, the scored Nomaflex joint filler remains flexible (1-in thick product can be bent to 12-in diameter without breaking) and can easily fit around curves and radii. The tear-off strip remains attached until the installer removes it.

Reusable and convenient, the Nomaflex cutter is available in three sizes (1/2-in, 3/4-in and 1-in) to fit the various thicknesses of Nomaflex joint filler planks. Nomaflex meets ASTM D8139 property requirements for concrete expansion joint fillers. ■



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## GOMACO

Gomaco's Commander III curb and gutter machine is now able to slipform a 610 mm radius. This Commander IIIx with G+ control system incorporates rotary sensed slew drives on each of the three tracks, sensed leg positioning and independent travel circuits to each track to allow tight radius slipforming.

Gomaco has developed a new Xtreme radius software bundle to make slipforming a tight radius on stringline easier than ever before. The operator simply programmes the size of the radius into the G+ controller and as the Commander IIIx approaches the radius, the operator activates the radius programme, and the paver slipforms around the radius with ease. The track angles, variable track speeds and other aspects of slipforming the radius are all managed by the G+ digital control system.

Smart hydraulic cylinders on all three legs of the Commander IIIx allow G+ to know the position of the tracks at all times for intelligent All-Track Positioning. Smart hydraulic cylinders are also used for telescoping the mould mounting system for intelligent offset and repeatable mould offset. The trimmerhead and mould can be independently vertically adjusted for raising and lowering.

The Commander IIIx accommodates Tier 4 engines and their cooling packages. It features an optimised cooling package with G+ controlling the hydraulic fan. G+ quiet technology makes it one of the quietest pavers on the market today while adapting the paver's cooling needs to jobsite conditions. This results in both quiet and efficient paver operation. Improved fuel efficiency is another advantage with a power-optimised engine and load-sensed hydraulic circuits.

In addition, Gomaco has introduced the two-track GP3 slipform paver. This dual-telescoping GP3 is the first in a new family of Gomaco pavers with next generation technology. Both the two-track and four-track GP3 slipform pavers feature Smart Frame Widening to accommodate multiple width changes.

The Gomaco GP3 features a roller frame to easily accommodate multiple width changes. The roller frame has dual telescoping capabilities of up to 2.13 m on each side of the paver, for a total of 4.26 m of automatic frame widening. Smart cylinders in the roller frame allow Smart Telescoping with accurate frame widening and automatic width reference for steering setup.

The GP3 is designed to be easy to operate with the G+ control system, as well as comfortable for the operator while offering a complete view of the paving operation. Vibrator modules are positioned across the front of the operator's platform for easy



LEFT: Gomaco Commander IIIx curb and gutter machine.

BOTTOM LEFT: Gomaco two-track GP3 slipform paver.

accessibility and operation visibility. G+ allows quiet running technology and also load-sensed hydraulics for maximum paving performance and optimised fuel efficiency.

G+ Connect allows all the smart accessories and guidance system for the Gomaco paver to be easily interfaced. Simply 'connect' a 3D stringless guidance system, IDBI, tie bar inserter (TBI), power transition adjustor (PTA), Gomaco Smoothness Indicator (GSI) and more to the GP3 slipform paver. The GP3 can also feature the latest in telematics and remote diagnostics. ■

## UTIFORM

The Mini plastering machine from Spanish company Utiform (below) is equipped with a 170 l/min air compressor and 230 V water pump. It features a single/three-phase mixing pump, with a pumping distance of up to 15 m and maximum pumping pressure of 15 bars.

The machine has a minimum water pressure of 3 bars and output of 12 l/min (depending on material quality, hose length and diameter). It will stop automatically if the water pressure is insufficient. The homogenous and continuous mix is guaranteed by the flowmeter and water pump. The compact machine (155 kg) is also designed for easy transport and operation. ■





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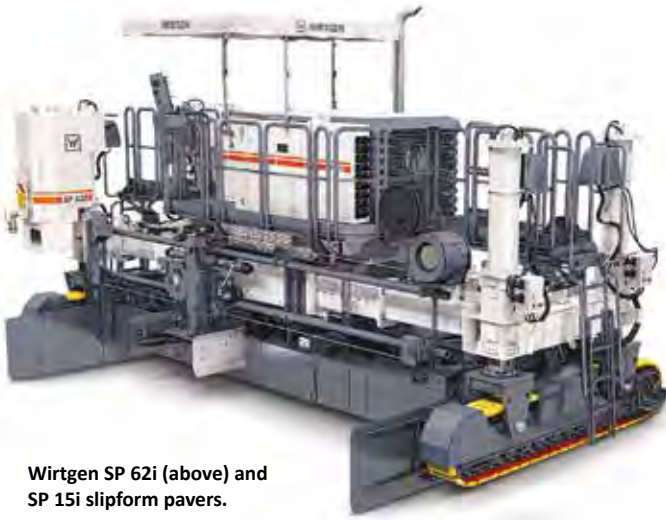
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## WIRTGEN

The Wirtgen SP 62i slipform paver can pave concrete in widths from 2 to 7.50 m and thicknesses of up to 450 mm - or more upon customer request. The intelligent steering and control system ensures smooth operation, even around tight corners. Thanks to the simple modification and extensibility with additional options, the SP 62i can be set up fast and adapted to any jobsite condition. Due to its ease of transport, the paver can also be made available on site quickly.

The other models, the SP 15i and SP 25i, are ideal for high-quality concrete paving of monolithic profiles in offset application. The offset mould can be positioned flexibly on either side of the slipform pavers, within or beyond the chassis. Transport poses no problem due to the machine's compact design.

In addition, the Wirtgen TCM 180i self-propelled curing unit, equipped with its automatic spraying and brooming system, is used directly behind the slipform paver to produce the desired surface texture. The spraying system applies a coating to the fresh concrete to retard evaporation of curing moisture. The machine's modular design allows working widths of between 4 m and 18 m. With its new operating concept, the TCM 180i can now be operated intuitively. ■



Wirtgen SP 62i (above) and SP 15i slipform pavers.



## BROKK

The electric-powered Brokk 110 features increased demolition power over its predecessor, the Brokk 100, and includes the Brokk SmartPower electrical system. The machine's improvements enhance its reliability and versatility when operating on harsh jobsites in industries such as construction, metal processing, mining and nuclear.

The Brokk 110 has a 3-m reach and weighs 990 kg. It delivers 15 percent more power than the older Brokk 100 and 50 percent more than its predecessor, the Brokk 90 (discontinued in 2011) while retaining its compact design, making it ideal in restricted spaces and on weak floors.

The Brokk 110 includes Brokk SmartPower, the company's electrical system, which is also available on the Brokk 120 Diesel, Brokk 280 and Brokk 500. The intelligent system incorporates hardened components and fewer moving parts than its predecessor. Brokk SmartPower optimises performance based on a number of factors, including power supply quality and ambient temperature. The system can sense when a power supply is poor or faulty, thus it is suitable for generators or unreliable power supplies.

In addition to improvements to its overall power and electrical systems, the Brokk 110 also features upgraded durability. This includes hardened parts, LED headlight protection, reinforced corners and a steel grey colour coating in strategic areas to add additional resistance to dirt and scratches.

The Brokk 110 is compatible with the same wide range of attachments available for the Brokk 100 that it replaces, including breakers, crushers, grapples, rock drills and shears. At 31-in wide, the compact machine and its attachments fit easily through standard doors and inside passenger elevators. With its low floor load, the Brokk 110 is able to manoeuvre in otherwise inaccessible areas, such as stairwells or elevators. Its compact size is ideal for a variety of applications, from top-down demolition and interior strip-outs to selective concrete removal. ■



Brokk 110 demolition robot.

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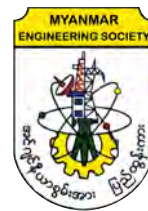
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## TEREX BID-WELL

The Terex Bid-Well 3600 paver boasts a range of available features that deliver bonus-level smoothness and improved visibility during nighttime paving operations. New orange strobe lights positioned at the corners of the paver's frame alert workers and nearby traffic when the machine is paving to enhance operating safety. The integrated Terex Bid-Well LED lighting system delivers additional paver visibility during nighttime paving operations and decreases the harsh shadows thrown by tower lights, allowing finishers to deliver a high quality final product. Up to 12 LED lights can be positioned virtually anywhere on the machine's frame and up to four lights can be mounted directly to the paving carriage to illuminate the paver.

The 3600 paver's exceedingly adaptable paving carriage incorporates a segmented upper and lower section design to improve component longevity and reduce clean-up time. Positioned at the front of the carriage, a single spud vibrator offers variable vibration frequency up to 175 Hz to deliver a 914.4-mm area of influence in the concrete when paving urban flatwork projects, like parking lots and city streets. Carriage movement along the paver's frame is powered by a separate 21-hp fuel-injected gas engine with advanced oxygen sensor that delivers reliable operation at altitude.

The paver's Rota-Vibe system features a 292-mm-long ribbed unit that delivers up to 83.3 Hz to densify the top 63.5 mm of concrete for a more uniformly consolidated surface. Dual 203-mm-diameter double-flight augers require less horsepower to operate and more quickly meter concrete than single-flight augers. Independent rotation of the two 1.2-m-long paving rollers offers optimal flexibility in sealing a variety of mixes, while the standard 127-mm hydraulic carriage lift quickly raises the paving rollers from the surface when paving has stopped or to pass over obstructions.

The machine's flexible, self-contained sidewalk paver quickly mounts at any location on the frame to pave multipurpose lanes, and it can be added to new or existing 3600 pavers in the field. The lightweight attachment is powered by its own fuel-efficient 14-hp engine and incorporates a hydraulically driven 152.4-mm-diameter roller that spins at variable speeds reaching 200 rpm. Roller tube length can be customised from 1.2 to 3.7 m to meet jobsite requirements.

Meeting a variety of in-line paving and skewed bridge designs, the 3600 paver offers standard paving width configurations from 2.4 to 26.2 m with on-the-fly paving widths changes of up to 9.1 m, so it quickly adapts to the contractor's bridge deck placement and slab-on-grade paving needs. Available inserts transition paver frame depth from 914 to 1,219 mm at the centre to extend paving widths to 33.5 m. For paving skewed bridge decks, the 3600 paver on display boasts the universal power crown adjuster that can be set for paving inline or offset to an adjacent hinge point opposite the other for quickly adjusting the crown when paving at a skew.

The highly flexible 3600 legs adapt to meet virtually any paving challenge the contractor faces, and the show machine offers fast and simple powered leg height adjustments of up to 1,168 mm. For paving at cross-slopes greater than 4%, the show machine features the pivot leg configuration that adjusts the paver to a true vertical operating position to reduce side forces placed on the rail and eliminate additional shoring. The swing leg design delivers zero-clearance paving when working in tight applications like rehabilitation work and deck overlays. ■



Terex Bid-Well 3600 paver.

## HACKER INDUSTRIES

Hacker Industries offers a variety of sound control mats (SCM) and pourable gypsum concrete underlayments to meet demanding sound-attenuating and fire-retarding specifications. These products, sold under the Firm-Fill brand, have been installed in residential, multi-family and commercial projects across North America.

The durable, lightweight Firm-Fill sound control mats are engineered to limit impact sound transmission between units when used in conjunction with Firm-Fill gypsum underlayments. Firm-Fill SCM can improve IIC ratings 15-25 points and carry a Class-A fire rating under ASTM E84.

All Firm-Fill gypsum underlayments are quick drying and offer a flat, durable surface for finished floor coverings. They meet ASTM F2419, standard practice for the installation of thick poured gypsum concrete underlayments.

The Firm-Fill SCM product line includes: Firm-Fill SCM-250, Firm-Fill SCM-125, Firm-Fill SCM-400, Firm-Fill SCM-750 and Hacker Sound Mat II.

The Firm-Fill gypsum underlayment product line includes: Firm-Fill Gypsum Concrete, Firm-Fill 2010+, Firm-Fill 3310 Classic, Firm-Fill 3310+, Firm-Fill High Strength, Firm-Fill 4010+, Firm-Fill CMD and Gyp-Span Radiant. ■



Firm-Fill SCM-250 sound control mats.

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## CARMIX

Carmix One is the smallest model in the Carmix self-loading mixer truck line from Italian manufacturer Metalgalante. The machine features high efficiency and versatility, and its articulated, oscillating steel-rod frame has specifically been designed for off-road use.

Carmix One is perfect for small construction sites, due to its compact design, agility and manoeuvrability. The machine can cope with gradients as steep as 30% and therefore, take on rough, tricky terrain such as dirt/sandy roads. It offers a 1,400-l load capacity with an effective mix yield of 1 cu m, and is powered by a four-cylinder Perkins 403D-15T water-cooled diesel engine (29 kW at 2,800 rpm).

Low maintenance costs plus excellent reliability and safety make Carmix One an ideal solution for jobsites where small/medium quantities of concrete are needed throughout the day. The machine is also well suited for the rental market and all those who need a compact, high-performance yet easy-to-handle machine.

### Metalgalante Carmix joins ARA

Following the agreement in 2012 with CAT Rental for South America and as of 2016 for the rest of the world, Metalgalante Carmix has recently joined the American Rental Association (ARA) – it is the first Italian producer of self-loading concrete mixers

Carmix One self-loading concrete mixer.



to become a member of the association. Founded in 1955, the ARA includes more than 1,000 manufacturing companies and over 10,000 rental companies, and for over 60 years it has brought together manufacturers, dealers and customers from the construction industry.

“The United States is a market with enormous potential for our products,” said Massimiliano Galante, managing director of Metalgalante Carmix. “We’re very happy to be members of the ARA, because it will

give us the opportunity to introduce our machines to the rental supply chain and to show what is new about them and what makes them unique. We were pioneers in inventing self-loading concrete mixers, which we have constantly innovated and improved for all construction sites around the world. From the most agile mixers to mobile concrete plants, I am positive that our range will meet the production and quality requirements of operators in the USA.” ■

## CATERPILLAR

The Cat 300.9D VPS (Versatile Power System) mini hydraulic excavator features a versatile design, which benefits both the owner/operator and the rental company by allowing the machine - in conjunction with its separate hydraulic power unit - to work either with its diesel engine or from a remote electrical power source, with no loss of performance.

Having an electrical drive system remote from the machine enhances utilisation and rental options. The 300.9D VPS can be rented alone for regular applications - or with the hydraulic power unit when the job requires low noise and zero emission. ■

Cat 300.9D VPS mini hydraulic excavator.



## KANACRETE

Kanaflex Corporation introduced its innovation from Japan, Kanacrete lightweight architectural precast non-structural wall panels. The company said the panels are 30% or more lighter in weight when compared to traditional ferrocement architectural 'off-site' precast wall panels, and thus have the potential to reduce foundation and superstructure load requirements as well as shipping and installation costs.

Kanacrete lightweight fibre reinforced ceramic material architectural precast wall panels provide faster build speeds as well as greater design opportunities with compatibility for various finishes to meet specific construction project needs.

A unique property of Kanacrete is its engineered built-in thermal resistance, R-Value, within the panels. According to Kanaflex, this is different than 'insulated sandwich panels' and either eliminates or reduces the amount of exterior insulation needed on a project. The built-in R-Value also has potential to reduce impacts of thermal bridging.

Depending on the facade finish, Kanacrete exterior wall panels are low maintenance and resistant to extreme weather conditions, said Kanaflex. Kanacrete is also compatible with Kanastone exterior facings or other upscale facade veneers. ■



**Kanacrete lightweight architectural precast non-structural wall panels provide faster build speeds as well as greater design opportunities with compatibility for various finishes to meet specific construction project needs.**

## ENERPAC

Enerpac's fully computer-controlled, multi-point JS-series Jack-Up system provides optimum safety and precision control for demanding high-tonnage lifting and lowering applications. A typical system set up includes four Jack-Up units, one positioned under each corner of 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 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. ■

**RIGHT: Enerpac's fully computer-controlled, multi-point JS-series Jack-Up system provides optimum safety and precision control for demanding high-tonnage lifting and lowering applications. A typical system set up includes four Jack-Up units, one positioned under each corner of load.**



## POWER PAVER

The Power Paver SF-1700/2700 slipform paver is designed with a low profile, minimal side clearance requirement. The SF-1700 is intended for half-width paving and roads up to 7.5 m wide.

The SF-1700/2700 low profile design gives the operator excellent visibility to both the front and rear of the machine. With only 74 cm of side clearance required, the machine has the ability to pave close to obstacles.

The machine is equipped with electronic sensors (hydraulic sensors are available as an option), electronic controls and an easy-to-understand control panel. The side-forms automatically adjust with contour of the grade because they are matched with the tracks. This design also minimises the distance between the finished concrete and the tracks.

By using side ramps, the machine crawls directly onto a trailer. No expensive disassembly or second truck required, the machine can be easily moved from job to job. Because of the low-profile design, height clearance requirement is



Power Paver SF-1700 slipform paver.

minimal. Keeping concrete flowing into the paving pan and away from the tracks, the containment noses quickly fold for reduced

transport width. The SF-2700 is powered by a 220 hp engine, while the SF-1700 is fitted with a 160 hp engine. ■

## ANMOPYC

ANMOPYC, the Spanish Manufacturers Association of Construction, Public Works and Mining Equipment, returned to the WOC along with some of its member companies.

The association was founded in 1982 as the sole representative of construction sector in Spain. Its main objective is to promote exports of its members worldwide, to give them encouragement for manufacturing of safe machines and equipment, as well as to strengthen R&D activities in the construction sector. The association is currently made up of about 100 companies from all over Spain.

ANMOPYC's member companies manufacture a wide range of products in various segments: concrete and mortar; lifting and transport; aggregates, mining and recycling; road, earthmoving, underground and drilling; temporary works; auxiliary equipment; and components and spare parts. ■



ABOVE AND LEFT: ANMOPYC, the Spanish Manufacturers Association of Construction, Public Works and Mining Equipment, attended WOC 2018 together with several of its member companies who are involved in the concrete industry.



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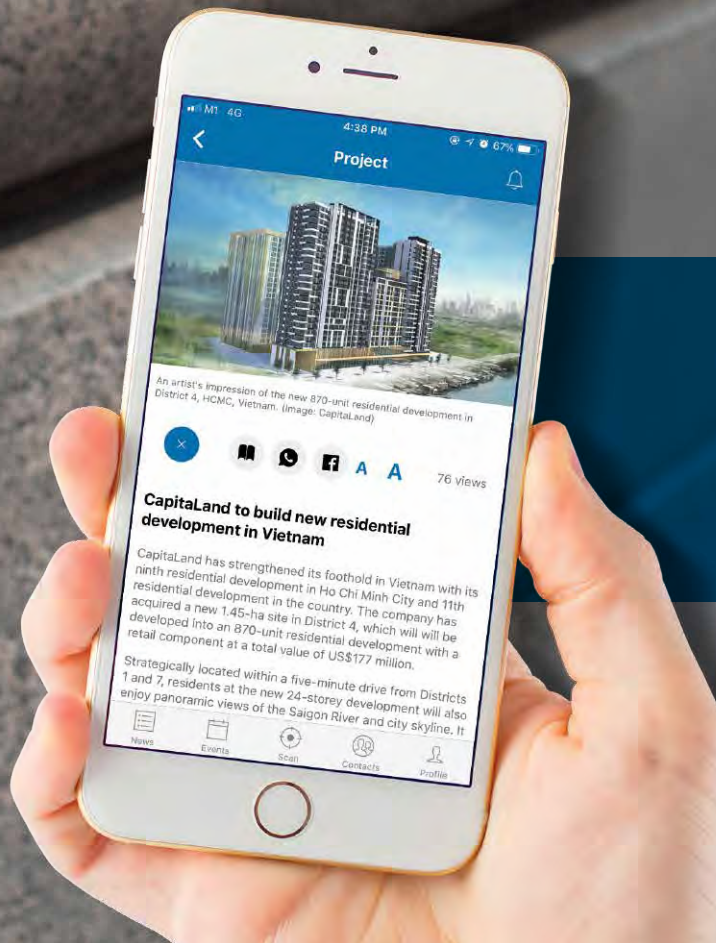
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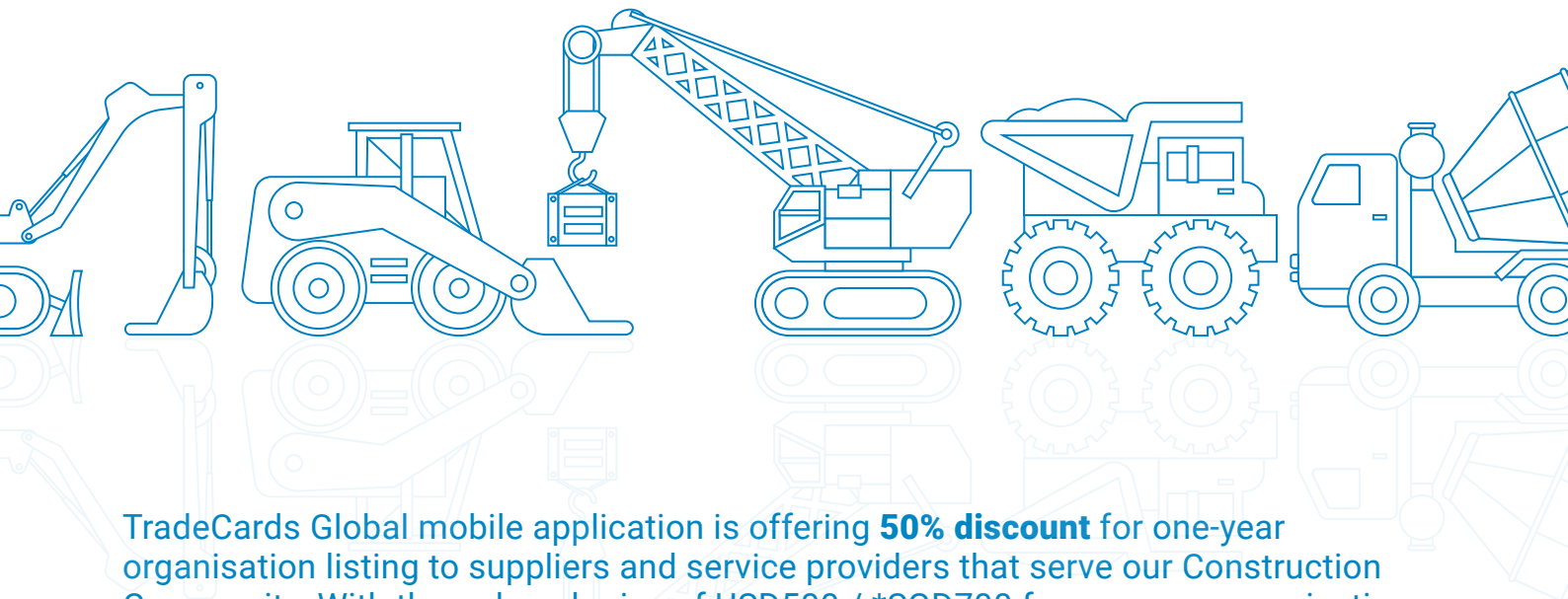
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# PETTIBONE

The new Pettibone Traverse T944X telehandler has an extendable traversing boom that moves loads by travelling horizontally. Up to 70-in of horizontal boom transfer allows users to precisely and safely place loads at full lift height through tight openings without having to coordinate multiple boom functions.

With the Traverse, the specified lift height of 1,356 cm is nearly identical to the 1,341 cm landing height. This stands in contrast to a traditional fixed boom pivot, where the true landing height is generally several feet less than the advertised lift height, said Pettibone, as operators must account for withdrawing the forks out of the load with enough rearward travel for the fork tips to clear the landing zone. The traversing boom allows for maximum forward reach of 1,092 cm.

The T944X is powered by a 74-hp Cummins QSF 3.8 Tier 4 Final diesel engine. A 117-hp option is also available. Drivetrain and axles have been optimised to provide greater tractive effort with minimal tradeoff on top end speed. Built for use on rough terrain, the unit offers full-time four-wheel-drive with limited-slip front axle differential. Tight steer angle capability provides an efficient turning radius of 429 cm.

Cylinder cushioning has been introduced to dampen the end of strokes – both extending and retracting – to avoid

the wear-and-tear of hard, jarring stops, while also helping prevent the potential spilling of a load. The telehandler also uses a single lift cylinder that improves operator sight lines, and has twin hydraulic lines for tilt and auxiliary plumbing.

The T944X offers a maximum lift capacity of 4,082 kg with its newly designed boom. Featuring formed boom plates and less welding, the structure offers greater strength while reducing weight. The design also minimises boom deflection for better control and accuracy when placing loads.

Boom overlap has been nearly doubled from previous models to provide smoother operation and reduce contact forces on wear pads, thereby extending service life. A bottom-mounted external extend cylinder further reduces the load on wear pads by up to 50%. This cylinder location also provides greatly improved service access to internal boom components.

The operator cab maintains Pettibone’s ergonomic seat, pedal, joystick and steering wheel positions. The 114-l fuel tank offers ample volume for a full day’s work at 100% load, and the lockable fuel-fill is in a clean, accessible location. ■



Pettibone Traverse T944X telehandler.

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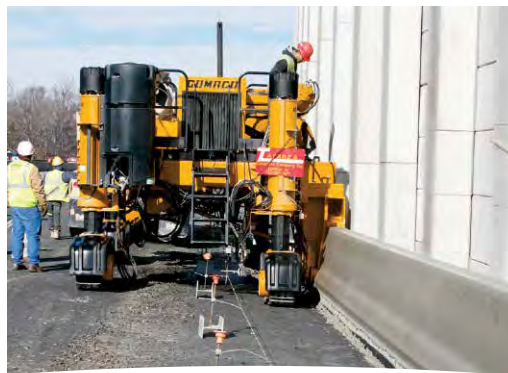
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