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SEPTEMBER - OCTOBER 2015



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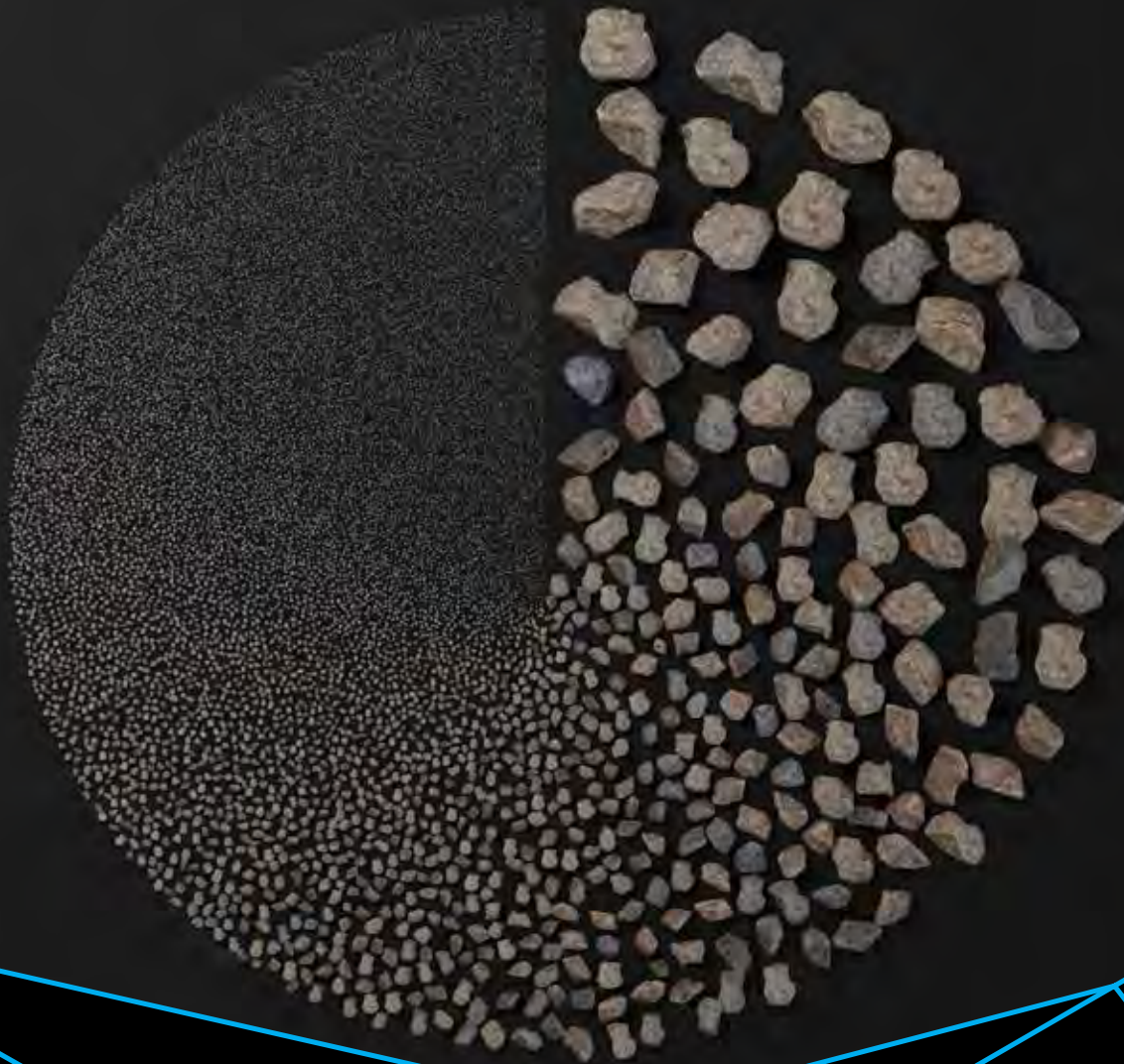
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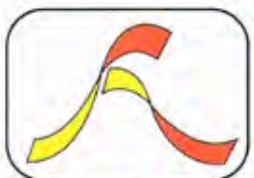
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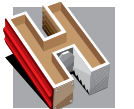
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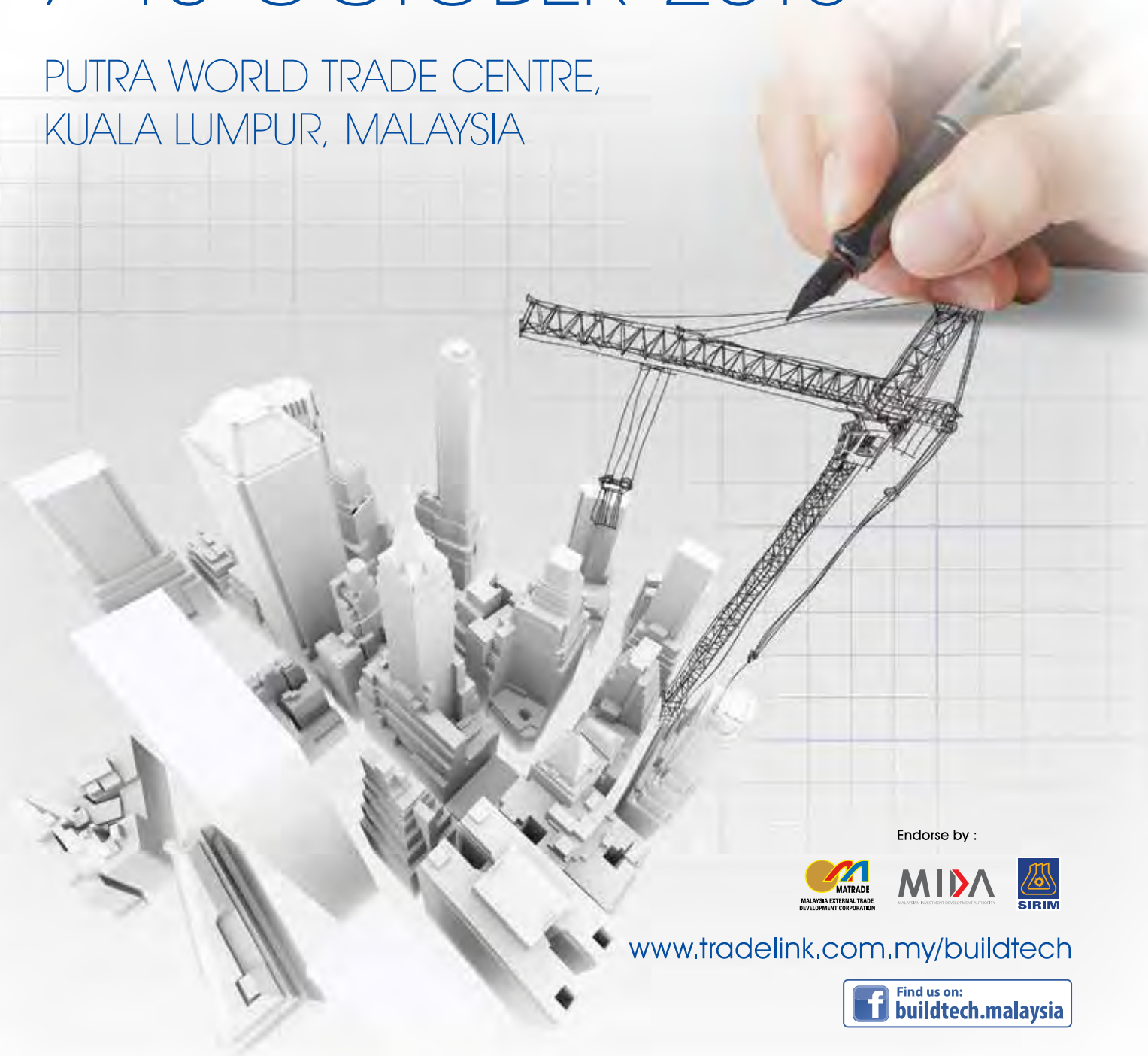
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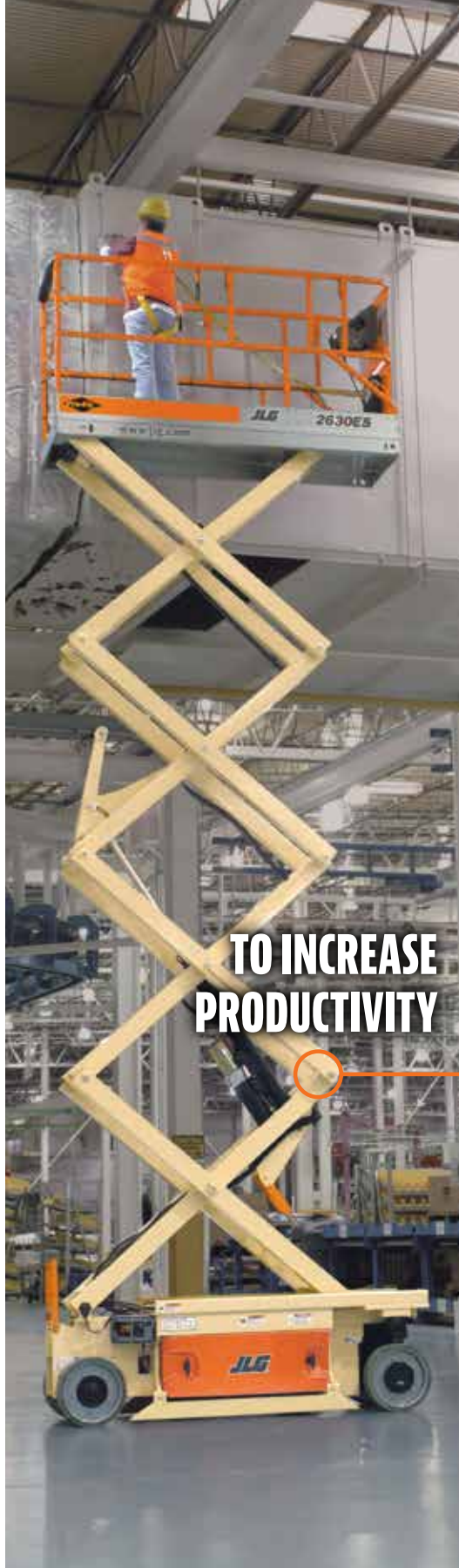


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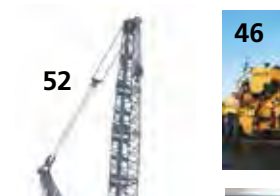
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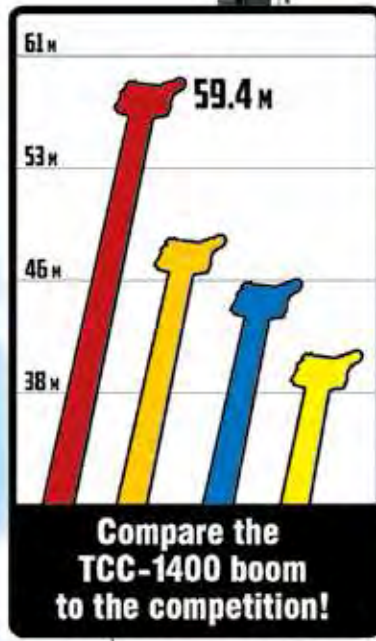
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Samsung C&T to build UMCity Medini Lakeside

Samsung C&T has signed a contract with UMLand for the construction of UMCity Medini Lakeside in Iskandar, Malaysia. The US\$160 million project will include four towers and a podium – hosting two 30-storey towers for residence hotel, a 15-storey tower for hotel and a 25-storey tower for office space – over a total ground area of 168,900 sq m. Work started in May 2015 and is expected to be completed by 2018.

“Positioned as the commercial hub in Medini, UMCity is a one-of-its-kind waterfront commercial development designed for a vibrant community and will feature distinctive and special qualities which are expected from UMLand projects,” said Datuk Charlie Chia Lui Meng, UMLand’s group CEO.

The UMCity Medini Lakeside is Samsung C&T’s second project with UMLand after Star Residences, a luxurious residential/commercial complex that was awarded in November 2014. Upon completion, Star Residences is set to be one of the tallest residential towers in Kuala Lumpur. ■



The new UMCity Medini Lakeside project is located in Iskandar, Malaysia. It features four towers and a podium over a total ground area of 168,900 sq m.

FLSmidth wins contract to supply ‘largest cement plant’ in Southeast Asia

FLSmidth has received an order worth approximately €100 million from the Vietnamese cement producer Xuan Than Group for the supply of a complete cement plant with a capacity of 12,000 t per day. The plant will be located approximately 100 km south of Hanoi in Vietnam.

Once completed, the plant is believed to be the largest cement plant in Southeast Asia with the most energy efficient equipment, state-of-the-art emission control and leading process control systems.

“The Vietnamese cement market is expected to grow over the coming years and it is a well known market to FLSmidth as we have been present in the country for many years – also the construction of the largest cement plant in Southeast Asia proves our strong position in the area,” said Per Mejnert Kristensen, president of FLSmidth’s cement division. ■

Manitowoc appoints Myanmar dealer

Two Elephant Asiagroup Co Ltd – a joint venture between Two Elephant Group and Asiagroup – has been appointed by Manitowoc Cranes to distribute and support the range of Grove mobile and Manitowoc crawler cranes in Myanmar.

Asiagroup already has one dealership agreement with Manitowoc Cranes in the region, representing its crawler cranes in Malaysia. It is also a long-standing customer and has purchased a mix of seven new Grove and Manitowoc cranes in recent months. Meanwhile, Two Elephant Group is an established rental company in Myanmar with knowledge and expertise of the local market.

“Two Elephant Asiagroup is a joint venture that knows Myanmar and knows cranes,” explained Raman Joshi, VP and general manager for Manitowoc in Asia Pacific. “The venture shares many of the same values that we do and we’re delighted to announce this latest partnership. In order to satisfy Myanmar’s growth ambitions, there is a huge amount of infrastructure development needed and that’s where Manitowoc’s equipment, that focuses on innovation and return on investment, can really help.”

Asiagroup Leasing Pte Ltd was established in 1989 and has grown throughout the years to become one of the largest crane rental companies in Singapore. The company currently owns a large fleet of all-terrain, rough-terrain, truck and crawler cranes serving the petrochemical, infrastructure and construction sectors.

“We are delighted to further expand our partnership with two of the industry’s leading crane brands,” said Asiagroup’s managing director, Steven Poh. “With our experience in selling and supporting cranes, combined with Two Elephant Group’s local expertise, we are certain we can offer customers a winning combination of high quality products backed by fast and reliable Manitowoc Crane Care support.”

The joint venture currently employs more than 80 people in Myanmar and owns a rental fleet of more than 40 cranes made up of a mix of rough-terrain, all-terrain and crawler cranes. It has grown to be the largest rental fleet of cranes and forklifts in Myanmar and the company prides itself on delivering professional support through its team of skilled technicians.

“This is an exciting time for both Myanmar as a country, and for Two Elephant Group,” said Han Soe Kyaw, managing director of Two Elephant Group. “We are proud to support our nation’s development through providing world-class lifting equipment and we are delighted to partner with Grove, Manitowoc and Asiagroup in this initiative.” ■



Raman Joshi of Manitowoc (left) and Steven Poh of Asiagroup sign the agreement to confirm the partnership between the two companies.

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SDLG Top Driver programme launched in Thailand

Shandong Lingong Machinery Co Ltd has launched the SDLG Top Driver programme in Thailand, in partnership with its national distributor Italthai Industrial (ITI). The launch of the programme was recently announced at ITI's 60th anniversary event in Bangkok.

The SDLG Thailand Top Driver programme has been endorsed by Thailand's Skill Development Department at Ministry of Labour. All competitors will receive a certificate of participation from the Italthai Technical Academy (ITA) and the top three winners will take home cash prizes of 100,000 Baht (US\$3,000), 80,000 Baht (US\$2,500) and 50,000 Baht (US\$1,500) respectively.

"I am proud to see our Top Driver campaign expand into overseas markets. Our aim with the programme was always to set new standards for the construction industry by promoting the right values and increasing the skill levels of workers in our industry. Through our partnership with the ITA and Thailand's Ministry of Labour, we hope to see more job opportunities for those who take part and a growing awareness of good operating practices throughout the industry," said Yu Mengsheng, SDLG's executive president.

The SDLG Thailand Top Driver programme includes a series of well-designed training courses and participants will be tested and qualified during boot camps – including machine operating skills and the maintenance of parts and components. The competition is open to anyone interested in the heavy equipment industry, whether they currently operate machinery or not.

The competition kicked off its first round in Suphanburi province, in the west of the country, from 25 to 29 May 2015. The event was then followed by first-round competitions in Surat Thani in the south, from 22 to 26 June, and in Khon Kaen in the northeast from 2 to 6 July.



Above and left: The SDLG Top Driver campaign has been launched in Thailand, in partnership with SDLG's national distributor Italthai Industrial (ITI).

The SDLG China Top Driver programme was launched in 2013. Now in its third consecutive year, it is estimated to attract over 10,000 participants from across China. ■

LHM orders more Terex TR100 dump trucks for Myanmar projects

Following its earlier purchase of nine Terex TR100 rigid dump trucks, Leadway Heavy Machinery (LHM) recently ordered another 10 units to be delivered to Myanmar.

LHM is Terex Trucks' official dealer for Thailand and Myanmar. Its affiliated company, Aung Hein Min (AHM) based in Yangon provides sales, marketing and service solutions for Terex Trucks customers. The 19 TR100 rigid dump trucks will be used for jade mining in Myanmar, transporting earth, rock and jade - but LHM is also expanding into other sectors such as dams and copper mines.

"Firstly, the demand is there, and Terex Trucks understood our requirements for penetrating the rigid dump truck market," said Jimmy-Chakart Seanchan, CEO of LHM. "In addition, the top management within Terex Trucks got fully involved in supporting us in the sale, including introducing flexible payment terms and a great aftersales service."

The Terex TR100 rigid dump truck delivers a robust performance in the steepest, deepest mines around the world. The minimum maintenance needs and tough design make the machine ideal for working in the most demanding jobsites in the ever-changing, tropical monsoon climate of Myanmar.

"After LHM's successful launch of articulated dump trucks over the past two years, we're anticipating great success for our partners in Myanmar as they break into the rigid dump truck market with 19 new TR100s," said Sam Wyant, global sales and marketing director for



Terex TR100 rigid dump trucks are ideal for demanding jobsites.

Terex Trucks. "LHM is an invaluable partner in our dealer network, and together we're looking forward to developing Terex Trucks' position in this growing market."

The TR100 rigid dump trucks are planned for delivery by the end of this year. ■



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Damansara City development in full swing

Damansara City is a new integrated development in Damansara Heights, Kuala Lumpur, Malaysia. The RM2.5 billion project spanning 8.5 acres of freehold land is being developed by GuocoLand (Malaysia) Berhad, a subsidiary of the Hong Leong Group. It boasts two 28-storey luxury residential towers - comprising 370 units - known as DC Residency, two Grade-A office towers featuring 33 and 19 storeys, a five-star hotel and a lifestyle mall known as the DC Mall.

Apart from a wide range of facilities, residents and tenants at Damansara City will also have access to a walking garden along the top of the retail mall. This is on top of the health and gym facilities that include an Olympic length salt-water pool and an aqua gym for residents at DC Residency.

Construction work on the Damansara City started in September 2011 and the entire project is set to be complete by mid 2016 - well ahead of the Sungai Buloh-Jalan Semantan MRT line that is scheduled to be operational before the end of 2016. Damansara City has been designated as an Entry Point Project under the Economic Transformation Programme, to push Malaysia to developed nation status by 2020.

GuocoLand expects Damansara City to have an initial traffic of 10,000 people daily working within the integrated development and average another 6,000 visitors when it is fully operational. GuocoLand has also confirmed that the Hong Leong Group will move its global headquarters to Damansara City. ■



Damansara City features two luxury residential towers, two Grade-A office towers, a five-star hotel and a lifestyle mall.

Gomaco dealer for Philippines

Monark Equipment Corporation has been appointed as an authorised Gomaco distributor in the Philippines. The company will provide sales and service for Gomaco's full line of concrete construction products.

"Monark has a long and established history in the Philippines, are well known for their service and support of the equipment they sell, and Gomaco is excited to have them join our worldwide distributor network," said Julian Dann, Gomaco's managing director for Asia Pacific. "It is Monark's mission, as well as Gomaco's, to be true partners in working together to find customers the concrete paving equipment they need for all of their projects."

Monark Equipment Corporation has a main office in Manila, a product support centre in Laguna and regional offices in Cebu, Davao City and Cagayan De Oro City. ■



From left: August S. Consebido, Monark; J.R. Banson, Monark; Julian Dann, Gomaco; and Manny Martin, Monark.

New Malaysia dealer for Palfinger

Asia Group Sdn Bhd has been appointed as Palfinger's new dealer for Malaysia. With this agreement, both companies can now expand their product and service outreach in the Malaysian market.

Asia Group Sdn Bhd was established in 1990 and owns one of the largest fleets of rental cranes in Malaysia. As a specialist in crane rentals and transportation services, the company has over 12 years of experience in servicing a diverse range of sectors such as airport and construction, power plant installations, and oil and gas industries. Asia Group has operations in Singapore, Hong Kong, Malaysia and Myanmar. ■



From left: Josephine Poh, Asia Group; Jeffrey Poh, Asia Group; Steven Poh, Asia Group; Johann Königshofer, Palfinger; Li Fook Seng, Palfinger; and James Liu, Palfinger.



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JLG strengthens in Thailand with new distributor

JLG has appointed United Motor Works (Siam) Public Company Limited (UMWS) as its only authorised distributor in Thailand. Through this strategic move, JLG can now benefit from UMWS' local distribution network, facilities and breadth of experience nationwide, sales and after-sales support to reduce the response times in reaching its customers.

As the authorised JLG distributor, UMWS acts as the local contact for all marketing and sales activities for JLG products as well as the after-sales service and support including equipment repair and maintenance, inspections, mobile service and maintaining local equipment and parts inventory.

"JLG has been gaining customer confidence and trust from all over the world, going above and beyond to support our customers' success. Besides delivering powerful, versatile equipment and providing unsurpassed training and service support, we believe we have a responsibility to be more than a manufacturing company. This approach has been proven successful, as JLG has received multiple global awards and recognitions throughout its history," said Desmond Soh, president and general manager of JLG Asia Operations.

JLG's comprehensive product lineup ranges from vertical lifts and telehandlers to the tallest working height telescopic boom lift reaching up to 19th storey. JLG's patented 'Extend-A-Reach' feature



United Motor Works (Siam) Public Company Limited has been appointed as the only authorised distributor for JLG equipment in Thailand.

gives equipment users greater flexibility for platform placement.

"We see this distribution appointment with UMWS as a very significant move in our aspirations to grow with the Thai economy," added Mr Soh. ■

Bangkok's new mixed-use project

Thailand's developer Magnolia Quality Development Corporation Ltd (MQDC) will invest US\$900,000 million to build 'an ideal community' called Whizdom 101 (below), which comprises residences, retail outlets, offices and large areas of public space on a massive 6.9 ha property. It is set to be one of the largest new developments in Bangkok, scheduled for completion in mid-2018.

Whizdom 101 includes Thailand's first in-building multi-level bicycle lane and jogging track that passes in and out of the building on a 1.3 km course in the multi-level garden park. The development will also have one of the largest vertical sports clubs in Thailand with around 10,000 sq m of space.

In addition, Whizdom 101 is expected to be Thailand's first fully integrated digital community, where offices, residences, retail and lifestyle facilities, and common areas will all be on a common digital platform, making the development a seamlessly connected digital town. ■



Manjung Unit 4 power plant in operation

Malaysia's Manjung Unit 4 power plant is now in operation, producing efficient and reliable power for the equivalent of more than two million homes. The 1,000 MW ultra-supercritical, coal-fired plant was delivered by an EPC (engineering, procurement and construction) consortium of Alstom and China National Machinery Import and Export Corporation (CMC). Black & Veatch was selected by CMC to provide engineering services and procure major balance-of-plant equipment.

"We worked closely with suppliers throughout to ensure that both schedule and international standards were consistently met," said Zhiqiang Shan, project manager at Black & Veatch. "This often resulted in us being deeply involved in reviewing their design, carrying out shop inspections during the manufacturing process or dispatching a resident quality control inspector to the factory for several months."

The balance-of-plant for the equipment and systems included coal and fly ash handling system, cycle makeup treatment system, wastewater treatment system, induced draft fan, cooling water pump, generator set-up transformer and unit auxiliary transformer. Black & Veatch has formally pre-qualified hundreds of quality Chinese equipment manufacturers. In addition, the equipment was globally sourced from Spain, Denmark and Malaysia. The company also served as CMC's technical advisor.

Manjung Unit 4 was constructed on a brownfield site in Ipoh, approximately 200 km north of Kuala Lumpur, capital of Malaysia. The plant is owned by TNB Janamanjung Sdn Bhd, which is a subsidiary of Tenaga Nasional Berhad, a state-owned power generation transmission and distribution company. ■

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Chartered Engineer programme for Singapore's railway engineers

The Institution of Engineers, Singapore (IES), the Land Transport Authority (LTA), Singapore Workforce Development Agency (WDA), SBS Transit Ltd (SBST) and SMRT Corporation Ltd (SMRT) have signed a Memorandum of Understanding (MoU) to establish the Chartered Engineer programme for Singapore's railway professionals. This will support the national-level SkillsFuture movement by building a sustainable pool of highly skilled and proficient railway engineers and assisting individuals to advance in their careers.

The MoU will also establish a common set of railway engineering industry standards for engineering competencies. The signatories will work together to provide a platform for the continual development of professional standards and accreditation in operations, maintenance and regulatory work. Furthermore, all parties will collaborate to drive industry-wide branding and promotion of the railway engineering profession.

Launched by IES in 2013, Singapore's Chartered Engineer programme provides accreditation to engineers in fields that do not require Professional Engineer registration. The programme was first rolled out for engineers in the aerospace, chemical and process, environmental and water, marine and offshore, and systems engineering sectors. This programme will now be extended to engineers in the railway and transportation engineering sector.

The accreditation programme is based on independent peer review of an individual's experience, expertise and practicing competence. For railway engineers, it provides employers with a yardstick to determine and recognise their professional competence, which will in turn enhance their employability and career prospects. Application for accreditation is expected to begin from end-2015. Chartered Engineers will need to accumulate 40 Professional Development Units each year by participating in seminars, conferences and membership in Engineering Boards.

"We are making steady progress in our efforts to double our rail network to about 360 km by 2030. From now till 2024, we will open one new MRT line or extension almost every year. Beyond that, we have the Jurong Region Line and the Cross-Island Line, as well as extensions to the Circle Line, the North East Line and the Downtown Line, all by 2030. The math is simple: the more extensive our rail network, the more rail engineers we need – to build, operate and maintain a high quality system that the public can count on," explained Mrs Josephine Teo, Senior Minister of State, Ministry of Finance and Ministry of Transport.

"We will also need engineers who can handle more challenging tasks. Engineering works for new railway projects have become increasingly complex. For instance, when we started to build the Downtown Line, we had to divert the Singapore River, not once, but twice! Engineers have to figure out how to dig and construct deeper, faster and better, while keeping to stringent construction and safety standards," she said.

In attracting new entrants, Mrs Teo also described how some of the organisations are working together to offer specialised education opportunities for students. "For example, LTA, SMRT and SBST have partnered the Singapore Institute of Technology (SIT) to develop the specialised Bachelor of Engineering in Sustainable Infrastructure Engineering. Students can choose to specialise in railway engineering, which is unique to SIT, and take modules in total preventive maintenance and non-destructive testing. They will also undergo a structured eight- to 12-month integrated work study programme with their host organisations to apply the knowledge



Above: IES, LTA, WDA, SBST and SMRT have signed an MoU to establish the Chartered Engineer programme for Singapore's railway professionals.

Left: Mrs Josephine Teo, Senior Minister of State, Ministry of Finance and Ministry of Transport, was speaking at the MoU signing ceremony event.

and skills learnt in the classroom, in a live operating environment. Students can also base their capstone project on their work experience to develop innovative solutions to real-life problems they have observed for themselves.

"There are also railway engineering programmes offered at the Institute of Technical Education and polytechnic levels, all of which were developed together with industry. This is testament to the industry's growing interest and efforts to develop railway professionals."

Chong Kee Sen, president of IES, said, "To achieve a robust public transportation system, Singapore needs a strong pipeline of railway and transportation engineers capable of the design, construction, operation and maintenance of various types of railway and transportation systems and developing innovative solutions for technical, societal and commercial problems related to railway engineering."

According to IES, the Chartered Engineer programme is aligned closely to the International Engineering Alliance's 'Graduate Attributes and Professional Competencies'. IES is also working towards having its Chartered Engineers accredited with international registries, thereby raising its engineers' competencies on a global platform.

Chew Men Leong, chief executive of LTA, commented, "The development of rail engineers is crucial to our growing public transportation sector. With the building of new rail lines and the doubling of our rail network to about 360 km by 2030, it is critical that we have engineers with the knowledge and expertise to plan, build, operate and maintain the rail system. This programme also encourages the right attitude in our engineers and the spirit of continuous learning, which will keep them in good stead to progress in this exciting industry." ■



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Manitowoc Cranes expands Australian operations

Manitowoc Cranes has invested heavily into its Brisbane and Sydney facilities in Australia, as well as appointing a new customer support agent covering Victoria. There is also a new vice president and general manager for Manitowoc in Australia, with John Stewart relocating from Singapore to lead company operations in the country.

In Brisbane, Manitowoc Cranes has relocated and expanded its operations to further improve service to customers in Queensland, with the new location offering improved facilities and a more convenient location. The Brisbane facility is close to the airport and the Gateway Bridge, which enjoys high traffic volume and is conveniently located for customers wanting to collect parts. Following extensive refurbishments, the facility is now open for business and includes a large yard with an expansive workshop complete with an open area for repairing and showcasing cranes.

Meanwhile in Victoria, the company's new agent, Jatco Engineering, will offer improved support and coverage for customers across the state, while enjoying the support and expertise of Manitowoc's other Australian operations when needed. Jatco Engineering stocks a range of Manitowoc crane parts and has 25 years' experience in the industry. Its purpose-built facility is located in Wendouree, Ballarat and there are seven service technicians employed there, who work in fully fitted out mobile crane workshops. The site can offer 'Green' sticker inspections and is fully equipped to diagnose, repair, sandblast and paint products.

Manitowoc Cranes has also invested in its NSW operation in Blacktown, increasing its parts store at the facility and continuing its commitment to provide ongoing training to its highly specialised technicians who work from there. The Blacktown facility is well located with an expanded two level yard for setting up and testing cranes and equipment. Its workshop has a large overhead crane and central parts warehouse that can carry four times the stock of the old facility for vastly improved parts availability.

These latest developments further strengthen Manitowoc's Australian set-up, which already includes sales and service partners in Western Australia and South Australia. The recent investments mean that today the company has an estimated A\$7 million in spare parts in the country, split between Manitowoc's own operations and those of its dealers. ■



Manitowoc's new facility in Brisbane.

Haulotte HA16 RTJ Pro goes to Oceania

Alfasi Hire is the first Australian customer to take delivery of the new Haulotte HA16 RTJ Pro boom lift, while Porter Access is the first New Zealand customer.

"The HA16 has always been a strong product for Haulotte and is one of the biggest selling lines for Haulotte globally, so we are excited to see these first machines arrive into the Australian and New Zealand markets," said Keith Clarke, general manager of Haulotte Australia/New Zealand. "The improvements in this new generation machine will help our customers become more successful. This machine is incredibly smooth and fast to operate. We left in all the extras our customers said were important, including 360 continuous slew and four-wheel steer. We have also added an oscillating axle and on board diagnostics."

Gary Murphy, general manager of Alfasi Hire, commented, "We believe the new range of boom lifts, starting with the HT23RTJ and now the HA16RTJ Pro, are the next generation of boom lifts in terms of technology, performance, serviceability and features. The productivity gains to the customer through faster operation, proportional controls, greater gradeability as well as ground clearance make these must have machines for our fleet." ■



Alfasi Hire is the first Australian customer to take delivery of the new Haulotte HA16 RTJ Pro boom lift.

Vinci acquires HEB Construction

Vinci has finalised the acquisition of New Zealand-based company HEB Construction. Founded more than 40 years ago, HEB Construction offers a broad array of expertise in civil engineering, engineering structures, hydraulic engineering, roadworks, earthworks, marine and port works, precasting and transport. The company employs 750 people and generated revenue of about €230 million in 2014.

With this acquisition, Vinci confirms its strategy of expanding in the high-growth international markets. New Zealand's GDP increased by more than 3 percent in 2014 and the country's construction and infrastructure sectors hold out prospects for steady growth.

"HEB Construction's fundamentals form an excellent fit with those of Vinci and its new projects reflect its vitality. One good example is the new contract notification in April of this year to build a 27 km four-lane urban motorway in Wellington. The project, in which HEB is participating as a member of a joint venture, has a value of more than €500 million and is one of the island's largest current infrastructure projects," said Philippe Chavent, chairman of Vinci Construction International Network. ■

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Atkins secures major projects in Hong Kong and China

Atkins has jointly won a contract with Planning and Design Institute of Nanjing University, Beijing Branch, to provide urban design for the new high-speed rail development in Shangrao, Jiangxi Province in China. Appointed by Shangrao Urban & Rural Planning Bureau, Atkins will design an urban area to help boost economic growth and transform the district of Shangrao.

The new high-speed rail district is located at the east downtown of Shangrao, 6 km from the city centre. The development will benefit from this close accessibility with a focus on high-end cultural and tourist attractions, whilst maintaining a balance between sustainability and economic growth. The design will incorporate the natural heritage of the city along with Chinese cultural elements.

The development has adopted an eco low-carbon urban planning approach to provide green and open spaces to highlight the city's natural beauty. A pedestrian system that encourages walking and cycling is proposed in the transport plan to promote green travel lifestyle and sustainable development of the city. A digitalised smart network will improve the efficiency of public services and quality of life of city residents.

In addition, Atkins has won a consultancy service contract for the detailed design of 650 ha of reclaimed land in preparation for the construction of third-runway system (3RS) at Hong Kong International Airport. Upon completion of the 3RS, the expansion plan will allow the airport to handle an additional of 30 million passengers a year according to the Airport Master Planning of 2030.

Atkins' contract is one of the first detailed design consultancies to be awarded for the 3RS with numerous other design packages expected to be tendered progressively into 2016. Atkins' scope of works includes the design of the ground improvement works, reclamation, seawalls, re-provisioning works and the extension and modification of existing large box culverts.

The detailed design will be delivered within a tight schedule to facilitate the anticipated award of the main works contract in 2016. Atkins' services will continue into the construction phase with the provision of design support services. ■



Above: The new high-speed rail development in Shangrao, China, has adopted an eco low-carbon urban planning approach to provide green and open spaces.

Below: Three-runway system layout at Hong Kong International Airport.



Hyundai rolls out 500,000th construction equipment

Hyundai Heavy Industries (HHI) recently produced its 500,000th construction equipment, the HX520 excavator. The company has also delivered the machine to one of its customers.

The 500,000 construction equipment production record was achieved 28 years after HHI introduced its first excavator in 1987. According to the company, it started the business with 426 new excavators and has now emerged as a major player in the market with the broadest product range among Korean makers. HHI's product lines include 1.5 t excavators, 30 t forklifts and Korea's largest 120 t excavators. The company has also announced its eco-friendly and high efficiency HX series excavator models.

HHI has been active in making inroads into global construction equipment markets with five overseas production factories in China, India and Brazil. The company achieved US\$2.7 billion in global sales in 2014. This year, it aims to secure US\$3 billion in global sales.

"We will continue to introduce new models with improved quality and performance and solidify our position as a reliable maker in the international construction equipment market," said Rhee Sang-gi, COO of HHI's construction equipment division. ■



Hyundai Heavy Industries recently rolled out its 500,000th construction equipment, the HX520 excavator. The company has also delivered the machine to one of its customers.

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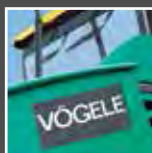


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LiuGong opens new global R&D centre in Liuzhou

LiuGong has inaugurated its new global research and development (R&D) centre in Liuzhou, China, underlining the company's long-term commitment to innovation and future technology. The facility spans 110,000 sq m and includes an office complex covering an area of 22,000 sq m, a 100,000 sq m global test centre, a prototype centre, seven laboratories and a large outdoor experimental field. It seats 1,200 engineers.

This new global R&D centre is another milestone for LiuGong, expanding the company's R&D capability. It will initially focus on major research, development and testing for LiuGong's lines of wheel loaders, excavators and graders etc. One of the first projects will be the completion of research and development, as well as testing the latest models of H-series wheel loaders, said LiuGong.

In addition, the facility's comprehensive range of laboratories will develop measures to test and optimise all aspects of machine performance, such as structural design, materials science, electronic and hydraulic efficiency, cooling, vibration and noise.

The new global R&D centre also has several specialised training laboratories including virtual reality studios and industrial design studios, which will also be the focal point for technical training within LiuGong.

"R&D is the nucleus of the future and the ability to be innovative is an uppermost priority for the future. At LiuGong, R&D has



always been major focus. The new centre is a significant commitment to future technology, with many more scientific and technological advances being made. We are confident it will provide all tools we need to become the game-changing company in the construction equipment industry," said Zeng Guang'an, chairman of LiuGong Group.

The new global R&D centre will be the new hub that influences LiuGong's four other R&D facilities in India, Poland, the US and the UK. The development of the new R&D centre began in 2013 and the accumulated investment in the project since then has reached RMB270 million. ■



Top and above: LiuGong's new global R&D centre in Liuzhou, China, is another major milestone for the company.

Snorkel's new sales manager for China



Aerial work platform manufacturer Snorkel has appointed Song Wang (left) as its sales manager for China. He will be responsible for all sales activities for Snorkel in the mainland China region, which will include management and development of Snorkel's existing Chinese distributor network, as well as direct sales into key accounts and large rental companies. Mr Song will work closely with the existing Snorkel China team based in Shanghai.

Mr Song has a professional track record and a solid background in aerial work platform sales. He began his career in 2006 as a sales manager for Shanghai Universal Equipment Co Ltd, which was the dealer for JLG in Shanghai and eastern China. From 2013 until joining Snorkel, he held the position of sales director at Shanghai Lovdream Communication Technology Co Ltd, a Qualcomm cellphone design company.

"China remains a strong growth opportunity for the AWP industry and we intend to further develop our presence in the region," said Matthew Elvin, CEO of Snorkel. ■

Mott MacDonald appointed on Forum 66 project

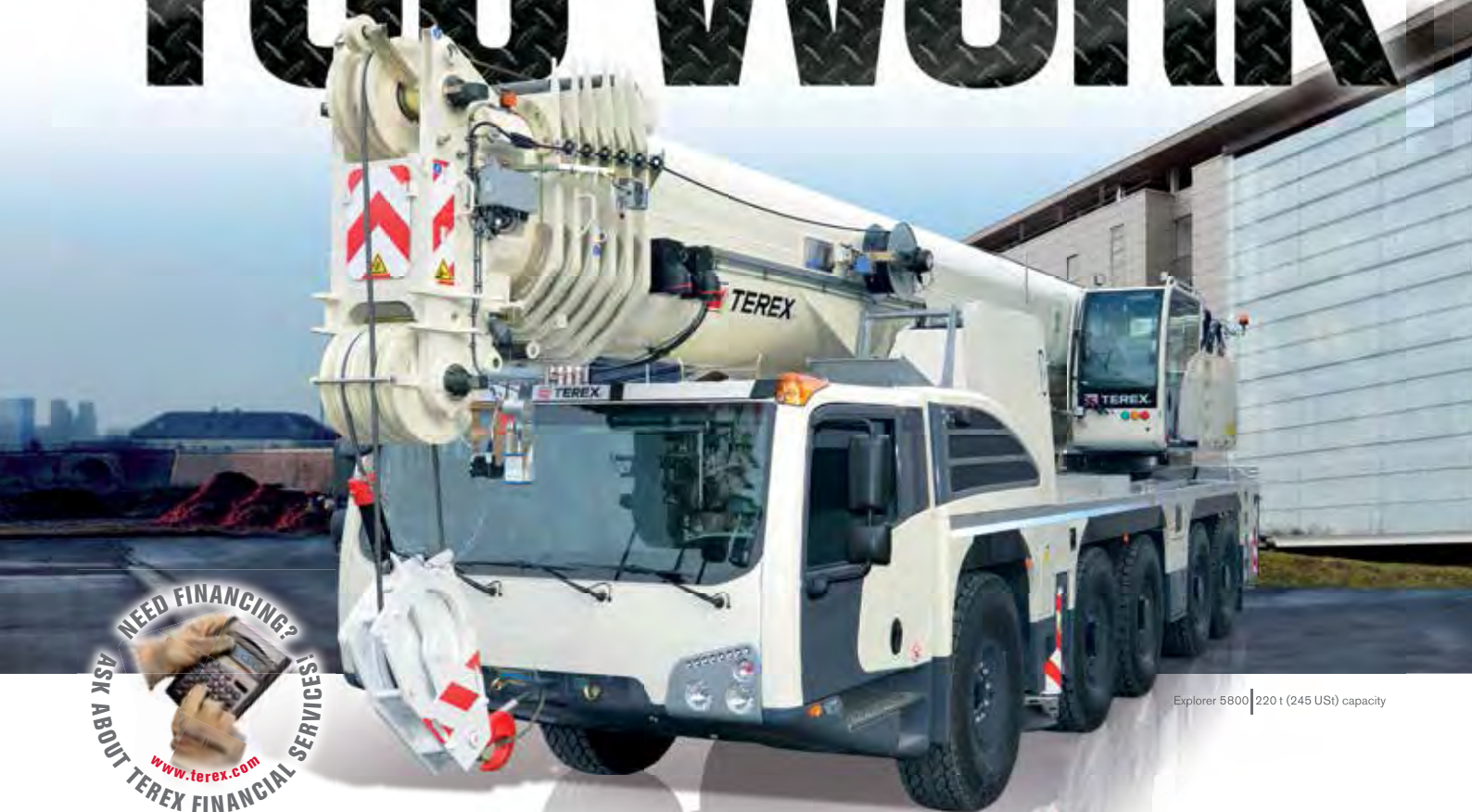
Mott MacDonald has been appointed by Hang Lung Properties to provide facade consultancy services on Phase 3A of the Forum 66 mixed-use development in Shenyang, China.

Forum 66 is the largest of Hang Lung Properties' mixed-use developments currently under development on the Chinese mainland. The 861,240 sq m complex will contain premier shopping facilities, hotels, serviced apartments and offices, as well as a tower which at 350 m high is set to be the tallest building in Shenyang. A metro station will also serve the scheme as part of Metro line 2, which has been constructed under the scheme.

With a total gross floor area of approximately 115,000 sq m, Phase 3A comprises a 104,000 sq m, 67-storey serviced apartment tower that stretches 265 m high as well as a 11,000 sq m three-storey linked retail podium. These sit in a landscaped plaza above five levels of underground parking and building support areas.

"As Shenyang is in the north of China we will need to develop a high performance thermal insulation facade system so it can withstand the extremely cold winters the city faces," said Tim Xiong, Mott MacDonald's project director. Phase 3A of Forum 66 is expected to be completed by the end of 2019. ■

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Middle East growth aims high

According to Timetric's Construction Intelligence Centre (CIC), the construction industry in the Middle East, along with Africa, will be the star performer in the coming five years compared to other major regions in the world. The industry will expand at an annual average rate of 6.9 percent in 2016-2020, an acceleration from 4.9 percent in 2011-2015.

"Much of this will be driven by massive investment in infrastructure, particularly rail networks; both mass transit metro systems in major cities and intra-regional rail links," said Sina Zavertha, economist at the CIC. However, multi-million dollar projects in residential and commercial buildings, particularly in Qatar, UAE and Saudi Arabia, will also contribute significantly to the growth in the industry, as well as enable key cities in the region to develop as top tourism destinations and global business hubs.

Among the most impressive skyscraper projects underway in the region are the Kingdom Tower in Jeddah, Saudi Arabia, which is set to be the tallest building in the world when completed in 2020; Lamar Towers in Jeddah, Saudi Arabia; ADNOC Headquarters in Abu Dhabi, UAE; and Marina 101 in Dubai, UAE.

Other skyscraper projects also include Capital Market Authority



The Kingdom Tower is set to be the tallest building in the world.

in Riyadh, Saudi Arabia; Gate of Kuwait in Kuwait City, Kuwait; Diamond Tower in Jeddah, Saudi Arabia; and Damac Heights in Dubai, UAE. ■

Volvo CE has new dealer in Nepal

Explore Earthmoving Pvt Ltd, part of the Panchakanya Group, has been appointed as Volvo CE's national dealer for Nepal. The company will distribute Volvo CE's full range of excavators, wheel loaders, articulated haulers, road machinery and other construction equipment.

"Nepal is a unique market that presents some interesting prospects. The government is investing in road building and other infrastructure developments, while the hydropower industry is also presenting new opportunities. These projects require good quality, reliable machinery, with the aftermarket support to keep the machines running. In partnership with Volvo CE, this is something we can deliver," said Sushil Shrestha, director of Explore Earthmoving,

Nepal is said to be the world's second most abundant country in terms of inland water resources, thanks to a total water surface of over 818,000 ha. The country has the potential to generate over 727,000 GW-hours of electrical energy with increased investment and the construction of new hydropower operations.

As part of the agreement, Volvo CE will deliver training to Explore Earthmoving's salespeople and service technicians. "Our intention is to build up the business gradually, taking care of existing customers, further developing our aftermarket offering in partnership with Explore Earthmoving and identifying projects where our equipment can be most beneficial," said David Choo, business director for Nepal at Volvo CE. ■

Flowcrete enters Bangladesh market

Flowcrete has entered the Bangladesh market by establishing a dedicated sales presence in the country. The Flowcrete Bangladesh sales team consists of business development manager A. K. M. Mahmudal Hasan and sales manager Mahbulul Alam, both of whom will be based in Dhaka. These two new appointments bring with them a wealth of experience in flooring and the chemical industry and are well placed to introduce Flowcrete's modern flooring technology to the nation's construction sector.

Flowcrete's flooring solutions have been designed to meet the functional, aesthetic and operational demands of large-scale industrial and commercial developments. This versatile product collection includes the Flowfresh range of robust, antimicrobial enhanced polyurethane floors, the rapidly curing methyl methacrylate Flowfast systems and the highly decorative Mondéco collection of seamless epoxy terrazzo finishes. ■

HLG plays role in Kizad Industrial Zone Area A Secondary Infrastructure (Phase 1B) project

The Habtoor Leighton Group (HLG) has been awarded a contract with revenue of AED263 million for the Khalifa Industrial Zone (Kizad) Area A Secondary Infrastructure (Phase 1B) for Abu Dhabi Ports.

HLG, operating as Leighton Contracting Abu Dhabi LLC, will be responsible for the construction of various facilities within a 52 sq km site, including road network (dual and single) and associated traffic signals, streetlights and signage; sewerage network and associated pumping stations; storm network and associated pumping stations; potable water network and associated fire hydrants; process water network; telecom network (containment only); and low voltage and medium voltage network and associated 11 kV substations.

The methodology will include extensive dewatering, excavation, pipelaying and road construction works. The project started in July 2015 and is scheduled for completion in March 2017. ■

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Kobelco Cranes establishes German representative office

Kobelco Cranes has established a representative office in Frankfurt, Germany, which is aimed at strengthening its large crawler crane business.

“In order to develop and grow our overall crawler crane business by 2020, the 300 t class and above is a priority,” said Kobelco Cranes’ president and CEO, Akihiko Tsukamoto. “How quickly and smoothly we can introduce this line is the key. The Frankfurt office will improve our market research and analysis through worldwide ‘Voice of the Customer’ contact from a base in Germany, which we consider the centre of the large size crawler crane market, and where we can expect to establish ties with market leading parts suppliers and outstanding engineering consulting firms.”

Kobelco Cranes, in developing its medium-term plan in March 2014, has set the further growth of its large crawler crane business as one of the priorities, and the establishment of the Frankfurt office will be one of those concrete measures to achieve the goal.

In fiscal year 2015, Kobelco Cranes has begun to take steps for the implementation of its long-term product strategy and the strengthening of the organisation for its large crawler crane business. The tangible execution plan will be reflected in the next mid-term plan starting in April 2016. The plan calls for the business to support a growth in total sales in the future of approximately 30 percent.

Furthermore, the Kobelco subsidiary Kobelco Cranes Europe Ltd, with locations in the UK and the Netherlands, will continue selling and servicing the Kobelco crawler crane lineup from small to very large sizes for their customers throughout Europe. ■



Kobelco Cranes has set up a representative office in Frankfurt, Germany, to strengthen its large crawler crane business.

Liebherr's new logistics centre opens

Liebherr has opened its new logistics centre in Oberopfingen, Germany. It is the new central hub from which Liebherr will supply spare parts for wheeled and crawler excavators, wheel loaders, crawler tractors and other earthmoving machines to its customers around the world.

Until 2013, the management of spare parts supplies was more decentralised. In view of the growing product range and increasingly complex material flows, Liebherr decided to centralise its system, initially organising it from smaller, existing warehouses. In mid-2013, the company finally began to build the new, larger and more modern logistics centre. “Our customer now get their spare parts faster,” said Martin Barth, managing director of the operating company Liebherr-Logistics GmbH. “This important step guarantees that we will remain competitive in the future.”

The new central warehouse has an area of 47,000 sq m, accommodating approximately 100,000 different spare parts for the earthmoving equipment division. “Our modern warehouse technology and order picking systems make it possible to ship 1,600 individual orders to many European countries – almost all of them on the day the order is received,” added Mr Barth.

The location in Oberopfingen was chosen deliberately. Not only is the site directly next to the A7 autobahn, it is also in the immediate neighbourhood of the major production site for Liebherr earthmoving machines in Kirchdorf an der Iller. Other plants from the construction machinery and components divisions in France, Austria and Switzerland are also not far away.

In the final expansion phase in a few years’ time, the site is expected to grow to a total of 360,000 sq m, or more than 50 football pitches, and hall space will be created to secure the logistics processes for the decades ahead. In the long term, the Liebherr Group is planning to merge the spare parts logistics of other construction machinery divisions in Oberopfingen. ■



The new Liebherr logistics centre in Oberopfingen will supply spare parts for wheeled and crawler excavators, wheel loaders, crawler tractors and other earthmoving machines.

Skanska to work on tunnel and road projects in Sweden and Czech Republic

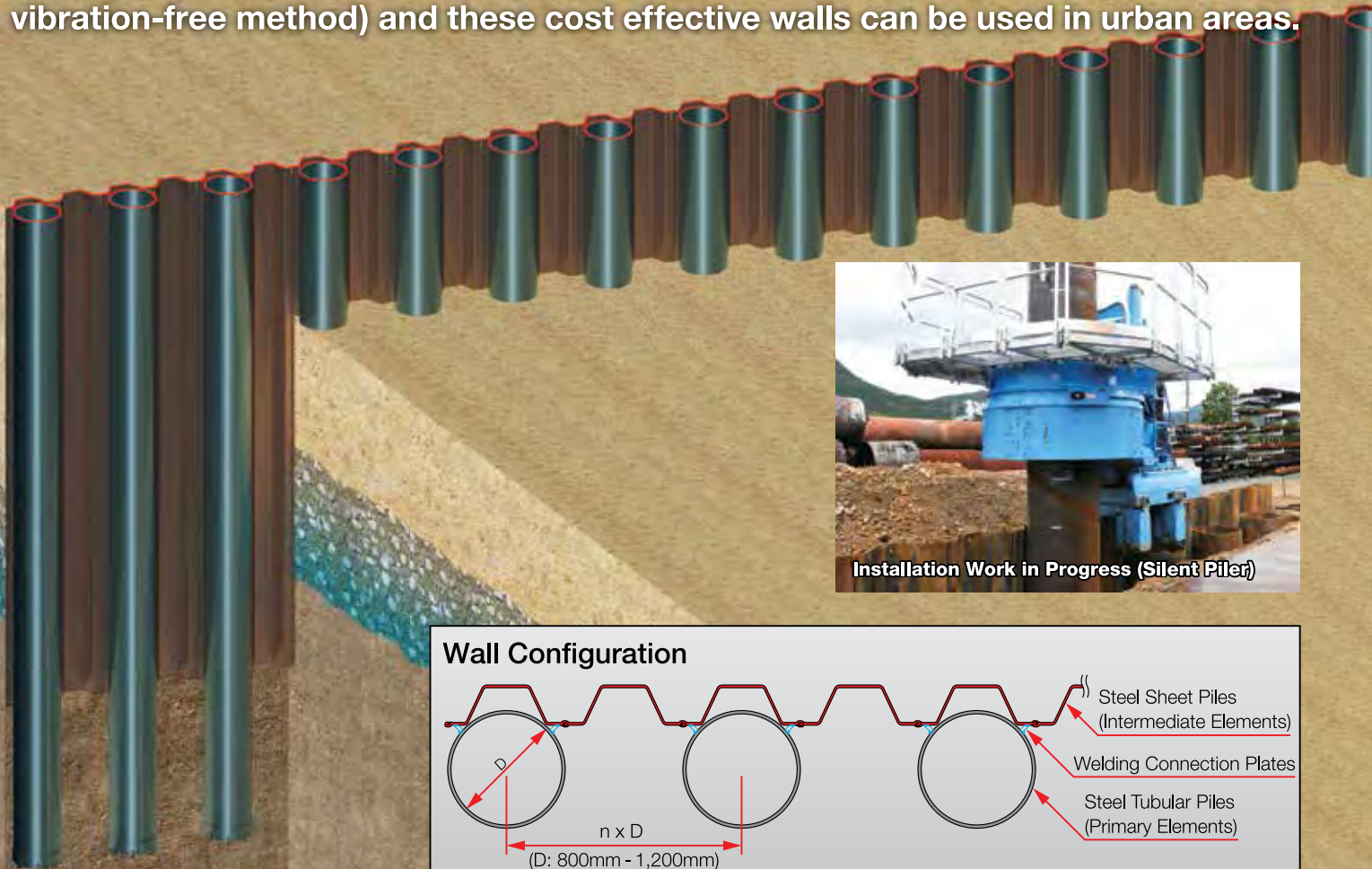
The Swedish Transport Administration has selected Skanska as contractor to build the southern connection of Stockholm Bypass tunnel. The project covers about 350 m of tunnel with two lanes in each direction, southbound connections and a new interchange. Construction work is scheduled to start in the first quarter of 2016, with expected completion in 2021. About 150 people are expected to work in the project carried out as a turnkey contract.

In Czech Republic, Skanska has signed a contract with the Road and Motorway Directorate for construction of a new part of the D1 motorway between Lipník nad Bečvou and Přerov. The project includes construction of 14 km of the D1 motorway, with 24 bridges, three interchanges, more than 7 km of sound barriers and retaining walls. Construction work is planned to start soon and due to be completed in 2019. ■

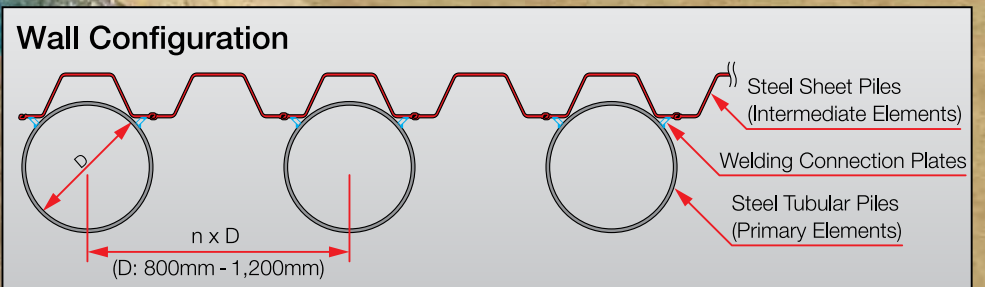
GIKEN COMBI-GYRO WALL SYSTEM

- High Modulus Steel Combined Wall -

The Combi-Gyro Walls are installed by the Press-in Piling Method (quiet and vibration-free method) and these cost effective walls can be used in urban areas.

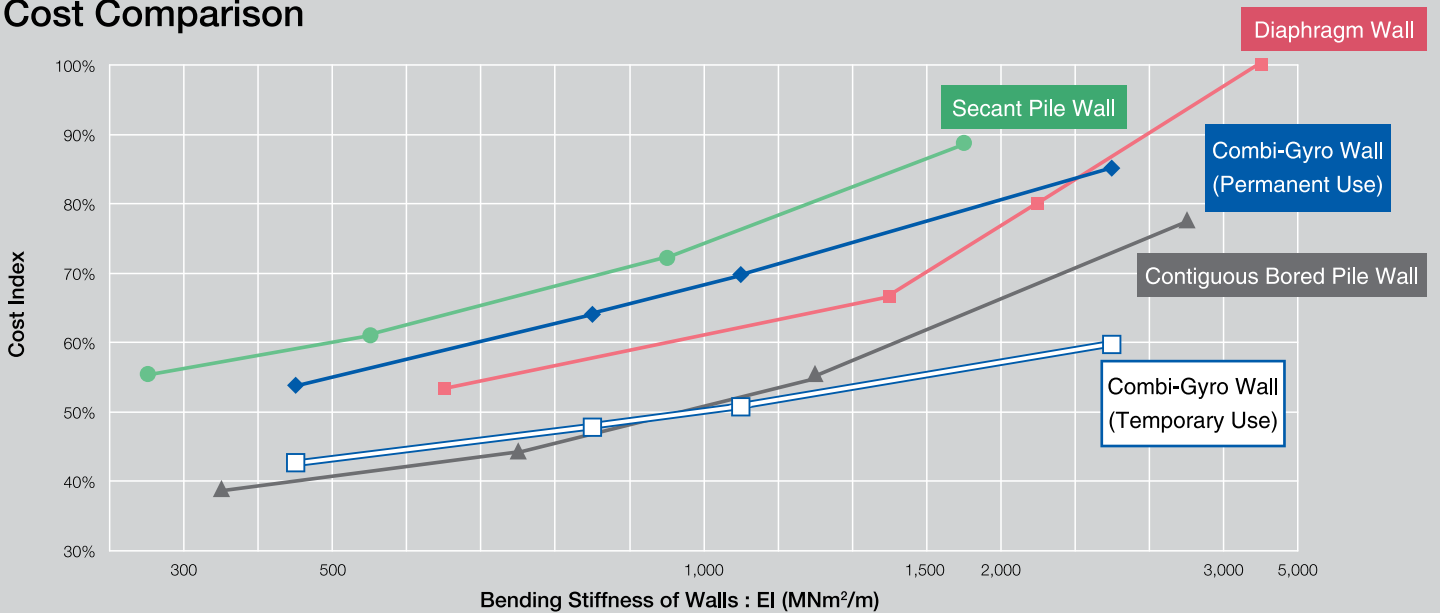


Installation Work in Progress (Silent Piler)



Overview of Combi-Gyro Wall

Cost Comparison



* For the sake of this comparison, "Temporary Use" means a half of the Combi-Gyro Wall is installed, first. And then, after construction the wall is removed and reused in the second phase of the project. This results in cost saving.

Flatiron to design and build Interchange in Canada

Flatiron has secured a contract to design and build a new CA\$203.9 million interchange at Provincial Trunk Highway 59 and PTH 101 in Winnipeg, Manitoba, Canada. The project, for owner Manitoba Infrastructure and Transportation, replaces an existing signalled interchange with a loop ramp interchange.

Work includes seven precast girder bridges (ranging from approximately 40 to 100 m in length), and one cast-in-place box culvert through pass, for a total of eight structures. The project also includes construction of 1.5 mil cu m of interchange embankment, demolition of one existing bridge and roadway updates.

The interchange is a main route for both daily commuters and commercial traffic. The surrounding communities are growing with additional residential developments expected in the near future. The project is designed to alleviate congestion in the short-term, as well as easily accommodate future infrastructure expansion for additional traffic demands. The upgrades will also improve safety at the interchange.

In addition, Flatiron has secured a contract for the Champlain Bridge Corridor Project in Montreal, Canada. The company will be working as part of a consortium to construct the new Champlain Bridge across the St. Lawrence River. Construction work is scheduled to take four-and-a-half years. The new bridge is expected to be complete at the end of 2018 while the remaining parts of the overall route - a total of around 8 km - by the end of 2019.

Flatiron develops innovative solutions to build transportation and infrastructure projects across the US and Canada, including roads, bridges, highways, rail transit, runways, dams, water treatment and storage facilities for both public and private clients. The company delivers projects through a variety of contracting methods, including design-build and public private partnerships. ■

Zapata is now XCMG dealer for Mexico

Zapata has been appointed as the official XCMG dealer in Mexico, distributing XCMG's various equipment including lifting machinery, road machinery and piling machinery, among others.

Located in Mexico City, Zapata is a leading trading company that supplies construction machinery, commercial vehicles, cars, buses, trucks, trailers, etc with a history of 57 years. Zapata has service outlets in 12 major cities around Mexico. ■



An XCMG mobile crane.

Vinci partners with Constructora Concreto in Colombia

Vinci has established a strategic partnership with Constructora Concreto, a leading Colombian construction and real estate development company. The partnership will take the form of a cooperation agreement primarily focused on Colombia's major infrastructure projects going forward. It will have the benefit of Vinci's expertise in concessions and contracting, and can result in the establishment of joint ventures in the various business activities concerned.

The partnership will also involve Vinci's acquisition of a 20 percent stake in Constructora Concreto via a reserved capital increase. Constructora Concreto is Colombia's second-largest construction and property development group, with €320 million revenue in 2014 and 4,800 employees.

"This agreement is a further illustration of the Vinci Group's expansion strategy in countries with high growth potential. Vinci is very proud to be associated with, and to bring its expertise to, an acknowledged leader in the Colombian construction and property development sector. This partnership will enable the Group to take part in and support Colombia's ambitious infrastructure development programme," said Xavier Huillard, Vinci's chairman and CEO.

Vinci's ambition is to put down long-term roots in Colombia, one of the most dynamic countries in South America. For about a decade, the country has regularly recorded annual GDP growth in excess of 4 percent. The construction sector is particularly promising, with volume expected to increase by 5 percent annually in coming years. ■

Terry Dolan joins Ritchie Bros.



Terry Dolan (left) has been appointed as Ritchie Bros.' president for the US and Latin America, based in Chicago, USA. He will have full P&L responsibility for the company's US and Latin America business unit, reporting directly to Ravi Saligram, CEO of Ritchie Bros.

Mr Dolan has over 15 years of executive and general management experience in the industrial sector, including leading national sales, operations and marketing teams. His experience has provided him with a strong background in the construction, agriculture and mining sectors.

Most recently, Mr Dolan was executive vice president for global commercial and industrial products at Generac – a manufacturer of industrial and retail generators and power products. He has also held executive positions at Boart Longyear, a drilling equipment manufacturer and service company to the mining sector, and Ingersoll Rand.

Mr Dolan spent the first decade of his career at Case Corporation, where he excelled in numerous sales and operations roles, including director for strategic accounts, CNH Global; director for regional sales, northern region, CNH Global; and manager for product information and sales training, CNH Global; among other roles. While at Case, Mr Dolan started the company's used equipment business and through this, began a business relationship with Ritchie Bros. ■

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➔ bernhard.kraus@sennebogen.de

SENNEBOGEN

Date	Events in Asia	Organiser & Contact
9 to 12 Sept 2015	Construction Indonesia 2015 Jakarta International Expo Jakarta Indonesia	PT Pamerindo Indonesia/IEM/OES Tel: +65 6233 6777, Fax: +65 6233 6768 Email: violet@iemallworld.com Website: www.constructionindo.com
10 to 12 Sept 2015	Cambuild 2015 Diamond Island Exhibition & Convention Centre Phnom Penh Cambodia	AMB Events Group Tel: +603 4041 9889, Fax: +603 2770 5301 Email: richard@ambexpo.com Website: www.expocambodia.com
10 to 12 Sept 2015	The Big 5 Construct India 2015 Bombay Exhibition Centre Mumbai India	FICCI Tel: +91 882 624 6663 Email: shaurav.pandey@ficci.com Website: www.thebig5constructindia.com
17 to 19 Sept 2015	AseanMach 2015/OneBuild 2015 Putra World Trade Centre Kuala Lumpur Malaysia	One International Exhibition Sdn Bhd Tel: +603 8943 7488, Fax: +603 8943 7599 Email: info@oneinternational.com.my Website: www.oneinternational.com.my
22 to 25 Sept 2015	BICES 2015 New Beijing International Exhibition Centre Beijing China	CCMA, CNCMC and CCPIT - MSC Tel: +86 10 5222 0905/0930 Email: info@e-bices.org Website: www.e-bices.org
7 to 10 Oct 2015	Buildtech Malaysia 2015 Putra World Trade Centre Kuala Lumpur Malaysia	Trade Link ITE Sdn Bhd Tel: +603 7842 9863, Fax: +603 7842 7863 Email: info@tradelink.com.my Website: www.tradelink.com.my/buildtech
13 to 15 Oct 2015	BuildTech Asia 2015 Singapore Expo Singapore	Sphere Exhibits Pte Ltd Tel: +65 6319 4037, Fax: +65 6319 6140 Email: buildtechasia@sph.com.sg Website: www.buildtechasia.com
28 to 30 Oct 2015	Concrete Show Southeast Asia 2015 Jakarta International Expo Jakarta Indonesia	UBM Tel: +62 21 2930 5959, Fax: +62 21 2930 5960 Email: niekke.budiman@ubm.com Website: www.concreteshowseasia.com
4 to 6 Nov 2015	Konstruksi Indonesia 2015 Jakarta Convention Centre Jakarta Indonesia	PT Infrastructure Asia Tel: +62 812 888 11248, Fax: +62 21 391 3349 Email: cheah@infrastructureasia.com Website: www.constructionindonesia.com
25 to 29 Nov 2015	Excon 2015 Bangalore International Exhibition Centre Bengaluru, Karnataka India	Confederation of Indian Industry Tel: +91 97898 08994, Fax: +91 44 4244 4510 Email: excon@cii.in Website: www.excon.in
3 to 5 Dec 2015	Myanbuild 2015 Myanmar Event Park Yangon Myanmar	AMB Events Group Tel: +95 9798435634, Fax: +95 1 254765 Email: darren@ambexpo.com Website: www.myanbuild.net
14 to 16 Jul 2016	LankaBuild 2016 Sri Lanka Exhibition & Convention Centre Colombo Sri Lanka	AMB Events Group Tel: +603 4041 9889, Fax: +603 2770 5301 Email: suraya@ambexpo.com Website: www.lankabuild.org
Date	Events outside Asia	Organiser & Contact
23 to 26 Nov 2015	PMV Live at The Big 5 2015 Dubai World Trade Centre Dubai UAE	dmg events Tel: +971 4 445 3655, Fax: +971 4 438 0356 Email: firasabouttaif@dmgeventsme.com Website: www.pmvlive.com
2 to 5 Feb 2016	World of Concrete 2016 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6379 Email: info@worldofconcrete.com Website: www.worldofconcrete.com







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Photo: 7250S in Singapore
Foundation works to make a bridge pier in pedestrian walkway.

CKE1350G in UK
Using a green engine crane to build a renewable power plant.

Crawler Crane Series

	<p>Multi-purpose lattice boom crawler cranes</p> <p>lifting capacity</p> <p>CKE-G series (European model) 60~250t</p> <p>CK-G series (American model) 85~275t</p> <p>CKS series (Standard model) 60~250t</p> <p>7000S series (Standard model) 120~250t</p>		<p>Large-sized crawler cranes</p> <p>lifting capacity</p> <p>SL-G series (European and American model) ... 300~550t</p> <p>SL-S series (Standard model) 300~550t</p>
	<p>Duty cycle lattice boom crawler cranes</p> <p>lifting capacity</p> <p>BME-G series (European model) 80t</p> <p>BMS series (Standard model) 80~100t</p> <p>BMS1200HD (Standard model) 120t</p>		<p>Telescopic boom crawler cranes</p> <p>lifting capacity</p> <p>TK series 55~75t</p>

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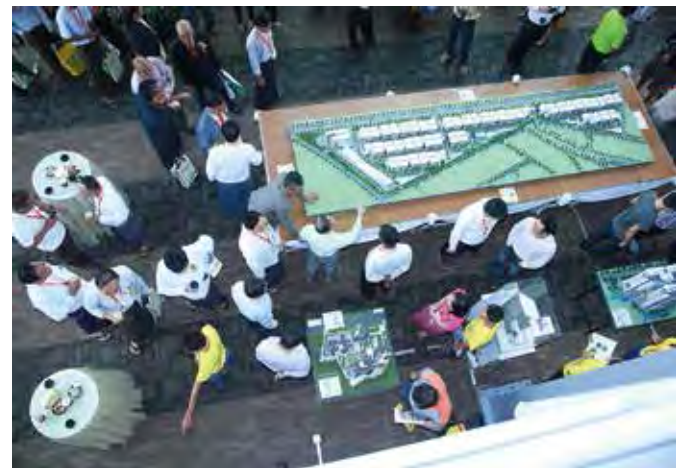
Successful knowledge sharing at BuildTech Yangon 2015

BuildTech Yangon 2015, Myanmar's trade show for the building and construction industry, concluded on 29 May 2015. It brought together over 4,200 exhibitors, speakers, delegates and trade associations from more than nine countries including Germany, Indonesia, Korea, Hong Kong, Malaysia, Myanmar, Singapore, Thailand and Vietnam. Organised by Sphere Exhibits, a subsidiary of Singapore Press Holdings, and co-organised by Myanmar Construction Entrepreneurs Association (MCEA), BuildTech Yangon showcased the latest products and technologies for infrastructure, residential and commercial buildings, transportation, manufacturing and trade development.

During the show, MCEA hosted the Best Construction Entrepreneurship Award. Aimed at encouraging local professionals to elevate construction industry standards and skills of the workforce, the award honoured individuals who were able to incorporate the latest construction technologies into various stages of the supply chain. Award applicants are divided into three categories according to age; Diamond, Gold and Platinum awards were presented in each category. The Diamond award winners were U Wunna Tun from Myanmar Mahar Tun Co Ltd in the 30-40 years category; U Kyaw Soe from Aryone Oo Co Ltd in the 40-50 years category; and MCEA Yangon and MCEA Mandalay (two awards) in the 50-60 years category.

"The Best Construction Entrepreneurship Award is the highest honour that any Myanmar company can aspire to because it signifies that the company uses the most advanced technology and has the potential to grow and evolve at pace with international players," said U Tha Hthay, chairman of MCEA.

In addition, a series of business seminars over the three days of the show saw industry debates and discussions, with leading experts weighing in on hot industry issues related to vertical construction, town planning, sustainable energy, construction law and more. CPD points were also offered so that professionals from the local built environment sector could upgrade their skills and expand their business networks, while at the same time collecting coveted industry points. Among the speakers were Daw Si Than, general secretary, Myanmar Engineering Council (MEngC); Tan Eng Kiat, vice president (Urban Planning & Design), Surbana Urban Planning Group; U Win Khaing, president, Myanmar Engineering Society (MES); and U Tun Naing Aung, joint secretary, Myanmar Industries Association (MIA).



Top and above: The indoor area of BuildTech Yangon 2015.



The outdoor area.

BuildTech Yangon 2015 is supported by six trade delegations and 14 industry associations from across the region. Close to 30 delegates from Singapore's Building and Construction Authority (BCA) were present, besides other delegations from Cambodia, Indonesia, Myanmar, Vietnam and Singapore. The show also offered a one-stop shop for purchasing requirements for the 28-strong trade delegation from Vietnam Association of Building Materials (VABM).

The industry associations supported BuildTech Yangon 2015 included Indonesia's Institute of Architects (IAI), International Power Access Federation (IPAF), Master Builders Association Malaysia (MBAM), Myanmar Engineering Council (MEngC), Myanmar Engineering Society (MES), Myanmar Industries Association (MIA), Singapore Business Federation (SBF), Singapore Institute of Building Limited (SIBL), The Republic of the Union of Myanmar Federation of Chambers of Commerce & Industry (UMFCCI), Vietnam Association for Building Materials (VABM), Vietnam Building Ceramic Association (VIBCA), Vietnam Electronic Industries Association (VEIA), Vietnam Electrotechnical Industry Association (VELINA) and the Workplace Safety & Health Asia (WSH Asia).

The next edition of BuildTech Yangon is planned to be held in May 2016 ■.

Website: www.btyangon.com

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First Construction Climate Challenge summit held in Sweden

The inaugural Construction Climate Challenge (CCC) summit took place on 24 June 2015 in Gothenburg, Sweden, where leading industry representatives, academics and interested stakeholders gathered to discuss the challenges of achieving sustainable construction. The event attracted approximately 150 attendees.

Organised by Volvo Construction Equipment (Volvo CE), the CCC debated issues such as how circular business models and cooperation across the value chain – together with innovations and research – can reduce the climate impact of construction. One of the keynote speakers was Professor Johan Rockström, executive director of the Stockholm Resilience Centre. He urged society to target a maximum increase in global average temperature of 2°C this century and reduce carbon emissions to zero.

“We have reached a tipping point where the earth’s biophysical capacity is no longer sufficient to support mankind’s activities,” said Mr Rockström. “Mankind has become a planetary force for change. To offset this we need a big effort from industry, government and communities in order to keep the planet within the sustainable 2°C limit.”

The summit also saw speakers from the World Wide Fund for Nature (WWF), European Commission, academia, public utilities and leading contractors such as Skanska and Balfour Beatty, as well as participation from leading non-governmental organisations including World Business Council for Sustainable Development (WBCSD) and World Green Building Council (WGBC).

“Collaboration and common language will be the key factors to achieving our environmental target,” said Martin Weissburg, president of Volvo Construction Equipment. “Industry, business, policy makers, legislators and market forces – all of us have a role in this. We have a shared vision – to improve our planet for the next generations. The CCC is designed to break down the barriers to cooperation and communication between our different interest groups. But it has to be more than just words or study, but also be a call to action that leads to meaningful change. I am confident that the motivation exists and we can make a difference.”

Sustainability project

In light of sustainable construction, Volvo CE has also teamed up with Skanska Sweden, the Swedish Energy Agency and two Swedish universities – Linköpings universitet and Mälardalens högskola – to collaborate on a SEK 203 million project that will see the company develop a range of solutions that benefit customers and the environment.



Martin Weissburg, president of Volvo Construction Equipment, host of the summit.



Left: Professor Johan Rockström, executive director of the Stockholm Resilience Centre.

Below: The inaugural Construction Climate Challenge (CCC) summit took place on 24 June 2015 in Gothenburg, Sweden.



Volvo CE has been working on the technologies that will be applied in this project for some time now. The company will continue to develop the concepts in-house before Skanska Sweden incorporates the machines into its operations in 2017 – proving the technology is viable for the industry. The project aims to deliver significant reductions in fuel consumption, emissions and total cost of ownership while also improving productivity.

“This project involves creating new concepts which are part of our long-term future vision,” said Anders P. Larsson, executive vice president of Volvo CE’s Technology function. “The work that we’ll do over the next few years has the potential to change the entire construction industry.”

The Swedish Energy Agency is a government agency for national energy policy issues. It works for the use of renewable energy, improved technologies, a smarter end-use of energy and the mitigation of climate change. “This type of cooperation between Volvo CE, its customers, the government and academic partners allows us to invest in new technologies and explore solutions that are both relevant for our customer base and address future challenges,” said Mr Larsson.

The initiative is jointly funded: Volvo CE is investing SEK 129 million, the Swedish Energy Agency is providing SEK 65 million (it has awarded SEK 59 million to Volvo CE, SEK 5 million to Linköpings universitet and SEK 1 million to Mälardalens högskola) and Skanska Sweden is contributing SEK 9 million. It is due to be completed in 2018. ■

Website: www.constructionclimatechallenge.com

Another 'gateway' to enter Indonesian market

The Big 5 Construct Indonesia 2015 was held from 7 to 9 May 2015 at the Jakarta International Expo, attracting 6,847 suppliers and buyers during the three days. The show presented a wide range of products and technologies for the construction industry.

The Big 5 Construct Indonesia also offered 17 continuing professional development (CPD) workshops for construction professionals. They received a certificate for their participation, which can help increase their competitiveness and qualifications in the industry. Some of the topics discussed at the workshops included MRT development, flood management, Building Intelligence Modelling, smart building and smart city, risk management, import and trade regulation as well as product licensing in Indonesia.

In addition, the show featured The Big 5 Platinum Club, an

exclusive group of senior buyers working on projects worth more than US\$50 million. Over 200 of these industry major players attended, making the event an important part of the construction industry in Indonesia.

The Big 5 Construct Indonesia is organised by dmg events in partnership with a local partner, PT Infrastructure Asia. It is supported by the Ministry of Public Works and Public Housing, Ministry of Trade, and Construction Services Development Board (LJPK). The Big 5 show also runs in the United Arab Emirates, Saudi Arabia, Kuwait and India.

According to dmg events, the next Big 5 Construct Indonesia is scheduled to take place from 11 to 13 May 2016. ■

Website: www.thebig5constructindonesia.com



The Big 5 Construct Indonesia took place at the Jakarta International Expo in May 2015.



The show offered continuing professional development workshops for constructions professionals.

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Reports reveal 1.1 million MEWPs worldwide

There are now 1,120,000 mobile elevating work platforms (MEWPs) in the worldwide rental fleet. This is up 8 percent from the previous year, reveals new research commissioned by IPAF.

The US AWP rental market recorded strong growth of 10 percent in 2014 to reach approximately US\$7.9 billion, according to the IPAF US Powered Access Rental Market Report 2015. The US AWP rental fleet expanded by 7 percent in 2014 to exceed 500,000 units. Strong demand from the construction sector allowed for fleet expansion and rental rates improvement, while balancing the negative impact of decreasing oil prices.

The Chinese MEWP rental market grew at a rate of 25 percent to 30 percent in the past two years to reach approximately 9,000 units.

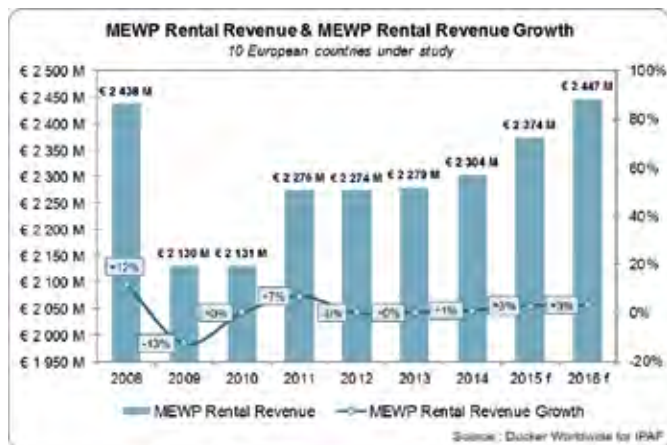
The European MEWP rental market grew slightly in 2014 (+1 percent) and is estimated at approximately €2.6 billion, according to the IPAF European Powered Access Rental Market Report 2015. Fleet expansion continued at a slow pace to reach 285,000 units. The 10 European countries surveyed were Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden and the UK.

Most European countries improved their situation in 2014. France and Finland were the only MEWP rental markets where deterioration continued. Spain and Italy showed signs of recovery after several years of shrinking. The markets in the UK, Germany, Norway and Sweden grew at similar paces, driven mainly by fleet expansion.

The IPAF rental market reports are presented in an easy-to-read format, highlighting key facts and figures for senior management, such as fleet size, utilisation rate and retention period. They include an estimate of the size of the MEWP rental fleet worldwide, with a breakdown by region and machine type.

New aspects covered in the 2015 reports include average payback period by machine type (booms vs scissors), most commonly requested machine features/options, and the impact and consequences of new MEWP regulations and safety standards.

The US report includes Canada. The European report includes seven individual country/regional sections: France, Germany, Italy, the Netherlands, Nordic/Scandinavian countries (covering Denmark, Finland, Norway and Sweden), Spain and the UK. ■



European MEWP rental revenue.

Next IPAF Summits and IAPAs

The next IPAF Summit and International Awards for Powered Access (IAPAs) will be held on 17 March 2016 in Madrid, Spain. In 2017, the events will take place on 4 April 2017; the venue will be announced at the end of the 2016 IAPAs.

The IPAF Summit conference draws together senior representatives from the access industry around the world to discuss and debate the latest technical, safety and business developments in this fast-growing sector. It has built up a tradition of challenging pre-conceptions and providing delegates with valuable take-home messages that contribute toward a professional and safe powered access industry.

The IAPAs are jointly organised by Access International and IPAF. They celebrate and recognise best practice, excellence and innovation in the powered access industry. Award categories range from products and projects, to rental companies and after-sales service. Winners and finalists are chosen by a top-level, independent judging panel. The gala dinner and awards ceremony attract full-capacity audiences of around 450 each year. ■

Website: www.iapa-summit.info



The 2015 IAPA winners.

IPAF to join BICES and Excon 2015

IPAF will demonstrate the importance of wearing full-body harnesses on boom-type platforms at the BICES show from 22 to 25 September 2015 in Beijing, China. The demonstration will be a vivid illustration of the catapult effect and how the use of harnesses with a short lanyard can help prevent operators from being thrown out of the platform in the event of an accident.

During BICES, IPAF will also showcase the benefits of the Smart PAL Card (Powered Access Licence). This machine-readable card can be used together with card readers fitted on machines, which can be set to ensure that only trained operators use equipment on site. An IPAF networking event will be held on 22 September.

In addition, IPAF will be at the construction equipment exhibition Excon in Bangalore, India from 25 to 29 November 2015, at stand 1273, hall 4. ■

Enquiry: sea@ipaf.org

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Powered by a new, fuel-efficient and eco-friendly Scania engine, the HX520 L can perform faster truck loading (by three percent) and faster levelling (by up to six percent). According to Hyundai, the machine has greater fuel efficiency in levelling by up to seven percent and generates 90 percent less particulate matter and NOx.

The HX520 L offers a variety of intelligent electronic support for the operators. The Eco Gauge enables efficient operation by showing engine torque and average, daily and hourly fuel consumption rate; Intelligent Power Control (IPC) manages the fuel pump flow depending on the work environments; and three-mode (power, standard and economy) power control ensures fuel efficiency.

The HX520 L is built to be durable. The robust upper and lower frame structure can endure sustained external shock and high-load work, making it ideal for use in tough working environments such as mining, quarrying and demolition operations. A wear-resistant cover plate placed at the end of the arm minimises abrasion on the connector between the arm and the bucket. Durability of the arm and boom has also been reinforced by as much as 1.8 times, compared to the previous generation 9-series.

For operator comfort and convenience, the HX520 L offers enhanced instrument panel comprised of an extra-wide intelligent cluster with excellent legibility; an integrated haptic type controller facilitating convenient operation; a Wi-Fi link up with the smart phone system; and a radio player, a USB-based MP3 player and an



The HX520 L excavator is one of the models in the new Hyundai HX-series.

integrated Bluetooth hands-free feature allowing convenient phone calls at work or in transit. Plus, the machine has incorporated the low-vibration design with coil spring and damper inside the mount to reduce noise inside the cabin and improve durability.

In terms of safety, the HX520 L is equipped with the Advanced Around View Monitoring (AAVM) system. This system also allows the operator to detect people or dangerous objects within the 5 m range. Furthermore, by using Hi-Mate, Hyundai's proprietary remote management system, the operator and dealer service personnel can access vital service and diagnostic information on the machine from any computer with internet access. ■

Website: www.hyundai-ce.com

Bomag's articulated pneumatic tyred rollers in 4.5 -11 t class

Bomag has developed a new generation of pneumatic tyred rollers in the 4.5 to 11 t class, the BW 11 RH-5. It combines traditional compaction with modern hydrostatic drive, making it ideal for use in earthworks and asphalt construction, compacting stabilised soil layers and rolling chippings on surface dressing.

Unlike larger and heavier pneumatic tyred rollers, this new model is articulated. The central positioning of the articulated joint allows the four rear wheels to roll in the gaps between the five front wheels even when driving round bends. The result is excellent compaction as well as smooth and even surface quality.

The roller also excels on sites where space is limited due to its turning radius of just 2.70 m. The fully hydrostatically driven BW 11 RH-5 features three travel ranges: in the first gear the drive allows maximum gradeability; the second gear can be used universally for different applications; and the third gear with high speeds of up to 25 km/hr is suited to large area outputs.

For ease of operation, the operator's platform with its modern ROPS cab is adopted from the latest generation of single drum rollers and can also be equipped with air conditioning. The driver can readily reach the central steering wheel and dashboard from the swivel seat for the best overview of the site. To increase stability the ballast compartments have been lowered significantly, and likewise the machine centre of gravity. In addition to the hydrostatic braking function, the machine is equipped with a dynamic service brake.

The engine and the hydraulic system are easily accessible from



The new BW 11 RH-5 pneumatic tyred rollers offer high gradeability and maximum speed.

all sides – all maintenance and control points can be conveniently reached from ground level. As all machine joints are maintenance-free, daily or weekly lubrication is no longer necessary. According to Bomag, the BW RH-5 is currently available in Europe and North America; for all other markets, at the end of the year. ■

Website: www.bomag.com



The first Potain MCT 205 topless tower crane in Vietnam at FUVI International's headquarters in Ho Chi Minh City

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Tough, safe and productive Enerpac torque wrenches

The new Enerpac pneumatic torque wrenches have maximum torque capacities from 1,356 to 8,135 Nm. Designed to optimise service life and reduce downtime, these square drive wrenches incorporate low-friction planetary gearboxes to minimise wear and extend uptime. They also feature commonality of motors and parts to facilitate maintenance in demanding industries such as construction, mining, oil and gas, transport, ship building, manufacturing and power generation.

The ergonomic design with weight-distributing handle and simple shape provides easy handling for repetitive tasks while eliminating trap points for fingers and impact hazards with older, imprecise manual tightening methods. The low-vibration design reduces fatigue and the risk of vibration-related injuries, particularly hand (HAV) hazard. The low-noise air motor (under 85 dba) enables quiet, consistent performance for indoor and outdoor applications.

The pneumatic torque wrenches also offer simple operation – just set the air pressure and pull the trigger. Continuous rotation means no time is needed to re-stroke tools, saving time. Other convenience features include easily accessible tightening/loosening switch and standard 3 m hose and standard reaction arm, complemented by a wide assortment of optional custom arms and accessories.

Applications of the pneumatic torque wrenches in power generation and construction/infrastructure projects include hydro, fossil, wind, solar array positioning and turbine bolts, foundation bolts, bearing bolts, turbine casings, blades and tower segments including crane tower. In transport and mining projects, the applications include fixed plant and equipment, track maintenance, undercarriage maintenance, wheel and suspension maintenance, shovel maintenance, trays, pins, as well as flotation cells, mill liners, process equipment including screens, crushers, stackers, reclaimers, diesel engines, pumps, railway tracks, pinions, diffs, etc.

The Enerpac pneumatic torque wrenches are also suitable for oil and gas, metal, water, wastewater and processing equipment industries, as well as for manufacturing, fabrication and process industries.



Enerpac X-Edition S-series square drive (above) and W-series low profile Hexagon (right) torque wrenches.



In addition, Enerpac has extended the safety and durability of its S-series square drive and W-series low profile hexagon cassette torque wrenches with its new X-Edition incorporating additional features that make them easier to use while achieving more uptime.

The latest X-Edition series features a stronger, more durable and safer connection between tool body and manifold,



Top and above: The new Enerpac pneumatic torque wrenches offer maximum torque capacities from 1,356 to 8,135 Nm.

along with a dual plane swivel manifold that has interlocking arms to increase robustness and safety. The X-Edition wrenches are also equipped with tough upgraded handles featuring one-piece design with metal inlays for positive location, as well as an optional ergonomic straight handle design to ensure safety and avoid potential pinch point situations for operators.

The hexagonal drive X types feature a top handle mount on cassettes to help operators attain easier handling of narrow access applications while keeping hands away from pinch points. Productivity is enhanced on the square drive X types by wider reaction arm release levers, making operation simpler in gloved hands.

Productivity is also facilitated by engraved tool markings on the wrenches, including direction-of-turn for tightening or loosening with the square drive series. Moreover, a CE-ATEX declaration for use in explosive environments is provided with each tool. Every Enerpac torque wrench now comes with a certificate of performance (calibration), which provides end users with assurance that the tool meets the stated performance expectations.

Enerpac W-series torque wrenches weigh from 1.4 to 12 kg with a torque from 2,712 to 47,450 Nm. They are complemented by the equally versatile S-series of double-acting square drive wrenches, which extends from 2.7 to 31 kg with outputs of 1,898 to 34,079 Nm. ■

Website: www.enerpac.com

Volvo launches EC300DL excavator in Thailand

Volvo's new EC300DL excavator is designed for heavy duty applications such as road building, truck loading, quarrying and trenching. With the Thai government moving ahead with plans for a multi-billion dollar infrastructure programme, which includes major upgrades to the country's rail and road network, as well as the expansion of ports and airports, anticipated demand for this Volvo excavator is high.

Driving performance on the heavy duty EC300DL is a Volvo D7E engine that has a 169 kW power rating and also delivers excellent fuel efficiency. Productivity is a strong focus, with power from the unit improved by up to 11 percent and torque improved by up to 12 percent compared to its predecessor.

Similarly, breakout force and arm tearout force is also increased by around 3 to 6 percent, offering higher digging power compared to its predecessor. Further enhancing productivity is the Volvo Care Cab, which provides a safe and comfortable working environment that allows the operator to focus purely on the job in hand.

The EC300DL is well-suited to high volume earthmoving. It can offer a maximum digging outreach of 11.32 m and a maximum digging depth of 8 m. For greater flexibility, operators can choose from one of five working modes, each offering varying levels of fuel efficiency and productivity, allowing users to select the right mode for the right job.



The Volvo EC300DL is ideal for heavy duty works such as road building, truck loading, quarrying and trenching.

The EC300DL was officially launched into the Thai market at ItalThai Expo in Bangkok at the end of April, an event to celebrate ItalThai Group's 60th anniversary. The first deliveries to customers are expected to begin shortly. ■

Website: www.volvoce.com

LINNHOF MOBILE ASPHALT MIXING PLANT

As a German manufacturer of asphalt mixing plants since the 1900s, Linnhoff has been committed to constantly innovate and develop more productive, efficient, and environment-friendly asphalt mixing plants. Linnhoff Mobile Asphalt Mixing Plant series (TSD), with production capacities ranging from 60 tph to 120 tph, provides complete mobile solutions for quick dismantling and demobilization needs. To learn more about Linnhoff TSD asphalt mixing plants and their advantages, please contact us.

TSD-1500, Philippines



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— Better Roads with Linnhoff —

Caterpillar's new F-series paver improves fuel economy

Performance improvements and technology with a customer-friendly interface are key benefits of the new F-series pavers from Caterpillar. The machines are powered by a 167 kW Cat C7.1 ACERT engine, which meets European Stage IV and US EPA Tier 4 Final emissions regulations. On some models, a Cat C7.1 engine is also available that meets emissions equivalent to US EPA Tier 3 and EU Stage IIIA, providing power of 186 kW.

Eco-mode is standard on F-series pavers. When used with automatic engine speed control, Eco-mode efficiently manages engine RPMs to optimise fuel economy, reduce sound levels and keep the paver running cool. The control automatically adjusts RPMs when the engine reaches a high load threshold or needs additional cooling.

An integrated generator, the power behind a new screed heating system, is another fuel-saving enhancement. It is directly connected to the paver engine, and operates as a core part of the machine. The SE60 series screeds' refined heat distribution combine with the generator to bring the screed to the proper temperature in approximately 15 minutes, compared with the previous 30-45. The F-series pavers run at about 1,300 rpm while heating.

Touchscreen displays provide increased flexibility for operating and adjusting the machine. New feature controls are accessed through the touchscreen. The new single-switch auto-fill feeder system simplifies setup and helps provide consistency for operators of varied experience and skill levels.

The screed-heating system diagnostics enable uninterrupted paving in the event a screed temperature sensor fails. Ratio control for the conveyors can now be controlled from the screed. Likewise, the tractor operator can now adjust the mix height for increased flexibility. Previously only the tractor operator could control conveyor ratio.

The operator console features enhanced functionality. Crews who prefer limited options have an organised, efficient control system at their fingertips - and mostly in the same locations as on earlier models. Those who want to utilise more functions can do so by accessing various menus through the touchscreens.

Two hopper designs include a standard-entry height and a low-entry height. The length of both hoppers has increased by 90 mm over the previous model, providing more clearance for tailgates on haul trucks. The standard-entry design features an inclined flat floor plate and large tie-down loops on the sidewalls, making it ideal for use with hopper inserts. The design includes a narrowed entry width of 3,224 mm for improved visibility in narrow paving applications. The low-entry design accommodates a wider range of truck heights. It reduces the entry height by 33 mm and maintains the lower height for 529 mm. The hopper is 3,490 mm wide and features improvements that reduce spillage.

The F-series pavers feature innovative undercarriages. Fully-bogied support rollers maintain contact with the surface regardless of irregularities. The oscillating bogies minimise deviations and tow-point movement, leading to smoother mats. The Mobil-Trac System (MTS) features oscillating bogies and a rubber belt instead of the standard steel track. MTS enables travel speeds that match the pace of wheeled pavers.

Wheeled F-series pavers offer six-wheel drive as an option, which utilises enhanced hydraulics to optimise traction and provide 200 percent more front pull force over previous models. A front wheel assist or four-wheel drive option increases front-wheel pull-force by 50 percent over previous models.



Top and above: Several features on the new Cat F-series paver help improve fuel economy while maintaining high performance levels.

Left: The operator console features enhanced functionality.

Three screed options are available: SE60 V, SE60 V XW and the SE60 VT XW. The XW models share common frame structures, with the V XW providing vibratory only and VT XW offering vibratory and tamper bars. The SE60 V screed delivers excellent ride and mat qualities, while providing versatility in urban areas, thanks to its smaller footprint and lighter weight. The SE60 XW-series screeds deliver extremely tight mat textures, with higher densities. The XW-series also features full hydraulic control of crown, extension slope and extension height at the full width of 10 m. This is particularly important in wide-width paving applications to ensure optimal mat texture and density. ■

Website: www.cat.com/paving

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Innovative compaction technology from Ammann

Many of Ammann soil compactors and tandem rollers for road construction feature Ammann Compaction Expert (ACE) technology, which helps operators improve compaction measurements to the point where multiple passes are eliminated. This in turn provides significant fuel savings. There is improved information as to when compaction is achieved, and the operator can quickly move the machine to the uncompacted areas of the jobsite. Having fewer passes also leads to more efficient use of labour and reduced wear on machines.

The ACE technology provides other benefits beyond eliminating passes. These include enabling use of smaller, more efficient machines to deliver compaction force typically associated with larger models; automatic adjustments that quickly adapt to changing conditions and boost productivity in the process; and preventing costly re-work, particularly when compacting multiple layers.

The Ammann technology is an automatic measurement, control and documentation system. ACE systems can be supported with GPS mapping to provide data regarding the areas the compactor has covered. All measured values can be displayed and evaluated, such as the load-bearing capacity of the material, the number of passes, and the frequency and amplitude values.

There are several system variations. ACE^{pro} measures and evaluates the characteristics of the ground and automatically adjusts the amplitude and frequency accordingly, while ACE^{force} measures the absolute value of the bearing capacity of the compacted material.

The systems continually measure for precise evaluation, meaning operators know when compaction is achieved. This helps avoid over-compaction and all the costs associated with unnecessary passes and material breakage.

The operation of ACE is managed via one simple structured display. In operation mode, the display focuses on the most relevant information and indicates the optimal rolling speed. Compaction data is displayed and documented, and can be printed at any time.

ACE also helps both to ensure a homogenous compacted area and to uncover trouble spots early in the process. This is particularly important during compaction of multiple layers. ■

Website: www.ammann-group.com



Many of Ammann soil compactors and tandem rollers feature Ammann Compaction Expert (ACE) technology, which helps operators improve compaction measurements to the point where multiple passes are eliminated.



Above and left: The operation of ACE is managed via one simple structured display. ACE systems can also be supported with GPS mapping to provide data regarding the areas the compactor has covered.

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New Potain MCR 160 luffing jib crane for greater efficiency

The new Potain MCR 160 luffing jib crane from Manitowoc Cranes - which is assembled at the company's Zhangjiagang facility in China - is modelled around Potain MR 160 luffing jib produced in Europe. Offering the same capacity and performance, the MCR 160 can lift a maximum of 10 t and can be rigged with up to 50 m of main jib and offers a 2.4 t jib-end capacity.

The MCR 160 has been engineered to offer maximum versatility in both internal and external climbing configurations. Siting tower cranes inside tall buildings as they are constructed is becoming an increasingly popular building method, especially in markets across Asia. When the tower crane is positioned centrally inside the building (usually inside the elevator shaft), it can cover the entire area of the project more easily. If the crane is erected outside the building, it has to reach further, meaning a much larger crane with a longer jib is usually required. And this inevitably means more cost and longer set-up times for the contractor.

One of the MCR 160's biggest strengths is that it can be assembled on both 1.6 m-wide and 2 m-wide mast sections, making it suitable for internal configuration, even in more limited construction designs.

Adding to the crane's flexibility is the choice of three winches. There is the standard 60 LVF 25 winch, a 45 kW rated hoist that can lift a 2.5 t load at speeds of up to 88 m/min; or the more powerful 75 LVF 25 Optima, a 55 kW rated hoist that can lift the same 2.5 t load at speeds of up to 95 m/min. Rope capacity on the 75 LVF 25 Optima is also larger, with 895 m available versus the 550 m available on the 60 LVF 25. A third option is the 100 LVF 25 Optima winch, offering excellent lift ability and reach. This 75 kW hoist can lift 2.5 t loads at speeds of up to 128 m/min, while the maximum available rope capacity is an impressive 1,270 m, making it perfect for taller buildings.

The MCR 160 is the second Potain luffing jib crane to be produced at Manitowoc's Zhangjiagang facility, joining the MCR 225 A. According to the company, the first units have already begun deliveries to customers.

Potain crane elevators

Manitowoc has also teamed up with Alimak Hek to co-develop new operator elevators for use on Potain's full range of top-slewing tower cranes, including traditional, flat top, luffing jib and special application models.

Two types have already been developed, one that sits internally within the crane's mast, and another that is attached externally. The external elevator is a standard solution that will be adaptable for all Potain cranes, utilising an access kit. The internal elevator, called CabLIFT, is a specially developed solution, designed exclusively for Potain distribution. By installing the CabLIFT internally within the crane's mast, Potain crane owners will benefit from reduced cost of ownership with ease of transport, assembly and storage, and advanced ergonomics for crane operators and service technicians.

Both solutions can be used on all K Mast systems, from 1.6 to 2.45 m wide, and can either be supplied new from the Potain factory, or retrofitted to existing cranes either onsite or at the customer's facility. The elevator solutions can reach a maximum speed of 24 m/min, allowing quick, easy and safe access for all Potain crane operators.

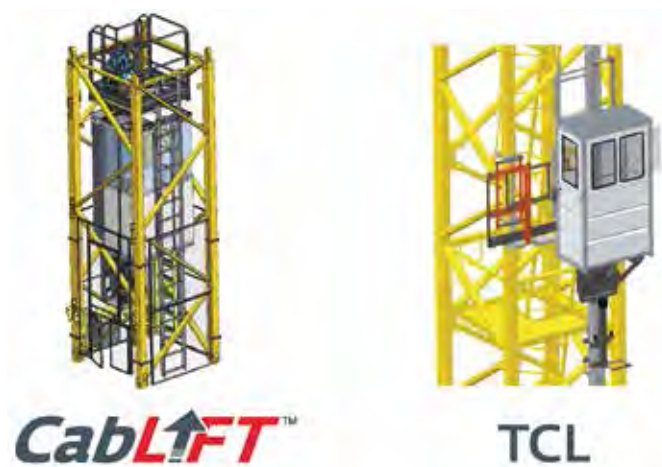
As well as improving access to tower crane cabs for operators and technicians, the new operator elevators offer a simpler mounting process and reduced assembly time.

The new elevator solutions will meet stringent health and safety regulations in Europe, including the latest French Recommendation



Above: The new Potain MCR 160 luffing jib crane offers maximum versatility in both internal and external climbing configurations.

Below: Manitowoc and Alimak Hek have jointly developed new operator elevators for use on Potain top-slewing tower cranes. Two types are available, one that sits internally within the crane's mast (left) and another that is attached externally.



R.459, stating motorised access must be available for operators climbing 60 m or more to the tower crane cab, and from 30 m in the new regulation taking effect in 2017. Both elevator solutions are expected to be available at the beginning of 2016 via the Potain dealer network. ■

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Liebherr unveils new crawler and mobile cranes

With a maximum transport weight of 45 t, the new Liebherr LR 1500 crawler crane can be transported around the world without any restrictions. The central crawler section has a turntable weight of 55 t; the removable A frame allows this weight to be reduced to 45 t. The crane's transport dimension is 3 m in width corresponding to the global transport standard.

The standard base plates on the LR 1500 measure 1.5 m in width. The crane delivers enormous hoist heights since the 84 m luffing jib can be installed on a main boom up to 84 m in length. The 250-t jib head on the luffing jib is also used for SL main boom operation. A 400-t head is available as standard for the S main boom for heavyweight jobs.

The derrick boom is 30 m in length and the derrick ballast is up to 260 t. The derrick radius can be adjusted in a large range from 9 to 16 m. The main hoist gear with its line pull of 180 kN can handle all hoists up to the maximum load capacity. This makes crane operation easier since there is no need for a second winch for dual operation for heavyweight hoists. Another winch with a line pull of 125 kN is only needed if the crane is operated with a runner, said Liebherr.

The lengths of the boom sections are 6 and 12 m. The guide frame for the derrick ballast has been completely omitted from the design. The ballast radius can be adjusted using the derrick boom. The ballast consists of the 10-t plates, which are also used on the LR 1400/2 and LR 1600/2 machines.

To increase the economy, Liebherr has created a smart solution for the central ballast. It consists of just a few concrete sections which can be set up quickly and easily, and whose top section forms a safe catwalk for the undercarriage.

In addition, the new Liebherr LTM 1250-5.1 mobile crane is intended to replace the LTM 1220-5.2. Its load capacity has been increased by around 15–20 percent, whilst the telescopic boom remains at 60 m long. With lattice extensions the maximum hook height has been increased by 9 to 110 m.

The 12.2 to 22 m folding jib can be extended by up to 36 m with 7-m sections. The folding jib is attached with a 0°, 22.5° or 45° inclination. As an option the folding jib can be supplied with a hydraulic adjustment system, which allows it to luff with a full load between 0° and 45°.

It is also possible to achieve a fixed jib of up to 50 m in length with just one additional TF adapter (connection between the telescopic boom and the fixed jib), a reducer section and a head. The existing telescopic boom extensions and folding jib extensions are used for this purpose.

The maximum ballast on the LTM 1250-5.1 is 88 t with a maximum width of 6.3 m. The base plate weighing 1 t and a 10-t ballast plate are the same width as the vehicle. VarioBallast is a new feature for Liebherr. The LTM 1250-5.1 can be operated with two different ballast radii: 5.58 m or 4.78 m. The ballast radius can be reduced by 800 mm using standard mechanically swivelling ballasting cylinders.

The LTM 1250-5.1 has a 12-speed ZF-AS-Tronic gearbox. A two-stage distributor gear permits minimal creeper speeds in manoeuvring mode. The interarder, a zero wear hydrodynamic brake integrated in the



gearbox, acts as a retarder. A Telma eddy current brake is also available as an option. Furthermore, the LTM 1250-5.1 is fitted with pneumatic disc brakes. The rear axles have active electro-hydraulic steering depending on the vehicles speed; this increases the manoeuvrability of the vehicle and drastically reduces tyre wear.

The Liebherr single-engine concept is used on the LTM 1250-5.1, with the superstructure being powered by a mechanical shaft. Gear shafts are routed from the distributor gear in the substructure via two mitre gears through the centre of the slewing ring to the pump distributor gear in the superstructure. A mechanical shaft ensures high efficiency levels and low engine speeds in the chassis engine, providing sufficient power for crane work. The benefits of not having a separate superstructure engine include reduced maintenance work and lower weight, according to Liebherr; the lower weight can be used for load-bearing components, thus increasing the crane's load capacity.

An add-on programme has been developed for the new crane drive concept with just one engine and a mechanical shaft, allowing the machine to be run with low fuel consumption. This means that complete pump drive can be automatically disconnected when the engine is idling and reconnected through the intelligent controller in a matter of seconds when it is required.

Liebherr has also developed a special mode for mobile cranes in the load-sensing range to reduce the cost of crane use whilst also reducing noise emissions. ECOmode minimises both fuel consumption and noise emissions when operating the crane superstructure. ■

Website: www.liebherr.com



Top: The LTM 1250-5.1 mobile crane.

Left: The LR 1500 crawler crane.



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All stainless steel submersible dewatering pumps

Tsurumi has developed pumps with the impeller, casing, motor frame, outer cover, strainer stand and flange made of 316 stainless steel. The pumps are well suited to the quarry and mining industries.

According to Tsurumi, it is important for the parts that come in contact with fluids to be made of stainless steel because runoff and discharge from quarries and mines in recent years have caused pollution in many countries. The company said more than 40 percent of the discharge from mining operations is highly acidic with a pH value less than 4, thus requiring more and more operators to seek out drainage pumps to treat that wastewater.

Tsurumi's all stainless steel pumps have been durably designed and built for use in severe environments that could cause aluminium and cast-iron pumps to break down in a matter of weeks if not days. These all stainless steel pumps are intended to handle both corrosive and alkaline fluids due to unexpected pH spikes; the pumps also stand up to drainage that contains abrasive materials.

The all stainless steel submersible dewatering pumps are applicable not only to quarries and mines, but also to a wide range of fields such as wastewater treatment. Tsurumi also offers seawater-resistant pumps that employ innovative technologies. ■

Website: www.tsurumi-global.com



Above: Tsurumi has developed all stainless steel submersible dewatering pumps for the quarry and mining industries. The pumps are suitable for use in severe environments that could cause aluminium and cast-iron pumps to break down in a matter of weeks if not days.

Left: The all stainless steel submersible dewatering pump model LH8110, with a motor output of 110 kW.

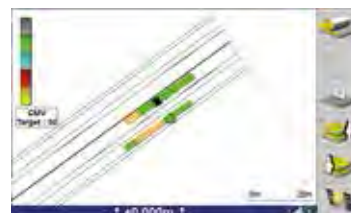
Trimble's new control systems

Trimble has introduced a new version of its GCS900 Grade Control System and CCS900 Compaction Control System with performance improvements for dozers and machine-to-machine communication capabilities for soil, landfill and asphalt compactors.

GCS900 version 12.7 features GradeMax Plus, a new technology that increases the overall performance of dozers by allowing the operator to grade faster and more consistently with tighter accuracy. The system uses the Trimble GS420 Inertial Measurement Unit (IMU) sensor to detect the current rate of acceleration and changes in orientation. Trimble has also increased the rate at which the GCS900 system drives the valves on the dozer for smoother, more consistent control and rapid recovery of the dozer blade so operators can grade higher quality surfaces at even faster speeds. With GradeMax Plus, operators can grade a wider range of complex surfaces without constraints. For example, operators have the freedom to rotate the dozer blade during operation on steep slopes while maintaining constant grading speeds.

CCS900 version 12.7 introduces wireless data share - machine-to-machine communication that gives operators the ability to share mapping data between compactors on the same site in real-time. The machines communicate using a Wi-Fi network via the Trimble SNM940 Connected Site Gateway telematics device. Wireless data share allows each compactor to see the work being done by other compactors in real-time, so operators know which areas have been compacted and which areas still need to be completed. In addition, new layer management functionality allows operators to view the layers or lifts other compactors are working on. The real-time display of this information in the cab enables the operator to achieve more consistent compaction while also reducing the amount of under- and over-compacted areas. This not only improves surface, but can also save time and fuel. The mapping information is synchronised back to the office for progress monitoring and compaction documentation and reporting, using Trimble's VisionLink asset management and project monitoring software. ■

Website: www.trimble.com



Above: GCS900 version 12.7 features GradeMax Plus, a new technology that increases the overall performance of dozers.

Left: CCS900 version 12.7.

XCMG telehandlers and aerial platforms

XCMG has three types of telehandlers, namely XCT670-70, XCT670-140 and XCT680-170.

The XCT670-70 has a maximum lifting capacity of 2,000 kg (at maximum height) and 1,250 kg (with fully extended boom). Powered by a 70 kW Deutz engine, the machine features a lifting height of 7,150 mm, minimum turning radius of 3,880 mm and minimum ground clearance of 400 mm. It has a total weight of 7,850 kg.

The XCT670-140 has a maximum lifting capacity of 3,100 kg (at maximum height) and 635 kg (with fully extended boom). Its lifting height is 13,700 mm, minimum turning radius is 4,238 mm and minimum ground clearance is 370 mm. The machine's total weight is 10,500 kg. It is also powered by a 70 kW Deutz engine.

The XCT680-170 has a maximum lifting capacity of 2,200 kg (at maximum height) and 490 kg (with fully extended boom). The machine offers a lifting height of 16,700 mm, minimum turning radius of 4,860 mm and minimum ground clearance of 400 mm. It is powered by an 82 kW Deutz engine and features a total weight of 13,500 kg.

In addition, XCMG provides aerial work platforms featuring working heights ranging from 12 to 40 m. One of the most popular models is the GKS28E with a working height of 28.2 m, which



Left and bottom: XCMG telehandlers (left) and aerial platforms have been used in construction projects around the world.



is suitable for use in municipal projects. The machine delivers a maximum platform height of 26.5 m and maximum travelling speed of 5.6 km/hr. It is powered by a 63 kW Cummins engine and has a total weight of 17,000 kg. The machine's slewing angle is 360 degree, while its amplitude of variation is between -12 and 80 degree. ■

Website: www.xcmg.com

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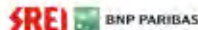
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Solo cut-off saws feature 'intelligent lubrication' system

Solo's cut-off saws, the models 880 and 881, feature ergonomic design, refined technical features and ease of maintenance. Available in both 300 and 350 mm, the units are powered by an 81 cc two-stroke high performance engine. Thanks to an automatic choke system, which eliminates the need for a manual choke, the operator can start the saw easily on every use. The one-push-stop system allows the operator to stop the saw safely, at the touch of a button.

The innovative air filtration system with an external rocker system helps in extending the life of the air filter. Nikasil-coated cylinders and two-ring Mahle-pistons ensure maximum service life expectancy. The anti-vibration system features five steel springs and rubber-coated handles that can significantly reduce user fatigue.

The 881 series utilises Solo's iLube engine – believed to be the world's first 'intelligent lubrication' system – which eliminates the need for pre-mixed gasoline. This is the company's patented system for separate engine lubrication. An electronically controlled pump adds the correct quantity of two-stroke oil, metered to suit the engine speed, to the fuel from a separate oil tank with a volume capacity of 0.32 l. There is no need to pre-mix fuel and oil, thus preventing any risk of incorrect fuelling. The full contents of the separate oil tank are sufficient for up to 20 fuel tank fillings. If there is insufficient oil in the tank, the engine automatically switches to a fault mode that reduces the engine speed to just above idling. This will also



Solo's cut-off saws feature ergonomic design, refined technical features and ease of maintenance.

prompt a change in the engine sound, signalling that it is time to replenish the oil tank. ■

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First Eurotec concrete batching plant installed in Myanmar

Eurotec has successfully installed its first concrete batching plant in Myanmar for the Shangri-La luxury hotel project. The new 347-room hotel is being built on the banks of Kandawgyi Lake in Yangon, and is scheduled for completion in 2016.

The Eurotec 4 MZ4500T plant has been producing concrete since May 2014, rated at 120 cu m per hour. As the project is located in the heart of the city, the plant's pollution control system has been designed in such a way that it can minimise the effect to the surrounding areas. The plant has also been equipped with galvanised features and aggregate feeding system to ensure the quality and efficiency for the whole process. ■

Website: www.eurotec.com.sg



First Eurotec batching plant in Myanmar at work on the Shangri-la luxury hotel project.

Bauer builds foundation for Deutsches Haus in Vietnam

Deutsches Haus in Ho Chi Minh City, Vietnam, is a symbol of the strategic partnership between Vietnam and Germany. It will be the official residence of the consul general of the Federal Republic of Germany, as well as the economic and cultural focal point for German companies and institutions in Vietnam. The 25-storey office building with an area of about 30,000 sq m is scheduled to be completed in 2017. Work on the foundations was carried out by Bauer, through its Vietnam subsidiary, Bauer Vietnam Ltd, from November 2014 to April 2015.

Bauer constructed an 800 mm thick and 45 m deep diaphragm wall using a mechanical grab; a secant pile wall with a diameter of 880 mm and a depth of up to 33 m was simultaneously constructed adjacent to the existing Kumho Tower and the Intercontinental Residence Building. The work also included the construction of eight bored piles with diameters of 1,500 mm and 39 grouted piles with diameters of 2,000 mm – all between 60 and 80 m long – including kingposts for a semi-top-down construction. A Bauer BG 28 and Bauer BG 40 were used for the secant pile wall construction, and a Bauer BG 40 was used to construct the grouted bored piles.

Due to the tight deadline, the bored piles were constructed simultaneously with the secant pile wall and the diaphragm wall. To minimise noise and disturbance



Bauer machines carry out foundation work for the Deutsches Haus in Ho Chi Minh City. The 25-storey office building with an area of about 30,000 sq m is scheduled to be completed in 2017.

to residents in the neighbouring buildings, drilling works were carried out during the day and concreting at night. Owing to the restrictions on heavy traffic movement within the city, deliveries could be made only at

night, which, however, did not affect the project schedule. Bauer completed the work within the planned time frame without any problem. ■

Website: www.bauer.de

XCMG concrete pumps hard at work on Cambodia water project

Three XCMG concrete pumps have been used on a tap water project in Phnom Penh, Cambodia. The machines were in operation for 26 hours non-stop, pumping 1,500 cu m of concrete required for the project.

The contractor selected the 37-m XCMG HB37A concrete pump. Upon receiving the task, XCMG make a detailed plan and the project was completed successfully.

The XCMG HB37A concrete pump, with a rated torque of 1,422 Nm, features a pumping capacity of 138 cu m per hour and is powered by a 265 kW engine compliant with Euro Stage 3 emission standards. ■

Website: www.xcmg.com



Top right and right: Three XCMG HB37A concrete pumps worked for 26 hours non-stop on a tap water project in the Cambodian capital Phnom Penh.

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Auger Torque plays role in Powerlink substation project

Auger Torque recently delivered its high end Earth Drills to the Australian contractor Shannon Civil, including a model 30,000 for a 21 t excavator and a model 20,000 for a 14 t excavator. To go with the Earth Drills, Auger Torque also provided a range of augers and clean-out discs ranging from 750 to 1,500 mm in diameter, as well as a range of extensions so that the required depth of 7 m could be reached.

The equipment is being used during foundation work for a Powerlink substation project, with Shannon Civil responsible for the construction of three stations near Miles in Queensland, Australia. The contractor's task is to bore and pour a large number of 750, 1,200 and 1,500 mm diameter holes ranging in depth from 4 to 7 m. ■

Website: www.augertorque.com.au



Above and below: Auger Torque's Earth Drills being used with 14 and 21 t excavators on a Powerlink substation project in Queensland, Australia.



Skyjack completes Baku Olympic Stadium

Twenty two Skyjack SJIII 4632 scissor lifts were used to help build Azerbaijan's Olympic Stadium for the European Games, located in the country's capital of Baku.

In June 2015, thousands of European athletes gathered at the new arena to compete in the inaugural edition of the European Games - known as Baku 2015. Representatives from 50 different National Olympic Committees of Europe took part in the international, multi-sport event.

The Skyjack SJIII 4632 DC electric scissor lifts were delivered to the jobsite in 2013. During aerial work, when the machines had to fit piping, electricals, water lines and cables, their drivability at full height really came into play. At its working height, the SJIII 4632 reaches 11.75 m with a raised platform height of 9.75 m. In addition, an overall capacity of 317 kg ensures personnel productivity is maximised.

Upon delivery at the jobsite, the SJIII 4632s were used every day for 12 hours at a time, with running times ramping up to 24 hours per day as the completion deadline for the stadium drew closer. The stadium was completed on time and although work is now finished, the machines will remain onsite after the event to assist with other aerial work projects. ■

Website: www.skyjack.com



Above and left: Skyjack SJIII 4632 scissor lifts helped to deliver Azerbaijan's Olympic Stadium for the European Games, which took place in June 2015. The machines will also remain onsite after the event to assist with other aerial work projects.

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Liebherr cranes construct government buildings in Thailand

Four Liebherr luffing jib cranes are being used during construction of Thailand's new Supreme Court building, which is located in the centre of Bangkok's Rattanakosin Island conservation area, near to the Grand Palace.

The new Supreme Court, along with an office for the Courts of Justice, is being built on the site of the earlier Supreme Court complex that had been built in phases, starting from the early 1940s and ending in 1963. Tight restrictions are placed on any building projects within Rattanakosin, and the only type of tower crane allowed for the new Supreme Court was a luffing jib model, ensuring that the crane booms do not overfly the Sanam Luang ceremonial ground in front of the site, or the city moat behind the building.

The new Supreme Court building has been designed by the Faculty of Architecture at Chulalongkorn University, and is being constructed by Sino-Thai Engineering & Construction Pcl. A traditional Thai design theme is being used for the new four-storey structure.

Sino-Thai purchased the Liebherr cranes from its subsidiary company STIT Co Ltd, which is Liebherr's distributor for Thailand. The cranes include two 125 HC-L 6/12 Litronic units and two 112 HC-L units. The 125 HC-L has a maximum lift of 12 t and a 50 m jib that can be angled anywhere between 15 and 70 degrees and slew through 360 degrees under load at only 7 m slewing radius. The 112 HC-L has the same jib angles and slewing ability, with a 45 m jib that can also lift a maximum load of 12 t. The four cranes are expected to be working on site for 12 months.

In addition, a total of 13 Liebherr tower cranes are working on Thailand's new Parliament building, which is being constructed by Sino-Thai on a riverside site in Bangkok. The Liebherr units comprise eight 132 EC-H models, four 200 EC-H models and one 65 K unit. The cranes will be on site for 24 months.



Above and below: Sino-Thai is using Liebherr luffing jib cranes to build Thailand's new Supreme Court, located in the centre of Bangkok's Rattanakosin Island conservation area.



Above and below: Sino-Thai is also using Liebherr tower cranes on Thailand's new Parliament building, which is being constructed on a riverside site in Bangkok.



Sino-Thai's construction manager Pheera Nakwimol said that the cranes have been configured to cover the entire construction area. In some instances the jibs overlap, and different underhook heights have been utilised to ensure safe use. The 132 EC-H is a high-top crane that has a maximum lift capacity of 8 t, and 1.85 t at the full 55 m length of the jib. The 200 EC-H high-top crane can lift 10 t maximum, and 2.4 t at the end of its 60 m jib.

Liebherr's 65 K is a fast-erecting crane that has a maximum load capacity of 4.5 t, and 1.4 t at 40 m. Sino-Thai will deploy this unit in several different locations, with the flexibility of its 14 hook heights, from 15.6 to 51.7 m, allowing installation in areas of heavy craneage. Sino-Thai has only Liebherr tower cranes in its fleet, and is deploying a mix of its own cranes with some units supplied by the rental division of STIT Co Ltd.

The new Parliament building has been designed by a team of Thai architects and engineers from various companies in a joint venture named Sa Ngob. It is located on the outer edge of the Dusit district, in which the present Parliament building is located, and will have a prominent frontage on the Chao Phraya River.

The new Parliament, together with its associated buildings, will have a usable area of about 424,311 sq m and is designed to be one of the prime architectural landmarks in the city. Sino-Thai has been awarded a 12.2 billion Baht (US\$366 million) contract to complete this development in a 900-day period. ■

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Peri 'climbs up independently' at International Towers Sydney

The International Towers Sydney (ITS) high-rise complex in Australia is currently under construction. It forms the centre of the Barangaroo South project, which is being promoted and developed under the lead management of Lend Lease. The development consists of three towers with 39, 43 and 49 storeys respectively, and rises up to a height of 217 m. Together with the three-storey base construction, the building has a total gross floor area of 320,000 sq m.

In order to comply with the tight building schedule, Peri developed a comprehensive formwork and safety concept that is based on the LPS-climbing system. Through the use of mobile hydraulic units, the Peri solution has saved valuable crane time and thus accelerated working operations on this major construction site. In addition, the floor slabs of the base construction could be quickly and cost-effectively formed right from the beginning with the help of lightweight Gridflex aluminium girder grid slab formwork and PEP slab props with the systematic assembly sequence.

The housing with the lightweight LPS climbing protection panel units protects site personnel working in the upper floors under construction against falling. The very light grid elements ensure a high level of safety and wind-protected working areas due to the close-mesh design, while the permeable structure allows enough light into the building and simultaneously reduces the load on the anchoring in the building. For the ITS high-rise complex, the protection panel units are 18.50 m high and provide safe working conditions for up to five floors at the same time.

Thanks to the high flexibility of the LPS system, Peri could easily adapt the screens to suit the respective project-specific conditions as well as the stringent safety requirements. The girder grid units are telescopically arranged here for ensuring variable adaptation to the building floor plan. With the help of customised detailed solutions, even the smallest of gaps can be closed and thus avoided any safety risks during all phases of construction.

In particular, the Peri solution took into consideration the varying floor heights of between 3.80 and 5.50 m. And not least, working platforms on the slab edges with up to 75 cm workspace have ensured that the reinforced concrete slabs could be reliably prestressed.



Key components of the Peri climbing solution are two RCS landing platforms on each tower that have been integrated into the LPS enclosure and supplemented with additional protective meshes.



The three ITS high-rise towers form the centre of the Barangaroo South project in the Sydney harbour area.



Peri LPS enclosure secures and accelerates construction work on the three high-rise towers - up to the final height of 217 m.

The mobile hydraulic climbing devices of the LPS system guarantee a high level of safety along with optimised construction processes. As a result, no crane is required for moving the protection panel units. This speeds up construction progress significantly as forming and concreting as well as climbing can take place at the same time early in the morning. Integrated into the Peri climbing solution are two RCS landing platforms, which serve as temporary storage and moving of materials. Additional safety is ensured by protection panel equipment above and below the RCS platform.

Peri LPS is a weight-saving alternative to conventional, closed enclosures. Similar to the RCS system, the LPS climbing protection panel is also rail-climbed. This means that the units are connected to the building at all times with the help of climbing shoes, also during the climbing procedure – when climbing with or without a crane. The lightweight LPS grid elements can be easily and quickly assembled. In addition, the integrated telescopic function of the grid allows the delivery of complete climbing units in stacks by truck to the construction site. ■

Website: www.peri.com



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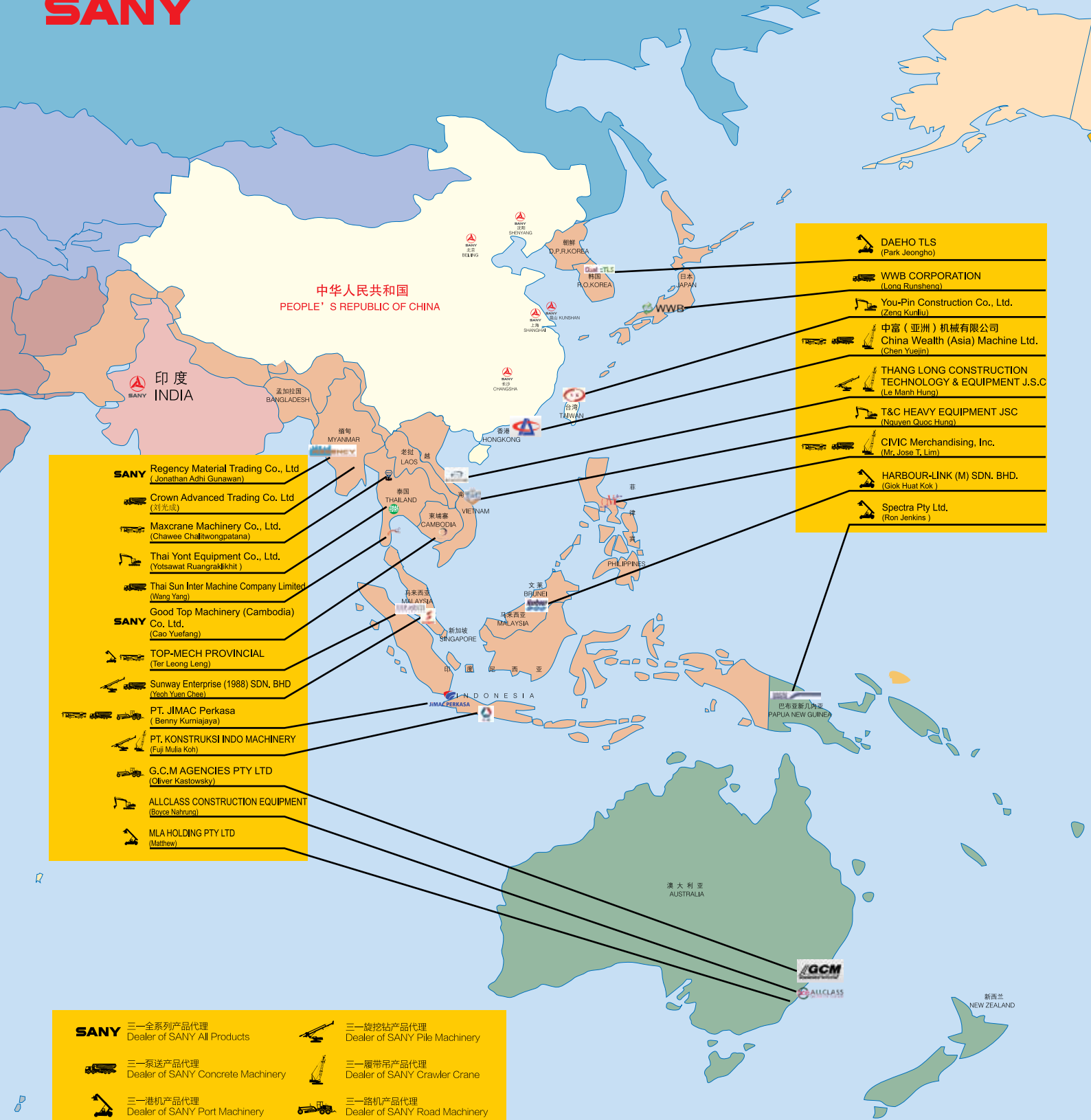
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Potain tower cranes ‘tour’ around Asia

Manitowoc’s first Potain MCT 85 topless tower crane in Cambodia has been put to work in the country’s capital Phnom Penh on the construction of a new building for the Ministry of the Environment. Main contractor on the project is Daun Penh Construction Group Ltd, which purchased the Potain crane through local Manitowoc partner APE Trading and Construction Co Ltd.

Loads for the MCT 85 on the development are all less than 1 t, making it ideal for the job. The crane can lift a maximum of 5 t or 1.1 t at its jib end of 52 m. On the Ministry of the Environment project, the crane is mounted externally and was initially configured at a height of 34.5 m.

In addition to its external set-up on the Cambodia job, the MCT 85 is also designed for internal climbing, where cranes are sited inside the building they are constructing usually within the elevator shaft. Such configurations are believed to be very popular in Asia, and in the case of the MCT 85 it can be mounted on 1.2 m mast sections, allowing it to fit inside even narrowest of elevator shafts. In this set-up, it can be initially configured at a maximum freestanding height of 33.2 m.

The MCT 85 is a practical unit designed for easier transportation, with its entire top portion able to travel on just two trucks. Assembly is easier too as most of the pre-assembly work happens at the factory before the crane is delivered to the customer.

Two Potain MCT 85 tower cranes have also been ordered by Talib & Shamsi Constructions, both of which are working on the DSK Dream City development in Pune, India. The project is being built for DS Kulkarni Developers, covering an estimated 142 ha and includes apartment blocks, leisure facilities and a five-star hotel, all in a self-contained community with its own parks, waterways and transport network.

The two Potain MCT 85 cranes are engaged in the first stage of construction, working with two of Talib & Shamsi Constructions’ Potain MCi 85 A cranes. The four cranes are operating together to build a cluster of eight towers, ranging from 17 to 26 stories, with the tallest reaching a final height of around 110 m. The cranes are lifting a variety of construction materials including the aluminium formwork used to set the concrete. Work began in March this year and this phase of development is expected to last two years.



Potain cranes being used on the DSK Dream City development in Pune, India.



The first Potain MCT 85 topless tower crane in Cambodia has been put to work on the construction of a new building for the Ministry of the Environment in Phnom Penh.



Potain MC 310 K12 top-slewing cranes help to build two tower blocks for phase two of the Shangri La Hotel development in Ulaanbaatar, Mongolia.

Talib & Shamsi Constructions has also ordered two Potain MCT 205 tower cranes, which will be put to work on a 175 m high building in the Parel area of Mumbai. The MCT 205 has a maximum capacity of 10 t, a maximum jib length of 65 m and a jib end capacity of 1.75 t

In Mongolia, two Potain MC 310 K12 top-slewing cranes are currently building two tower blocks for phase two of the Shangri La Hotel development in the country’s capital Ulaanbaatar. The project, valued at approximately US\$274 million, includes a 34-storey residency, a 24-storey office building and an entertainment and retail centre that will reach five stories. Each crane features a maximum capacity of 12 t and is equipped with a 65 m jib; one lifting to a height of 140 m and the other to 110 m. Korea-based crane rental company Liftec supplied both machines to the main contractor, Samsung C&T, on a 24-month contract. Both cranes will be working at the site until December 2015. ■

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Sandvik equipment chosen for Australia quarry and road project

In 2009, Central Queensland Quarries upgraded its main Fairview Quarry fixed crushing plant, adding a Sandvik CH 430 secondary crusher to its existing primary crusher. In late 2014, the company added a Sandvik CV 216 VSI (vertical shaft impactor) tertiary crusher. The three-stage plant is now able to operate at an output of 150 t/hr, producing a wide range of general aggregates and roadbase.

Central Queensland Quarries, which operates throughout Central Queensland, primarily around the Banana, Rockhampton and Central Highlands council regions, provides a range of quality sand and aggregate products from its four quarries. The company's customers include local councils in the region, civil contractors and mining companies, processing materials for use on main roads and infrastructure projects, which account for around 70 percent of its work, as well as mining, oil and gas project works.

While most of Central Queensland Quarries' operations are based around mobile crushing and screening units, its Fairview plant uses the two fixed Sandvik crushing units to deliver high-specification products to meet the increasing demand for higher quality aggregates. More recently however, the local construction industry has begun to upgrade its standards so that although the CH 430 was producing material within specifications, it was at the bottom end of the required specs. As a result, in late 2014 the company decided to purchase a Sandvik CV 216 VSI as its tertiary crusher.

Central Queensland Quarries' Fairview plant is now set up to produce a wide range of products through any combination of its crusher units, depending on industry needs and particular projects at any one time.

In addition, Sandvik roadheaders have been chosen by the Lend Lease - Bouygues Joint Venture (LLB JV) for the NorthConnex highway tunnel project in Sydney, Australia. This new tolled motorway connects the M1 Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills.

When complete, NorthConnex will link Sydney's north to the Orbital network and form part of the National Highway route. The scheme includes twin motorway tunnels around 9 km long, with two lanes and a breakdown lane in each direction, as well as an increased height clearance of 5.3 m with a speed limit of 80 km/hr. Each tunnel will be built with long-term capacity for three lanes, but will initially operate with two lanes and a breakdown lane in each direction.



Sandvik will provide the majority of roadheaders required for the NorthConnex highway tunnel project in Sydney, Australia.



Above: Central Queensland Quarries has recently upgraded its main Fairview Quarry fixed crushing plant with a new Sandvik CV 216 VSI tertiary crusher.

Below: The company also owns a Sandvik CH 430 secondary crusher, which was added to its primary crusher back in 2009.



The LLB JV was formed originally to construct the East West Link project in Melbourne and NorthConnex. The group was the successful bidder on both projects, but following the cancellation of the East West Link project the focus switched to NorthConnex.

Mechanical cutting with roadheaders was deemed the most suitable excavation method for NorthConnex. This was due to the large number of different tunnel profiles (intersections, ramps, shafts) in the project scope, and the accurate excavation profile required. Thirteen out of the 19 roadheaders required for the project are being supplied by Sandvik, and will consist of six MT720 units, one MT620 (from Bouygues' own equipment fleet) and six MT520 units.

The roadheaders selected for the project have been designed to excavate roadways, tunnels and underground chambers continuously without using explosives that cause harmful vibrations. Powered electro-hydraulically, they emit no fumes making them suitable for underground construction projects in urban areas. The roadheaders are equipped with state-of-the-art profile control, automatic sequence control system and online data processing possibilities. The Sandvik roadheaders to be supplied to this project are PLC controlled with profile visualisation system and precise guidance system. ■

Website: www.construction.sandvik.com

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Wirtgen's cold recycling technology for Ayrton Senna Highway

The SP-070 motorway in Brazil - also known as the Ayrton Senna Highway - is an important transport link between São Paulo and Campos do Jordão, Vale do Paraíba and Rio de Janeiro, as well as the main access route to Guarulhos International Airport. Since 2009 it has been operated by Ecopistas.

Structural repairs have been carried out on a 35-km section of the motorway – the stretch between the 11 and 46 km marks – that extends from São Paulo in an easterly direction. The 25-cm cement-bound base course that lies under the asphalt was severely damaged due to the high daily volumes of some 125,000 vehicles in each direction, of which 15 percent comprise heavy goods vehicles.

Both Ecopistas and Fremix Engenharia e Comércio Ltda, the company contracted to rehabilitate the road surface, decided to use recycled material with foamed bitumen, produced in Wirtgen's KMA 220 mobile cold recycling mixing plant.

On working days, the construction work was restricted to an overnight eight-hour window from 9 pm to 5 am to prevent traffic disturbance. The tight timeframe meant that a thick asphalt pavement was out of the question. While the thicker asphalt layers produced in conventional rehabilitation processes need to cool for about four days, Wirtgen's cold recycling technology allowed the pavement to be repaired section by section before being immediately reopened to traffic.

The approximately 10-cm asphalt surface course and the underlying 25-cm cement stabilisation layer, both requiring rehabilitation, were milled out separately and conveyed onto trucks. For this task Fremix used two of Wirtgen's large milling machines, the W 1900 and W 200.

The reclaimed material was transported by truck to a mixing location set up in close proximity to the site. Here, it was crushed using a Kleemann MC 110 Z EVO track-mounted jaw crusher to ensure that the grain size did not exceed 20 mm and that the material had an optimal granulometric composition. Using two Wirtgen KMA 220 mobile cold recycling mixing plants, the reclaimed material was then recycled into a top quality mix with foamed bitumen (BSM).

Loudon International and its engineers were in charge of the mix design and quality monitoring. Working with the technicians from JBA Engineering and Consulting Ltda, they provided support for the preliminary investigations and project execution. Using the results of preliminary tests carried out with the Wirtgen laboratory scale foamed bitumen plant WLB 10 S, the quality of the foamed bitumen and the optimum composition of the mix – obtained in combination with the Wirtgen laboratory-scale twin-shaft compulsory mixer WLM 30 – could be precisely identified before construction work commenced. The formula finally selected comprised 1 percent hydrated lime and 2 percent bitumen.

The hot bitumen is foamed in the expansion chamber of the KMA 220 by adding air and water. This produces foamed bitumen, which is 20 times the volume of the original product. The foamed bitumen is combined with the hydrated lime and the reclaimed material to produce a homogeneous mix. The recycled reclaimed material was paved in two layers: the 20 cm-thick first layer was compacted by both a 14-t Hamm 3414 compactor and a 9-t Hamm HD 90 tandem roller, and then the HD 90 completed the compaction of the 13 cm-thick second layer on its own. The Vögele Super 1300-3 tracked paver was used to apply an unusually thin 2-cm surface course. A Hamm GRW 280 rubber wheeled roller took care of the final compaction of the asphalt mix. ■

Website: www.wirtgen.com.sg



The Wirtgen W 1900 cold milling machine can remove entire pavements comprising the surface, binder and base in a single pass, saving time and ensuring high productivity.



The Wirtgen KMA 220 cold recycling mixing plant features a mixing capacity of up to 220 t/h when producing high-quality cold mix from recycled construction materials.



Above: The Vögele Super 1300-3i road paver is compact, with a high laydown rate and pave width of up to 5 m.



Left: The Hamm GRW 280 rubber wheeled roller completes the final compaction of the asphalt surface course.

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Gomaco performs concrete overlay on Nebraska Link

Darr Link is an important little road connecting Interstate 80 with Highway 30 near Cozad in Nebraska, USA. It was scheduled to receive a new concrete overlay as part of the larger reconstruction of 20.1 km of Highway 30. Darr Link's overlay was scheduled right in the middle of Nebraska's fall harvest and consideration had to be given to the farmers whose fields bordered Darr Link, as well as the daily traffic travelling between the two major highways.

Instead of paving Darr Link in a 7.6 m wide pass, it would be paved half-width, one lane at a time, while allowing access to the fields for the farmers and other traffic. Paulsen Inc is the contractor on the Highway 30 project, and the company brought in its Gomaco two-track GP-2400 paver with Leica Geosystems 3D guidance system for the half-width overlay.

The project was carried out for the Nebraska Department of Roads, approximately 2,377 m long and 7.6 m wide. The road was existing asphalt, but would be updated to concrete for the longevity of it.

About 127 mm of the existing asphalt roadway was milled off, leaving 51 to 76 mm for a base. Then, Paulsen slipformed a new 127 mm thick concrete overlay on top of the milled and swept base. The contractor had used its Leica Geosystems 3D guidance system before on its Gomaco GP-2600 paver, but this was the first time for the GP-2400 and its paving crew.

The concrete for the project was supplied by two of Paulsen's own ready-mix plants located in Cozad and Lexington. Fourteen to 16 ready-mix trucks supplied the GP-2400 paver, each carrying a 7.6 cu m load. The concrete is a state specified 47B mix design with slump averaging 51 mm.



Paving production on the overlay averaged around 1,524 m per day with very little finishing work done behind the paver. Five Leica total stations were used, set up at 91.4 m intervals. Paulsen used a Spanit work bridge outfitted with a cure pump and spray bar to apply a burlap drag finish and white spray cure. The company also modified its Gomaco PS-30 placer/spreader to apply the longitudinal tining on the new overlay.

The Nebraska Department of Roads required longitudinal and transverse joints to be saw cut into the new roadway every 1.8 m. The Department also used the IRI (International Roughness Index) to measure the smoothness of its new concrete roads. ■

Website: www.gomaco.com

Top: Paulsen is slipforming a half-width concrete overlay with its Gomaco two-track GP-2400 with Leica Geosystems 3D guidance system on the Darr Link near Cozad, Nebraska.

Above: The existing asphalt surface of the road was milled off and swept clean before the GP-2400 could slipform the new 127 mm thick concrete overlay.

Left: A Gomaco Spanit work bridge applies the burlap drag and white spray cure while a modified PS-30 applies the longitudinal tining to the new overlay.

HOBAS culverts jacked under Poland railway line

In 2010, the Raba River in Poland overflowed its banks flooding Cikowice and nearby villages. Unfortunately, Cikowice is bordered by a railway embankment to the north, which acted as a dam, causing an additional accumulation of water. The water level on the village side was almost a meter higher than that on the opposite side, an area consisting largely of meadows.

In order to prevent such incidents in the future and enable the outflow of excessive water, a flood prevention programme was initiated in 2014. The project was carried out as part of the modernisation of E30/C-E 30 railway line, which involved the construction of four large culverts beneath the railway embankment. If the water level rose again, the culverts should allow for the water to pass freely to the other side.

HOBAS supplied the required pipes (with an external diameter of 3,000 mm and a length of 34 m each) for the culverts. The pipes' smooth inner surface ensures that flood water - which flows through them and usually contains various impurities - does not lead to siltation. HOBAS pipes also made it much easier to resume jacking works after an installation interruption due to heavy rain: the water causes the sandy soil to become slightly compacted and adhesive, and the thrust force required to restart works after the interruption is usually quite high. Thanks to the smooth outer surface, the necessary forces would be comparably lower and a restart quite easy. Before the start of the jacking works, the rail tracks were equipped with special beams that transferred the load from the trains evenly to the rails in case of any ground movements.

In addition, the structure of the pipes was strong enough that even during their installation the vibration induced by passing trains was not felt inside. The jacking machinery was secured against sliding on the sandy and slippery soil and positioned in a way to install the pipes with a slight slope, so that the water would eventually flow in the right direction. Once a culvert had been jacked through the embankment, its ends were specially prepared: one side was bevelled from the top, while on the uninhabited side of the embankment the culverts were equipped with special flaps, which prevent the backflow of water to the village. The construction of the culverts took around two months. ■

Website: www.hobas.com



To prevent flood occurrence in the Polish village of Cikowice, four culverts with a diameter of 3,000 mm and a length of 34 m each have been jacked under a railway line. HOBAS supplied the required GRP pipes for the project.



The structure of the HOBAS pipes was strong enough that even during their installation, the vibration induced by passing trains was not felt inside.

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Terex all terrain cranes used on Metrorrey Line 3 project

Since 1991, the Monterrey Metro (also referred as Metrorrey) has been serving over 170 million passengers annually in Monterrey, Nuevo León, Mexico. Accommodating more than 480,000 passengers each day, which significantly reduces traffic congestion, this rapid-transit rail system runs partially underground and partially elevated to keep it independent of other traffic.

To continue to alleviate the traffic situation in the city, a third Metrorrey line is under construction. When completed, Line 3 will connect the Line 2 terminus at General Zaragoza northeast to Hospital Metropolitano. Its 26 trains and nine stations are expected to serve an additional 280,000 passengers daily. A consortium of Alstom Mexicana, Constructora Garza Ponce and Constructora Moyeda, a leading construction company in northeast Mexico that specialises in the design and construction of civil works (particularly bridge) projects, was awarded the contract by the State of Nuevo León to construct the 7.5-km long elevated metro line.

According to Constructora Moyeda, having this project in the heart of Monterrey posed some equipment challenges for the crews. They needed cranes with the capacity to erect U girders, as well as with the mobility to lift at one end of the job in the morning and then move a couple of kilometres during the day to erect in different locations in the evening. Each U girder weighed 230 t - believed to be the heaviest precast pieces ever erected in Monterrey - and measured 37 m in length, 1.85 m in height and 5.2 m in width. The girders had to be placed to heights between 15 and 22 m.

Two Terex all terrain cranes were chosen for the project, an AC 350/6 and an AC 500-2. The AC 350/6 has a 350-t capacity and a



Top and above: When completed, the Metrorrey Line 3 will connect the Line 2 terminus at General Zaragoza northeast to Hospital Metropolitano.



Top and above: Terex AC 350/6 and AC 500-2 all terrain cranes being used on the Metrorrey Line 3 project.

64-m main boom length, while the AC 500-2 has a 500-t capacity and a 56-m main boom length. The cranes are also roadable, needing only six flatbeds each to transport the counterweights. In addition, a crew of 12 people can set up the cranes in just three hours, said Constructora Moyeda.

Another challenge that the crews faced while working in the confined spaces of the Monterrey metropolitan area was that Line 3 was to be erected above highway bridges, over pedestrian bridges and between power lines. Existing traffic patterns, old drainage lines and main water lines were also factors the consortium had to consider as they planned for, prepped and executed the project plan.

The original project proposal required the use of a launching gantry; however in order to use this method of construction, it was imperative that the construction sequence was done consecutively from pier to pier. If one pier could not be constructed due to interference all erection would have had to be halted. To circumvent this issue, Constructora Moyeda used the Terex cranes to construct a viaduct, in different fronts at the same time, so maintaining the continuity with a launching gantry was not needed.

According to Metrorrey, Line 3 is due to be commissioned in August 2015. ■

Website: www.terex.com/cranes

Producing asphalt mix with recycled consumer goods

An Ammann Universal High Recycling Technology (HRT) plant was recently used by Downer, an Australia-based company, to produce asphalt mix consisting of 99 percent recycled materials. What made this mix unique was the use of recycled consumer goods, including crumbed tyres and printing toner, which acted as a polymer; and crushed glass, which essentially replaced sand. RAP (reclaimed asphalt pavement) accounted for about 75 percent of the mix. The only non-renewable material in the mix was 1 percent binder.

Downer produced 25 t of the mix at its Bayswater facility in Victoria. The mix was then laid on a two-way access road for a City of Boroondara sporting facility.

Research conducted by Downer shows the use of the recyclables improved the asphalt quality. The company reported a 30 percent improvement in deformation resistance, increasing product ability to resist damage from heavy traffic; a 16 percent increase in stiffness, which improves bearing capacity to carry heavy traffic. This also means a thinner surface can be placed, further reducing emissions; and improved durability and resistance to fatigue cracking due to innovative product design.

Downer manufactures about 2.5 mil t of asphalt per year at its approximately 30 plants. The company said it is hopeful that higher recycling targets are written into future project specifications. Current best practices in Australia include 30 to 40 percent renewable



Ammann Universal HRT plant.

materials, with some limited facilities achieving higher production levels. ■

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Herrenknecht TBMs set pace in London ‘tunnel marathon’

The Herrenknecht tunnel boring machine (TBM) named Victoria recently made a breakthrough at the Crossrail project in London, the UK. It is the last of eight Herrenknecht TBMs which together have dug 42 km of tunnels right through the heart of the city. The other seven TBMs were Elizabeth, Phyllis, Ada, Jessica, Ellie, Sophia and Mary.

Crossrail forms a major new east-west connection through the congested metropolis of eight million inhabitants. Five twin bore tunnels with a total length of 21 km and 10 new stations link existing railway networks to the east and west of London. The new railway will stretch from Reading and Heathrow in the west through central London to Shenfield and Abbey Wood in the east.

The project owner Crossrail Ltd (CRL) commissioned three joint ventures for the construction of five tunnel sections: Bam/Ferrovial/Kier JV for the western tunnels, Dragados/SISK JV for three sections of the eastern tunnels and Hochtief/Murphy JV for the Thames tunnel. Herrenknecht supplied six Earth Pressure Balance (EPB) Shields for the construction of eastern and western tunnels through London clay, sand and gravel. Two Herrenknecht Mixshields excavated the Thames tunnel at depths of up to 15 m below the river bed.

At depths of up to 40 m the TBMs made their way under several housing estates past existing metro lines, sewerage, supply and disposal channels as well as building foundations. The machines with a shield diameter of 7.08 m are 147 m long, weigh up to 1,100 t and have a drive power of up to 1,920 kW. For precision targeted control all eight machines were equipped with navigation systems from Herrenknecht subsidiary VMT.



The two Herrenknecht TBMs, S-719 and S-720, were later known as Elizabeth and Victoria. These machines with a shield diameter of 7.08 m and weight of 1,100 t, are 147 m long and have a drive power of 1,920 kW.



The TBM Victoria being lifted into the Limmo Peninsula launch shaft. It then bored its way from east to west through central London. Over a distance of 8.2 km the TBM drove beneath Soho, Hyde Park and several housing estates.



The TBM Elizabeth achieved a breakthrough on 10 May 2015.



On London's huge Crossrail infrastructure construction site three joint ventures built a total of five tunnel routes in three sections.

Operated by 20 people per shift, 12 people on the TBM, eight on the back-up and above ground, the machines drove 24 hours a day, seven days a week. They achieved advance rates of up to 72 m (45 segment rings) per day.

Crossrail will be a new 118 km metro line connecting 40 stations, 10 of which are new. The journey time from London Heathrow to the main financial centre in the city of London (Liverpool Street) will be shortened from 55 to 32 minutes. About 200 million passengers per year are expected. To deliver the Crossrail project, up to 10,000 workers are active on more than 40 jobsites. Construction started in 2009 and the start-up is scheduled for the end of 2018. The total costs amount to approximately €20.8 billion. ■

Website: www.herrenknecht.com

Sennebogen 643 lays foundation for Royal20 project

The construction company Entrapaulus recently used a Sennebogen 643 telescopic crane to carry out foundation work for the Royal20 project, an eight-storey office building with over 4,500 sq m of usable space on Boulevard Royale in Luxembourg.

Multiple excavators worked 15 m below the surface to remove soil. This excavated soil was then lifted to the surface and loaded onto trucks with the Sennebogen 643. The 40 t crane has a 30 m long telescopic boom and is powered by a 128 kW diesel engine.

Due to space constraints in the middle of the city, the crane's compact dimension was a crucial factor. With an undercarriage length of just 6.87 m and a transport width of less than 3 m, the crane could be easily taken to the job site on a flatbed truck and be positioned close to the pit without obstructing the sidewalk. The Maxcab comfort cab can be elevated up to 2 m, giving the driver an excellent view of the pit and the loading area of the trucks. ■

Website: www.sennebogen.com



A Sennebogen 643 telescopic crane lifts some excavated soil to the surface and loads it onto the truck. The crane is currently helping to construct the foundation of an eight-storey office building in Luxembourg.

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ALL SET FOR BRIGHT FUTURE IN ASIA

Vermeer Asia Pacific was set up in 2007, headquartered in Singapore. During the following years the company invested heavily in various innovations and expansions, leading to its significant growth in the region. Southeast Asia Construction recently talked to Mike Spaur, managing director of Vermeer Asia Pacific, and Todd Judy, managing director of Vermeer SEA (authorised dealer), about the company's latest milestones and activities in Asia, and what the future holds.

1. Vermeer has been really busy in Asia for the last eight years. How important is this region to the company?

Mike Spaur (MS): Asia is a very important region for Vermeer. Some of the largest orders in our history have been in Asia. Because of this, we have made substantial investments in the region for manufacturing, distribution and product support. Over the past five years, we have achieved growth in excess of 10 percent per year and we are planning to more than double current sales in the next five years. Our staff for the Asia Pacific regional office has also more than doubled in the past five years to support this growth.



2. Which are the biggest markets for Vermeer in Asia?

MS: Currently Japan, India and China are our largest markets in Asia, but it is Southeast Asia that has experienced the highest growth over the past two years. In Thailand, for example, there is an abundance of gas installation projects across the country, many of which we have been involved in.

Todd Judy (TJ): Other bright spots in Southeast Asia are Myanmar and the Philippines. We expect an increasing number of fibre cable installations to take place in these two countries. Singapore is also a good market at the moment due to the upcoming Changi Terminal 5 project, where our grinders are being used for biomass recycling.



Above, from left: Mike Spaur, managing director of Vermeer Asia Pacific Pte Ltd; and Todd Judy, managing director of Vermeer (SEA) Pte Ltd.

Left: A Vermeer RTX 550 ride-on tractor works on a fibre cable installation project in Myanmar.

Bottom: A Vermeer grinder being used in the preparation for the Changi Terminal 5 project.



3. Myanmar could be 'the next giant' in Southeast Asia, as the country is now opening up and has been attracting a large number of global manufacturers and investors. How well are you doing over there?

TJ: We entered Myanmar about 18 months ago when a local customer approached us, and since then we have been quite active in the market. We kind of have to start from zero – some of our customers over there had never been around heavy equipment before. So product training is necessary. It is an exciting market, where people are open to new technologies and willing to learn. And because our equipment is simple to operate - everything is automated - inexperienced operators can pick it up easily.

Continued on page 80...



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Continued from page 78...

4. Asia is such a diverse and complex region. How do you compete in this marketplace?

TJ: We try to offer a better way of doing things. We would look at how a job is done and then improve it. This is the Vermeer model.

For instance, compared to that of competitors, our tractor is designed to work in more difficult conditions. It is bigger, but it has many functions – we can put a dirt trencher, rock wheel (micro trencher), or plough on it. Operators can use various attachments with the machine and switch them as conditions change. Plus, our tractor’s wheel can cut through solid concrete, including steel reinforced concrete rebar.

MS: Along with offering high quality and productive equipment, Vermeer has the most extensive dealer network and a large corporate presence in the region. We view our customer relationships as partnerships, and we are committed to providing strong after-sales support with parts, service and technical training.

Vermeer is here for the long haul, and that’s why we are committed to the long-term success and profitability of our customers.

5. You have been in Asia for a while now, what kind of challenges do you face?

MS: Our biggest challenge is introducing new technologies. Vermeer technologies are new concepts for most of these markets, and though they provide a more productive and profitable way of completing a job, sometimes changing the way things have been done for many years is difficult and takes time.

TJ: We have put a lot of effort in educating our customers. We explain to them the advantages of these new technologies over the existing ones. The traditional process is slow and non sustainable - you have to break into concrete manually and often you end up excavating more than you need to. So we have come up with a better solution.

There is also a lack of maintenance skills in the industry – many of our customers don’t take care of their machines properly. This is a wrong mindset! The most durable machines are those that are best maintained.

6. Have you been successful in educating those customers so far?



Top and above: Vermeer tractors’ wheel is specifically designed to cut through solid concrete, including steel reinforced concrete rebar.

Top left: Workers operate a Vermeer RTX 550 ride-on tractor in Guam.

Left: Vermeer’s D20x22 S3 HDD is a compact yet powerful machine.

TJ: As for trenching equipment, we have made good progress in several countries. However, in some countries we are still facing issues. In the HDD sector though, our machines have been around much longer, so our customers are more informed.

7. Moving forward, are you confident in the future of the industry in Asia?

MS: Yes, definitely! As Southeast Asia is one of the areas of highest growth for Vermeer over the past couple of years, we see great potential in the future for our products and

solutions in this region. We will continue to invest in Asia to help our customers be more productive and profitable. We will keep introducing new solutions and expand our after-sales support capabilities both at the corporate and local dealership levels.

TJ: As Mike has explained, we are very optimistic about the future. Some countries will grow and once China has stabilised its economy, other countries like Mongolia will come back. ■

Website: www.vermeer.com

Note: Vermeer Asia Pacific Pte Ltd is a subsidiary of US-based Vermeer Corporation. Vermeer (SEA) Pte Ltd is not part of Vermeer Corporation; it is the exclusive dealer for Vermeer equipment in Singapore, Malaysia, Myanmar, Laos, Cambodia, Vietnam, the Philippines, Bangladesh, Guam, the Northern Mariana Islands and Mongolia. Vermeer (SEA) Pte Ltd was established in 2011 and is based in Singapore.

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Back to school



Top and above: The NTU Learning Hub is a new iconic landmark in Singapore.

The Nanyang Technological University (NTU) Learning Hub in Singapore is iconic for its architecture, moving away from traditional type building design. A cluster of 12 pods that accommodates 56 new-generation corner-less, smart classrooms, the building was conceived by UK designer Thomas Heatherwick and T.Y. Lin International Pte Ltd (TYLI) was the civil and structural engineer for the project.

Many engineering challenges were overcome by TYLI in the project's delivery, from designing a building where the only vertical elements in the building are the four lift and staircase walls to the use of pigmented concrete in the structural elements (the lift and stair core walls) – believed to be a first for Singapore. To develop a cost effective, buildable and safe structural design, the successful delivery of this unique project demanded that the TYLI team think outside the box and work very closely with the designer, architects and other team members. The NTU Learning Hub is slated to welcome students and professors in August 2015.



© Hufon and Crow

Open column frame system

The building footprint grows asymmetrically outwards as it increases in height. As a result, each floor layout is different from the one above and below it. All columns are curved at differing inclinations. Inclination of the columns is grouped together as much as is architecturally acceptable and they are straight and segmental between each floor. Variable curvature floor edges were adopted throughout the eight-storey building to assist in creating space for multiple open areas.

This complex building demanded a structural framing system that overcame engineering challenges in terms of design as well as construction. The structural system adopted was an

Continued overleaf...



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open column frame system with the lateral stability provided by the four lift and stair cores. The system consists of reinforced concrete (RC), with steel structures for the roof and mechanical and electrical enclosures.

The foundation is bored pile system of varying sizes ranging from 600 to 1,100 mm diameter piles, with a 600 mm diameter contiguous bored pile wall as a soil retaining system for the semi-basement at one of the corners of the building. This system was selected due to the good soil characteristics at the site and the methodology minimised noise impacts during the foundation works.

A flat slab system at every floor acts as a horizontal diaphragm tying the vertical elements to provide the rigidity and stability to the building. The flat plate contributed greatly to constructability. The lateral load resisting core walls are arranged in such a manner that the lateral rigidity of the whole building is equally distributed in any direction. This arrangement ensures that the inclined columns in the building



Above and below: The building footprint grows asymmetrically outwards as it increases in height. As a result, each floor layout is different from the one above and below it.



will not take additional axial loads due to the lateral load.

During design development and construction, stability of the structure was one of the key design considerations. In the initial stages, the extent of the overhang per floor was much larger than the completed building which created many long cantilevers and caused instability. Through extensive coordination and collaboration with the design architect, the final optimum structural solution was reached.

The increasing footprint of the building upwards and the varying angles in the columns posed further challenges for the design team, through the introduction of unbalanced horizontal forces to the slab from the axial load in the columns. These horizontal forces are transferred to the lateral load resisting system through the slab. TYLI performed in-depth structural analysis to ensure stability of the building in the permanent stage; proper load transfer; the stress distribution in the slab was within the maximum allowable values; and building was built to the required architectural profile.



The structural system adopted was an open column frame system with the lateral stability provided by the four lift and stair cores. The system consists of reinforced concrete, with steel structures for the roof and mechanical and electrical enclosures.

Continued overleaf...

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Pigmented concrete

Besides the permanent stage design, the methodology and sequence of construction was considered in the analytical model. This building is not like normal buildings; the projection of the floor area is increasing as the building moves up, and the columns are not vertical. At each level, the building only became stable when the floor slab for that level was fully constructed. Thus, a construction stage engineering analysis (for each stage of the construction) was carried out to ensure that the building was built safely and to the required architectural profile.

During the actual construction works, the construction stage and sequence were further refined with the input provided by the contractor and carefully monitored to verify the analytical results. Specialist instrumentation was installed at critical locations to monitor settlement, deflection and twisting of the building during the construction stage right through until the end of the defects liability period. So far, no significant movement has been recorded.

Pigmented concrete was used in the structural elements for the first time in Singapore. This was achieved by adding pigment powder (iron-oxide) to the concrete mix. While the pigment powder can be considered a filler in concrete, research has shown that despite being inert (i.e. does not react with the other components in the concrete),



the technical characteristics of the concrete may be affected because of the physical properties of the pigment (e.g. particle size or shape). To ensure the characteristics of the concrete were not affected, a trial mix design with pigmented concrete up to 1 percent (by mass) was carried out and it was found that the concrete was not affected. Further verification was carried out during construction with in-situ testing. ■



Top and above: Pigmented concrete was used in the structural elements for the first time in Singapore. This was achieved by adding pigment powder (iron-oxide) to the concrete mix.

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SAS 500/550, SAS550/620 (Grade 75) SAS 555/700 (Grade 80)	Reinforcing, Marine Tie Rods, Geotechnic (micropiles, soil nails) - Ø12-75m
SAS 900/1100 (Grade 160)	Formwork, weldable - Ø15mm, 20mm, 26.5mm
ULTS 500/600	Cryogenic Bars - Ø20-32mm
S 450/700 (Grade 60) S 650/800 (Grade 90)	Mining - Ø16-30mm

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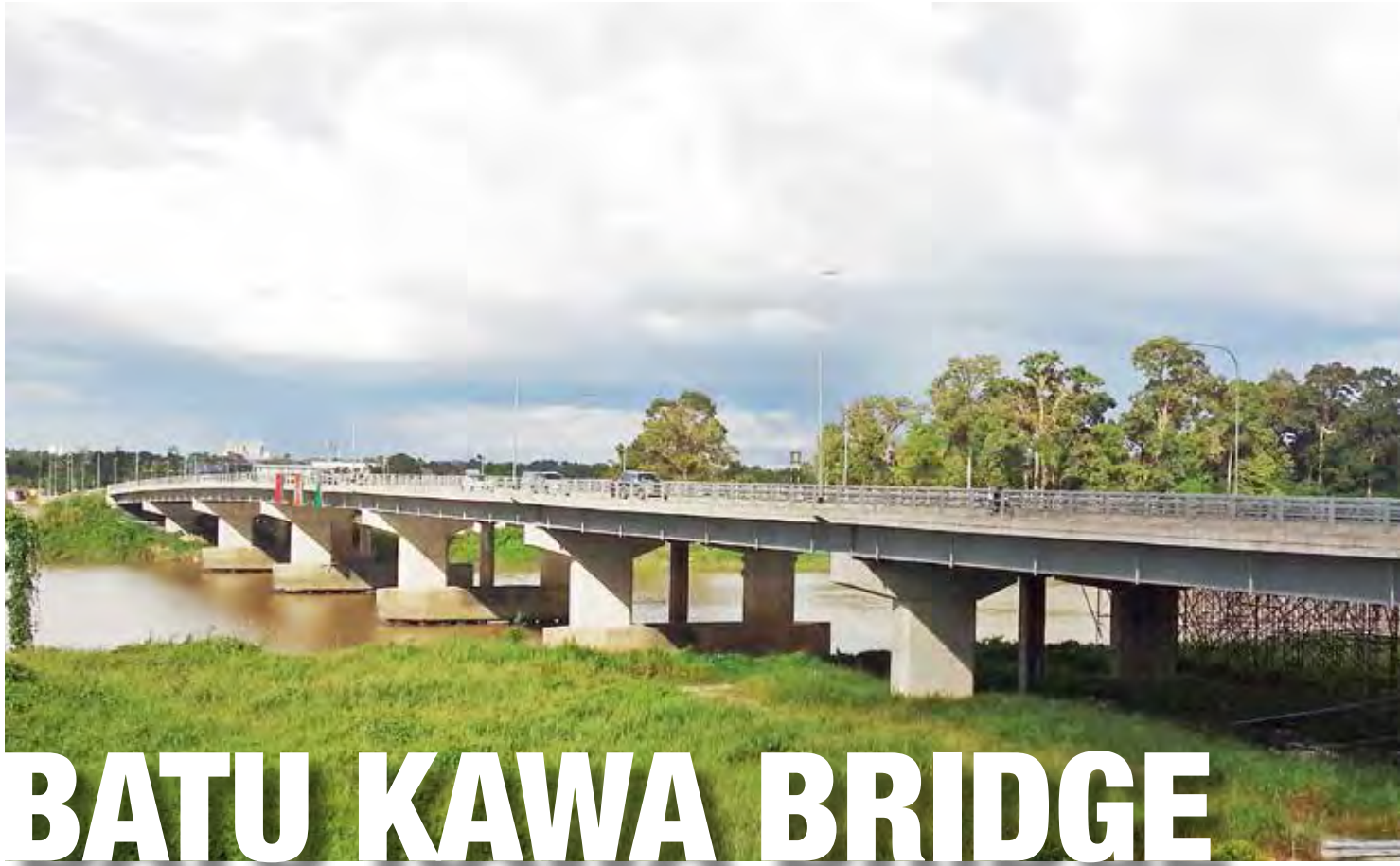
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BATU KAWA BRIDGE

Batu Kawa Bridge is located in Kuching, the capital of Sarawak state in Malaysia. It is one of the only two bridges linking Kuching to the western areas of the state, and has therefore been heavily used and loaded. This eventually resulted in the formation of cracks in the structure.

A refurbishment and structural strengthening was then carried out on the 20 year old, 292 m long bridge in order to repair all cracks and restore its structural

integrity; strengthen the main structural sections and make the bridge safe for increased traffic; and provide protective and decorative coating to the strengthened structure. The project had strict deadlines and was expected to be completed in time for the coming harvest festival. Contractor on the project was Awi Builders Sdn Bhd, which performed the repair work between March and July 2013.

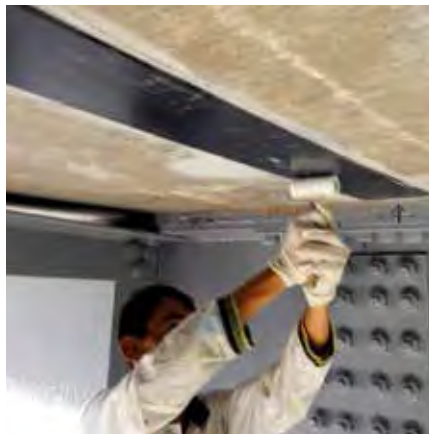
Mapei products were chosen by the

contractor to help complete the job. The Adesilex PG2 SP two-component, thixotropic epoxy adhesive was used to repair the surface cracks; the Epojet LV two-component epoxy resin with very low viscosity was used for injections into microcracks; and the Carboplate pultruded carbon fibre plate was used for structural strengthening. In addition, the Colorite Primer 800 S and Colorite 880 W provided protective and decorative coating. ■

Website: www.mapei.com.my



Pull-off test to check substrate strength.



Installing Carboplate for structural strengthening.



Application of Colorite 880 W to provide protective and decorative coating.



The article courtesy of Rectira Mapet International no. 51



Top and above: Batu Kawa Bridge has recently been upgraded.



Completion of Colorite 880 W application.

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TURKEY RISING



© Eroğlu



Top: At 284 m high, the Skyland Office and Residence Towers are set to be Turkey's tallest buildings upon completion.

Above: Construction of the project is currently underway and is expected to be completed in 2016.

The new Skyland Office and Residence Towers in Istanbul, at 284 m high, are set to be Turkey's tallest buildings upon completion. The Skyland Hotel completes the highrise-triad designed to meet the requirements of modern living, working and playing in the European part of the city. The project is being developed by Eroğlu and built by Alcen. Work started in 2013 and is expected to be completed in 2016.

Formwork technology

The challenge presented by the office tower in terms of formwork technology is twofold. For one, the architects decided on a triangular ground plan and therefore also building core. For another, the risk of earthquakes in Istanbul presents special challenges related to static engineering. Thus, lower level walls are 1.5 m thick; at 100 m they measure 1.1 m, with the wall thickness reduced to 60 cm in the final storeys. Additional stability is created thanks to monolithic construction, where walls and floors are reinforced in one go. Given these demands, Alcen chose Doka formwork technology.



Triangular ground plan provides a challenge in terms of formwork technology. For this reason, the contractor uses Doka's self-climbing Platform SCP. This system allows for fast, flexible and safe forming of any ground plan.

Doka's self-climbing Platform SCP is ideal for the project. Any ground plan can be formed quickly and flexibly with the new version of this modular highrise core forming machine. A few high-performing hydraulic cylinders raise the wall formwork – in this case Doka's Top 50 large-area formwork – along with the working platform in one lift to the next casting section. With its newly developed lifting unit, the Platform SCP now adapts even more flexibly to complex layouts. As well as anchoring the lifting units to the structure on both sides (like in shafts), there is also an extended solution, which makes it possible to transfer the forces on one side only. This makes it easy to use the system where there would not otherwise be enough walls, or where there are openings in the opposite walls.

To further optimise and accelerate the construction progress, Doka experts pulled out all the stops during planning and divided the forming jobs between two platforms. They can therefore be climbed independent of each other to the next casting section and add more flexibility to the processes. Thus, the planned weekly cycle is within close reach.

Apart from that, the self-climbing Platform SCP offers a high level of safety on the entire site. The all-round enclosure of working surfaces allows work to take place safely and unaffected by weather conditions. Giant platform surfaces are ideal for depositing reinforcement and site equipment.

It is not only the building core that benefits from Doka's safety systems. The contractor also relies on the Xelimb 60 protection screen with trapezoidal sheet enclosure for both the Skyland Office Tower and Residence Tower. This flexible enclosure for all highrise projects consists of a hydraulically climbed system that can also be quickly repositioned by crane, provided sufficient crane capacity is available. Protection screens can be dimensioned very flexibly, permitting last-centimetre adjustment to any layout. ■

Website: www.doka.com

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RACING FOR THE CUP

A key part of the preparatory works for the Qatar 2022 FIFA World Cup includes the creation of a new orbital highway and truck route (P023) near the capital city, Doha. The project comprises approximately 56 km of road works, and five main interchanges that will be able to accommodate the projected increase in the area's traffic. Located to the west and south of Doha City, it will further provide connection between three projects of the Expressway Program connecting contracts 1 and 2 of the new orbital highway and truck route together with the East-West Corridor Projects.

The finished expressway, with its truck lanes, will be located to the west of Doha City, linking the New Doha Port and Mesaieed Industrial City in the south with Al Khor in the north. The project includes 22 grade-separated interchanges, which will create a safe, efficient, high speed and high quality highway with free flowing traffic around the outskirts of Doha. It will substantially improve the connection between the Al Rayyan, Al Khor, Lusail and Al Wakra Stadiums.

The project has been awarded to a joint venture company consisting of the Habtoor Leighton Group (HLG) and Al Jaber Engineering. "The orbital highway is a major opportunity for HLG and our joint venture partner Al Jaber Engineering, and we are pleased to have been selected by Ashghal to work in partnership with them to deliver such an important element of national infrastructure for Qatar," said José Antonio López-Monís, HLG's CEO and managing director.

Excavation and groundworks

A project of this size has necessitated a huge amount of excavation and



groundworks, which will forge the road through the hard and medium hard limestone that makes up the local geology. Much of that hard breaking work has been entrusted to five Rammer 5011 hammers that are mounted on Hitachi ZX470 excavators, and a Rammer 4099 hammer mounted on a Komatsu PC400. The aftercare is provided by Rammer local dealer, Arabian Supply Centre.

The Rammer 4099 and 5011 have been designed using the same operating principle that has raised the standards in power to weight ratios, which allows these hammers to be purpose-matched to specific applications for increased productivity and usability. This



Top and above: A key part of the preparatory works for the Qatar 2022 FIFA World Cup includes the creation of a new orbital highway and truck route near the capital city, Doha. The project comprises approximately 56 km of road works, and five main interchanges that will be able to accommodate the projected increase in the area's traffic.

is done by using two simple working mode selectors located on the hammer. The long stroke setting uses a lower blow frequency for optimum breaking in hard materials, such as granite and reinforced concrete foundations, while the short stroke setting delivers higher blow frequency which is ideal for softer materials, such as limestone, as found on the Doha highway project.

The 4099 and 5011 hammers have been designed for low-noise operation and a long, trouble-free life. Simplified and more robust hydraulics feature less valves and greater back-pressure tolerance, making them ideal for a wide range of carriers and hydraulic flow rates. The models utilise long-life, high-tension VIDAT tie rods for improved reliability and lower operating costs. The tool-retaining pins are locked by simple, reliable rubber rings, while the surface of the lower tool bushing has been specifically designed to provide longer tool life.

To further extend their working life, the Rammer hammers are offered with three greasing options: a centralised manual option; carrier-mounted Ramlube I automatic greasing; or Ramlube II, which utilises a cartridge mounted on the hammer to automatically deliver optimum levels of lubrication for greater wear protection and a longer service life. The hammer further comes equipped with Rammer's Ramdata II service indicator that allows operators and service personnel to monitor and log vital service and maintenance information. ■

Website: www.construction.sandvik.com



The project has necessitated a huge amount of excavation and groundworks, which will forge the road through the hard and medium hard limestone that makes up the local geology. Much of that hard breaking work has been entrusted to Rammer 5011 and 4099 hammers.



Five Rammer 5011 hammers are mounted on Hitachi ZX470 excavators, while a Rammer 4099 hammer is mounted on a Komatsu PC400.

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ROAD TO OMAN

Building roads in Oman can be quite difficult due to the rough terrains. The inland desert, Jiddat al-Harasis, covers most of the central part of the country. Towards the coast in the northeast, the desert is hemmed in by a barren mountain range with peaks reaching up to 3,000 m in height; this is where the 35-km-long road project between Bidbid and Sur took place a little while ago. It forms part of the important road between Muscat, the capital city, and the southeast section of the coast. Where economically feasible, tunnels were constructed to overcome the mountain range. In other places, the slopes were blasted away and then stabilised to prevent landslides.

The Omani Ministry for Transport commissioned the construction company Özkar Construction LLC to build the road.



Above: Building roads in Oman can be quite difficult due to the rough terrains.

Left: Slopes up to 20 m high and outdoor temperatures of 40°C were some of the challenges on the recent road project that took place between Bidbid and Sur.

Top: The slopes were stabilised using shotcrete, aided by a Putzmeister P 715 TD concrete pump.

Stabilising slopes

Slopes up to 20 m high and a rugged landscape were some of the challenges on the Bidbid-Sur road project. The slopes were stabilised using shotcrete, with the help of a Putzmeister P 715 TD concrete pump.

The combination of outdoor temperatures of approximately 40°C and 90 m of hose between the pump and the shotcrete nozzle were equally demanding. The concrete consistency had to be adapted precisely to the pump and ambient conditions to ensure that the material remains pumpable and does not harden.

Putzmeister was present on site to provide a supporting role. The company conducted a series of delivery tests with and without fibre admixtures under real conditions to determine the right concrete formulas and make sure the concrete could be pumped over the long distances involved.

The P 715 TD trailer-mounted fine concrete pump is compact and lightweight, making it easy to transport and manoeuvre. This two-cylinder piston pump is driven hydraulically and generates a maximum pumping pressure of 68 bar, while maximum delivery rate of 17.4 cu m/hr guarantees rapid construction progress. The P 715 TD can also be used for pumping anhydrite, cement and cementrite self-levelling floor screed, fine grained concrete with a grain size of 16 mm and pressure pointing mortar.

On rugged sites like the one in Oman, the lightweight, hard-wearing plastic hood repels dust and stone impacts with ease. A stable shutter protects instruments and switches from damage. The chassis and support feet are ideal for these conditions because they are robust and guarantee maximum stability at all times. The large hopper is also well



On rugged sites, the P 715 TD's lightweight, hard-wearing plastic hood repels dust and stone impacts with ease. A stable shutter protects instruments and switches from damage.

equipped for this task.

Besides the Putzmeister fine concrete pump with matching hoses and a 50 mm shotcrete nozzle for a grain size of 8 mm, a compressor with air hose, a chemical tank

with silicate metering pump for the binder and a truck mixer for delivering the fine grained concrete were also used to stabilise the slopes. ■

Website: www.putzmeister.com



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THE EMPTY QUARTER

The Rub' al Khali desert, also known as the Empty Quarter or the 'quarter of emptiness', is believed to be the largest and most barren sand desert in the world, spreading over four Arab nations and covering 600,000 sq km. This includes Saudi Arabia, Oman, the United Arab Emirates (UAE) and Yemen – most of the southern third of the Arabian Peninsula. The desert itself is 1,000 km long by 500 km wide and surface elevation varies from 800 m in the southwest to sea level in the northeast. The terrain is covered with steep sand dunes with heights up to 250 m.

Linking Saudi Arabia and Oman

In 2010, Al-Rosan Contracting was one of the contractors hired to build the first ever road connecting Saudi Arabia and Oman, consisting of a 519 km-long highway. The longest part of the road, which Al-Rosan Contracting was commissioned to build (256 km) comprises a single-lane carriageway and in sections where there are steep inclines, secondary lanes are added for trucks and slower-moving traffic.

"The entire project was a challenge from day one whether it was the climatic conditions, topography of the area, the distance from the nearest inhabited city or availability of spare parts, logistics and services," said Fahad Hazza Aba Alros, general manager of Al-Rosan Contracting.

Trying to build a road on shifting sand dunes was always going to be difficult. The project involved building sand bridges across salt flats and high rising dunes, so the selection of adaptable and reliable equipment was critical for this project, not least because of the aggressive environment, intense heat, sand and remoteness of the site.

To help complete the job, Al-Rosan Contracting opted for Volvo machines, which were supplied by FAMCO (Al-Futtaim Auto & Machinery Co LLC), Volvo CE's exclusive distributor in the UAE and Saudi Arabia.



Top and above: Saudi Arabia has built the first ever highway through the world's largest and most barren desert, the Empty Quarter. The project involved building sand bridges across salt flats and high rising dunes.

"The road through Rub' al Khali is a fine example of how service, product support, customer engagement and on-site maintenance all came together for the contractor. This is a project that is extremely important to Saudi Arabia's infrastructure development," said Paul Floyd, senior managing director of FAMCO Group.

"The challenges were mainly the climate and enormous amounts of sand moving," said Eslam Reddah, workshop supervisor at Al-Rosan Contracting. Volvo Construction Equipment machines were chosen because of their reliability in extreme conditions."

The construction of the 256 km road was completed in sections and involved gigantic amounts of sand 'cut and fill'. The sand transported to construct the bridge was 130 mil cu m, and 12 mil cu m of material was needed to protect the embankment of sand from wind and water.

The equipment was ordered throughout several stages of the project, totalling 95 Volvo machines, including a range of articulated haulers, excavators and motor graders. As the project progressed, a lead excavation team tackled the dunes while aiding the excavation and building of the raised surface and foundations for the road.

“The aim of this project was to directly connect two countries by road for the first time, making it easier for citizens to travel from the borders,” said Fayez M. Subbaheen, project manager at Al-Rosan Contracting.

Hundreds of drivers, excavator operators, technicians and auxiliary workers – almost 600 in total – were employed over the three-year project. They lived in self-contained camps strategically designed with facilities to support this unique development. The remote location, 1,000 km away from the capital Riyadh, presented FAMCO service and maintenance teams with a demanding schedule. This was manifested by the extreme desert temperatures, reaching 50°C degrees in the day and dropping to below 1°C at night.



Volvo machines used on the project included a range of articulated haulers, excavators and motor graders.

Every day the construction team worked 14 hour shifts, excavating and depositing sand that was then compacted using naturally salty ground water. The road was successfully completed and will soon establish a vital connection between Saudi Arabia and Oman.

It is also expected to have a huge beneficial impact for people and businesses travelling between the two countries, as the direct route through the desert will reduce journey times dramatically. ■

Website: www.volvoce.com

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Institutional Buildings Category

ACADEMIA



A 13-storey building at Singapore General Hospital with biosafety labs, an auditorium, offices and common spaces from basement to level 6 as well as a pathology block and research block from level 7 to 13.

• Main constraints:

- A fast track project with limited budget;
- Only access via College Road with high traffic volume;
- Surrounded by hospital wards and medical centres restricted heavy machinery works and operating hours;
- No delivery during patient visiting hours.

• Alternate designs/products:

- Installed drain cell water management system at basement slab to facilitate draining off water to perimeter drain in the external leaf;
- Replaced insitu concrete stiffeners with steel type;
- Used prefabricated steel staircase.

• Notable features:

- Used system formwork with a prefabricated cage rebar and precut rebars;
- Used BIM for managing complex 1,033 t steel structures in housing the massive M&E services at the roof and basement mezzanine;
- Used pre-insulated chilled water pipes and pre-painted fire sprinkle pipes;
- Facade aluminium fin, panel features and steel frames were prefabricated in modules to facilitate installation;
- Used rapid drying self-smoothing screed for higher accuracy in

Project Team

- Builder: Kajima Overseas Asia Pte Ltd
- Developer: Ministry of Health
- Principal Consultant: CPG Consultants Pte Ltd
- Architectural Consultant: CPG Consultants Pte Ltd
- Structural Consultant: CPG Consultants Pte Ltd
- M&E Consultant: CPG Consultants Pte Ltd
- Quantity Surveyor: CPG Consultants Pte Ltd
- Facade Consultant: Aurecon Singapore (Pte) Ltd
- Construction Cost: S\$266.8 million
- Construction Period: 31 months
- Gross Floor Area: 76,279.25 sq m

placing lab equipment.

- Notable achievements:** High CONQUAS score at 94.3 points; BCA Green Mark Gold Plus Award (2012); and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

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Institutional Buildings Category

NUH MEDICAL CENTRE



A 19-storey building and two basements at National University Hospital at 1 Lower Kent Ridge Road.

• Main constraints:

- On top of Kent Ridge MRT station with MRT tunnels running along north-south direction;
- Limited access as two of the three access roads need to remain unobstructed to ambulance at all times;
- Undulating terrain with 15 m height differences;
- Crack control (quality) was a critical requirement to prevent radiation leak for the linear accelerator bunker;
- No tower crane was allowed over MRT station box to lift the mega transfer truss at level 12.

• Alternate designs/products: Replaced all RC lintels and stiffeners with steel.

• Notable features:

- To prevent structural damage to the existing MRT station box, balance excavation was carried out simultaneously on both sides of the station box;
- Specific placement of layers of PBFC and OPC with temperature monitoring to optimise concrete mix design for the construction of bunker. Temporary RC up-stand beams were installed to reduce back-propping during bunker concrete placement for the construction of bunker;
- Adopted a detail room book shopdrawing scheme to customise

Project Team

- Builder: Penta-Ocean Construction Co Ltd
- Developer: National University Hospital (S) Pte Ltd
- Principal Consultant: CIAP Architects Pte Ltd
- Architectural Consultant: CIAP Architects Pte Ltd
- Structural Consultant: T.Y. Lin International Pte Ltd
- M&E Consultant: Parsons Brinckerhoff Pte Ltd
- Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
- Construction Cost: S\$266.3 million
- Construction Period: 27.4 months
- Gross Floor Area: 71,917.61 sq m

equipment installation in each of the 1,724 rooms.

• Notable achievements: High CONQUAS score at 93.5 points; BCA Green Mark Platinum Award (2013); BCA Design and Engineering Safety Excellence Award 2014 – Merit; SSSS Structural Steel Excellence Award 2014 – Merit; and SIA Design Award 2014 – Honourable Mention.



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Institutional Buildings Category

SPECTRA SECONDARY SCHOOL



A specialised school comprising one block of three-storey, two blocks of four-storey and two blocks of six-storey school, ancillary building and one block of three-storey multi-purpose hall/indoor sports hall at Woodlands Drive 64.

• **Main constraints:** Sequencing of the installation of 696 bore piles was critical due to poor soil condition as only one bored pile per rig per day could be achieved.

• **Alternate designs/products:**
 - Changed the first storey's insitu floor and beam to flat slab design;
 - Changed insitu drains to precast;
 - Used PVC drip ledge along edges of free fall roofs;
 - Doubled up the integrated cable tray as lighting support and feature design along common corridors.

• **Notable features:**
 - The first government school project that used BIM;
 - Managed to top 1 m thick soil to PUB required platform level using excavated soil without the need to source from external;
 - Used precast wall system for internal and external walls;
 - Used Aluma system formwork and DFS formwork;
 - Replaced RC stiffener with steel stiffeners;
 - Minimised the use of scaffolding with scissor and boom lifts.

• **Notable achievements:** Highest record CONQUAS score at 96.1 points in Institutional Category; MOM WSH SHARP Award 2013; RoSPA Award 2013 (Silver); First government schools to be awarded BCA Green Mark Platinum; and BCA Green & Gracious Builder Scheme (GGBS) with Excellent Award.

Project Team

Builder: Kwan Yong Construction Pte Ltd
 Developer: Ministry of Education
 Principal Consultant: Architects Vista Pte Ltd
 Architectural Consultant: Architects Vista Pte Ltd
 Structural Consultant: ECAS-EJ Consultants Pte Ltd
 M&E Consultant: Mott MacDonald Singapore Pte Ltd
 Quantity Surveyor: Barton Bruce Shaw Pte Ltd
 Project Management Consultant: SIPM Consultants Pte Ltd
 Construction Cost: S\$32.4 million
 Construction Period: 20 months
 Gross Floor Area: 23,178.88 sq m

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S-CPTu

Civil Engineering Projects Category

ENGINEERING, PROCUREMENT AND CONSTRUCTION OF PRIMARY JETTY AT THE SINGAPORE LNG TERMINAL ON JURONG ISLAND



Construction of the secondary berth with ancillary facilities for Singapore LNG Terminal at Meranti View, Jurong Island. The secondary berth consists of secondary and tertiary jetty.

- **Main constraints:**

- Marine environment and pollution;
- Rehandling of huge volume of reclaimed sand before construction of the jetty resulted in plenty of technical/construction issues.

- **Alternate designs/products:**

- Omitted two mooring dolphins (from six) for the tertiary jetty with alternate design, resulting in significant saving in cost, material and time (four weeks);
- Optimised the design of the mooring dolphins at the secondary jetty, minimising potential risk to the sheet pile retaining structure during operation.

- **Notable features:**

- Incorporated real time kinematic (RTK) global positioning system (GPS) technology into traditional surveying for the marine piling work, improving pile installation productivity and accuracy;
- CEMIII-B cement was used for the ready mix concrete to improve concrete quality and durability in the marine environment;
- Cryogenic reinforcement was installed for the impounding basin structure in order to sustain the $-1,680^{\circ}\text{C}$ low temperature in case of LNG leakage.

- **Notable achievements:**

- By omitting two mooring dolphins for the tertiary jetty it saved 288 cu m of concrete, 80 t reinforcement and 143 t of steel pipe piles or 811 t of CO₂ emission reduction;
- Ahead of schedule by one month.

Project Team

Builder: Antara Koh Private Limited

Developer: Singapore LNG Corporation Pte Ltd

Principal Consultant: Kenneth Chong Eng Teik

Structural Consultant: Kenneth Chong Eng Teik

Marine Specialist: AGF Eddie Consultants Pty Ltd

Construction Cost: S\$25.8 million

Construction Period: 12 months

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Civil Engineering Projects Category

ENGINEERING, PROCUREMENT AND CONSTRUCTION OF SUBMARINE GAS TRANSMISSION PIPELINE ACROSS WEST JURONG CHANNEL



To construct a 1.55 km, 15 m deep submarine tunnel to house a gas transmission pipeline between Tuas and Jurong Island for transporting regasified natural gas from the new Singapore Liquefied Natural Gas Terminal on Jurong Island to mainland Singapore, by crossing the West Jurong Channel.

- **Main constraints:** Highly variable soil profile from soft ground to hard rock formation.
- **Alternate designs/products:** Changed the original dredging and pipe laying design to submarine tunnel design to eliminate obstruction of shipping and environmental disturbances.
- **Notable features:**
 - A dual mode TBM (earth pressure balance and slurry) was used to overcome the potential complications in the highly variable soil condition;
 - Nine intermediate jacking stations spaced between 100 mm and 200 mm were constructed to assist with the pipe jacking;
 - Horizontal alignment was controlled and monitored using a north-seeking gyro-case and a hydrostatic water level system for the tunnel elevation.
- **Notable achievements:**
 - Longest tunnel by single drive pipe jacking in Southeast Asia and fifth longest in the world;
 - The tunnel and shaft works were completed two months ahead.

Project Team

Builder: Ed. Züblin AG, Singapore branch
 Developer: Powergas Limited
 Principal Consultant: WorleyParsons Pte Limited
 Structural Consultant: P Teo Associates Consulting Engineers
 Construction Cost: S\$23 million
 Construction Period: 23 months

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Commercial/Mixed Development Buildings Category

ASIA SQUARE TOWER 2



A 46-storey mixed use development comprising 26 office floors, 17 hotel floors and associated facilities. The retail/pedestrian mall covers two floors and has an attached podium for three levels of carpark/ bicycle parking facilities. The hotel facility is five-star ranking with 305 rooms. The office building is a high quality A grade building.

• **Main constraints:** Very soft reclaimed land, proximity to common services tunnel (CST) and protection of existing 8 m wide PUB drain within the site boundary.

• **Alternate designs/products:** D&B FIDIC Red Book Contract with alternate design to avoid deep basement construction in view of the site constraint.

- **Notable features:**
- Installation of steel trusses at the roof without affecting any structural elements under the enabling works;
 - Two-stage concrete casting method for the transfer plate and transfer beam at the 35th storey;
 - Changed two-way beam to one-way beam design to cater for long-span office layout and standardised floor design between office and hotel, increasing productivity;
 - Fall proof formwork with the use of ACS & RCS safety screens and special two-layer safety catch net to avoid falling objects;
 - Triple low-e coating double glazed curtain walling;
 - Use of district cooling simplified air-conditioning system and space required;

Project Team

Builder: Hyundai Engineering & Construction Co Ltd

Developer: Asia Square Tower 2 Pte Ltd

Principal Consultant: Architects 61 Pte Ltd

Architectural Consultant: Architects 61 Pte Ltd

Structural Consultant: Meinhardt (Singapore) Pte Ltd

M&E Consultant: Meinhardt (Singapore) Pte Ltd

Quantity Surveyor: Northcroft Lim Consultants Pte Ltd

Construction Cost: S\$437.3 million

Construction Period: 30 months

Gross Floor Area: 113,580.00 sq m

- Largest photovoltaic cell (solar panel) installation at the roof for commercial development in Singapore;
- First biodiesel generation plant for commercial development in CBD.

• **Notable achievements:** High CONQUAS score of 95.4 points; BCA Green Mark Platinum Award in 2009; Leadership in Energy & Environmental Design Core & Shell (LEED-CS) Platinum certification by the US Green Building Council; and BCA Green & Gracious Builder Scheme (GGBS) Star.



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Commercial/Mixed Development Buildings Category

CARLTON CITY HOTEL (TANJONG PAGAR)



A 29-storey hotel with 387 guestrooms plus two basements for carparks on Tanjong Pagar Rd/Gopeng St (Outram Planning Area).

• Main constraints:

- Limited site area in CBD surrounded by residential buildings and high traffic volume close to MRT station;
- Construction of the mega structure at transfer floor (4.5 m thick) at level 4.

• Notable features:

- Comprehensive use of precast structures and jump screen at perimeter improved productivity and lower risk;
- A complex floating slab was constructed for holding the massive M&E system at 27-storey, which was directly over the suite rooms;
- Installation of 13,702 sq m of large marble slabs with matching veins;
- Achieved average eight day cycle per floor;
- Used auto climb core wall formwork system;
- Rainwater collection tray was installed at every floor;
- Various customised lifting cage, working platform, temporary stage, etc to improve safety.

• Notable achievements: High CONQUAS score of 94.1 points; BCA Green Mark Platinum Award in 2012; MOM Workplace Safety & Health Performance Award 2013; RoSPA 2013 Gold Award; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Project Team

Builder: Kajima Overseas Asia Pte Ltd
 Developer: Carlton City Hotel (Singapore) Pte Ltd
 Principal Consultant: DP Architects Pte Ltd
 Structural Consultant: T.Y.Lin International Pte Ltd
 M&E Consultant: Beca Carter Hollings & Ferner (SE Asia) Pte Ltd

Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
 Project Management Consultant: Davis Langdon KPK (Singapore) Pte Ltd
 Construction Cost: S\$113.9 million
 Construction Period: 31.5 months
 Gross Floor Area: 19,333.00 sq m

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Commercial/Mixed Development Buildings Category

HOLIDAY INN EXPRESS SINGAPORE ORCHARD ROAD



A 16-storey hotel located on Orchard Road with 221 luxurious hotel rooms. There is a three-storey podium that accommodates the dining hall, common areas and car park.

• Main constraints:

- Heavy traffic and shared access with neighbour site;
- Existing piles deferred foundation design.

• Notable features:

- Contractor played a key role in the design and implementation of Green Mark Platinum features e.g. green wall, roof garden, etc;
- Used self-cleaning paint for all external walls to save water;
- Adaptation of full height netting and catch platform for safety;
- High productivity gained by using Peri system formwork and ST100 for non-typical floor for structural works. Prefabricated reinforcement cages and bars were installed where possible;
- Guest room toilet wall in curved glass and a glass door to serve as shower door and toilet door;
- Introduced the use of hydroball, UV light cleaning, heat recovery wheel, magnetic centrifugal chiller to optimise the efficiency of the cooling system;
- Extensive use of T8 or T5 lighting tubes for the entire project to save electricity;
- Provided alternate storey water supply to reduce and control water consumption.

• Notable achievements: High CONQUAS score of 93.5 points; BCA Green Mark Platinum Award in 2012; MOM SHARP Commendation; BCA Green & Gracious Builder Scheme (GGBS) with Merit Award; and completed one month ahead of schedule.

Project Team

Builder: Kienta Engineering Construction Pte Ltd
 Developer: Valeside Pte Ltd
 Architectural Consultant: JGP Architecture (S) Pte Ltd
 Structural Consultant: JS Tan Consultants Pte Ltd
 M&E Consultant: United Project Consultants Pte Ltd
 Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
 Interior Designer: APSA Pte Ltd

Green Mark Consultant: Kaer Pte Ltd
 Project Management Consultant: Arcadis Project Management Pte Ltd
 Construction Cost: S\$44.6 million
 Construction Period: 26 months
 Gross Floor Area: 7,365.83 sq m



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Commercial/Mixed Development Buildings Category

THE METROPOLIS



Two office tower blocks of 21 and 23 storeys with three basement carparks and two levels of retail units on North Buona Vista Drive. The two office towers are linked up by a skywalk.

• Main constraints:

- Directly adjacent to the underground Buona Vista Station (Circle Line) with basement wall just 2 m from the outer edge of the underground MRT entrance and 6 m from the outer edge of the station;
- Required to construct the 13.5 m deep basement carpark in poor Kallang formation very soft clay soil;
- Phased TOP with requirement to complete Tower 1 in 27 months.

• Alternate designs/products:

- Combined two rows of bored piles with adjacent CBP retaining wall due to proximity;
- Insitu roof perimeter beams, columns and trellis columns changed to precast concrete increased productivity and improved safety;
- The wall was changed to drywall and Acotec panels.

• Notable features:

- Adopted a combination of top down and semi top down construction for the basement construction for strut-free;
- Used Doka system formwork like table form and remote control hydraulic system to lift the core wall formwork;
- Installed table lift to transfer table formwork to new floor, reducing demand for tower crane and enhancing safety;
- Installed tower pile cap above the first storey's slab to allow earlier use of tower crane;
- Used stationary concrete placing boom and table lift system to lift formwork to relief the use of tower crane;
- Used solar panel to reduce demand for electricity.

Project Team

- Builder: Lum Chang Building Contractors Pte Ltd
- Developer: Ho Bee Land Limited
- Principal Consultant: DCA Architects Pte Ltd
- Architectural Consultant: DCA Architects Pte Ltd
- Structural Consultant: KTP Consultants Pte Ltd
- M&E Consultant: KTP Consultants Pte Ltd
- Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
- Landscape Consultant: Cicada Pte Ltd
- Facade Consultant: Arup Singapore Pte Ltd
- Lighting Consultant: Lighting Planners Associates (S) Pte Ltd
- Acoustic Consultant: Shen Milson & Wilke (S) Pte Ltd
- Traffic Consultant: Aecom Singapore Pte Ltd
- Green Mark Consultant: G-Energy Global Pte Ltd
- Security Consultant: SKM (Singapore) Pte Ltd
- Arborist Consultant: ArborCulture Pte Ltd
- Construction Cost: S\$297.7 million
- Construction Period: 33 months
- Gross Floor Area: 115,394.66 sq m

- Notable achievements:** High CONQUAS score of 91.8 points; BCA Green Mark Platinum Award in 2011; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

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Residential Buildings – Below S\$1,800/sq m Category

PUNGGOL SAILS (PUNGGOL WEST C8)



Seven blocks of public residential buildings for 606 units and one MSCP.

• Main constraints:

- Half of the project site was inside the railway protection zone;
- Close proximity to Edgefield Secondary School restricted working time.

• Alternate designs/products:

- Improved MSCP roof design for prevention of killer litter by integrating killer litter shelter with privacy fins and unauthorised access by adding GS spikes;
- Improved design to the MSCP crash barrier;
- Created a 75-100 mm fall at drain from planter base to reduce potential flooding at MSCP roof garden;
- Enhanced the construction of the entrance box culvert for the existing live HT cables.

• Notable features:

- Used pipe jacking for minor sewer works;
- Used precast drain for service road;
- Re-engineered precast propping method using Hilti:HUS-H Bolt;
- Developed a portable lifting machine for lifting 250 kg steel railing for the MSCP crash barrier installation to improve productivity and safety.

Project Team

- Builder: Ho Lee Construction Pte Ltd
- Developer: Housing & Development Board
- Principal Consultant: P&T Consultants Pte Ltd
- Architectural Consultant: P&T Consultants Pte Ltd.
- Structural Consultant: P&T Consultants Pte Ltd
- M&E Consultant: United Project Consultants Pte Ltd
- Quantity Surveyor: Davis Landon KPK (Singapore) Pte Ltd
- Construction Cost: S\$82.9 million
- Construction Period: 29 months
- Gross Floor Area: 66,637.35 sq m

- **Notable achievements:** High CONQUAS score at 93.7 points; BCA Green Mark Gold Plus Award; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

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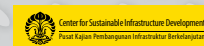
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Residential Buildings – Below S\$1,800/sq m Category

PUNGGOL WEST C15 (PUNGGOL WAVES)



Six blocks of public residential buildings for 573 units and one MSCP.

• Main constraints:

- Three out of six blocks were inside the railway safety zone;
- Close proximity to school restricted working time;
- MSCP was constructed in two phases to allow crawler crane to operate closer to high slope beside TPE to prevent collapsing.

• Alternate designs/products:

- Redesigned house drain to improve the flow to main CE drain;
- Improved design of roof garden link bridges to address the potential issue of killer litter;
- Changed the massive precast water tank to precast ring water tank due to accessibility restriction of 400/500 t heavy duty mobile crane in LTA collapse zone.

• Notable features:

- Prevented further soil collapse from the high slope beside service road using gravel stone method;
- Used left over concrete to cast lintels and C7 drain;
- Automated plant watering process eliminated manpower needs to hold water hose during watering;
- Improved productivity and safety by preassembled steel roof structure for the drop-off point on ground level first;
- Adopted bolt & nut method over welded joints for the steel structure at the precinct pavilion;
- Improved wall tile detailing over window opening to minimise cracks.

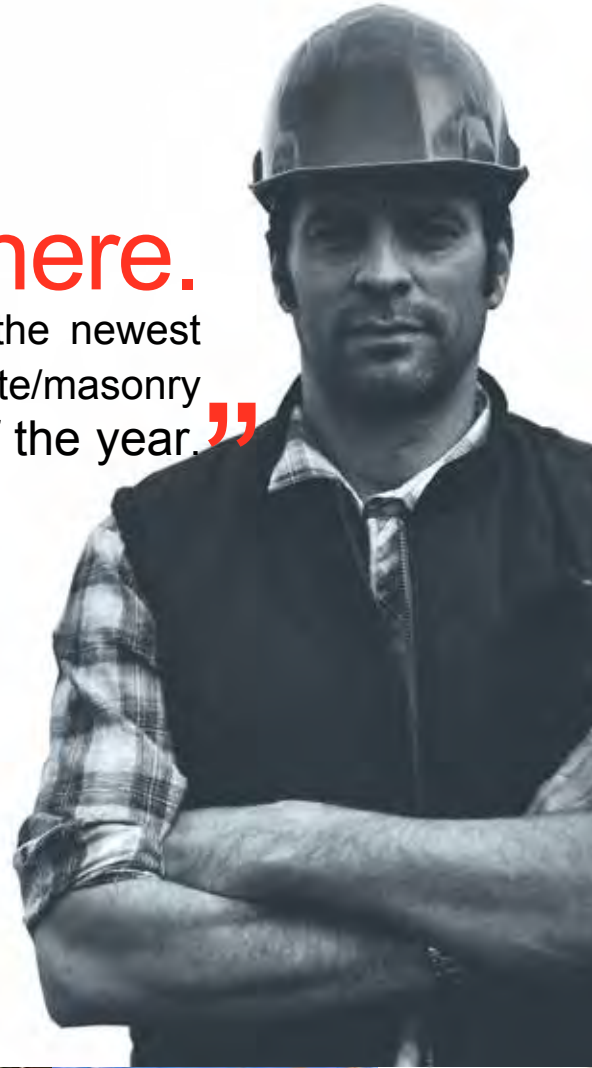
Project Team

- Builder: China Construction (South Pacific) Development Co Pte Ltd
- Developer: Housing & Development Board
- Principal Consultant: ADDP Architects LLP
- Architectural Consultant: ADDP Architects LLP
- Structural Consultant: DE Consultants (S) Pte Ltd
- M&E Consultant: United Project Consultants Pte Ltd
- Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
- Landscape Consultant: Site Concepts International Pte Ltd
- Construction Cost: S\$78.6 million
- Construction Period: 35 months
- Gross Floor Area: 72,300.00 sq m

- Notable achievements:** High CONQUAS score at 93.3 points; HDB Construction Award 2014; high productivity of 0.52 sq m per manday; BCA Green Mark Gold; and BCA Green & Gracious Builder Scheme (GGBS) with Merit.

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Residential Buildings – Below S\$1,800/sq m Category

SENGKANG N4 C11 (FERNVALE FOLIAGE)



Four blocks of public residential buildings with 504 units and one MSCP.

• Main constraints:

- Pent-up demand for early delivery;
- Industry wide shortage of precast components.

• Alternate designs/products:

- Precast column skin to eliminate external formwork later for grouting;
- Converted cast insitu roof element to precast.

• Notable features:

- Used 18 m high heavy duty scissor lift, mast climbing platforms, boom lift, 58 m concrete pump, etc to boost productivity;
- Used U-shaped bricks to minimise hacking for piping;
- Installed hanging walkway for safe access to tower crane;
- Used high impact green label products.

• Notable achievements: High CONQUAS score at 94.2 points; high productivity at 0.475 sq m per manday; HDB Construction Safety Award 2014; HDB Construction Award 2014; UK RoSPA Bronze Award for 2014; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Project Team

Builder: Straits Construction Singapore Pte Ltd
 Developer: Housing & Development Board
 Principal Consultant: Architects Vista Pte Ltd
 Architectural Consultant: Architects Vista Pte Ltd
 Structural Consultant: T H Chuah & Partners LLP
 M&E Consultant: Rankine & Hill (S) Pte Ltd

Quantity Surveyor: WT Partnership (S) Pte Ltd
 Landscape Consultant: Tulin Design Pte Ltd
 Construction Cost: S\$72 million
 Construction Period: 32 months
 Gross Floor Area: 63,042.95 sq m



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Residential Buildings – Below S\$1,800/sq m Category

SENGKANG N1 C27 (RIVERVALE ARC)



Eight blocks of 18-storey public residential buildings for 1,120 units and one MSCP.

• **Main constraints:** Close proximity to existing residential buildings and temple.

• **Alternate designs/products:**

- Created iconic arc-shaped precast columns with different curvatures combining aesthetic and functionality;
- Simplified connection details of steel roof structure for prefabrication and minimised work at height and hot works;
- Changed galvanised steel security screens with cast in fish-tail installation to powder coated aluminium using bolt & nut.

• **Notable features:**

- Ensured a minimum of six to seven piling rigs in operation daily, three ready-mix suppliers for uninterrupted supply of concrete and completed 1,457 number of piles in 2.5 months;
- Used aluminium formwork and self-climbing formwork to increase productivity;
- Ferrolite partition wall panels were hoisted up during slab construction to minimise the use of material hoist during architectural stage;
- Replaced timber plywood with 3 mm thick steel sheet with toe board for building perimeter overhead shelter;
- Replacing turf at void within block with piper improved survivability.

Project Team

- Builder: Welltech Construction Pte Ltd
- Developer: Housing & Development Board
- Principal Consultant: ADDP Architects LLP
- Architectural Consultant: ADDP Architects LLP
- Structural Consultant: DE Consultants (S) Pte Ltd
- M&E Consultant: United Project Consultants Pte Ltd
- Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
- Construction Cost: S\$129.1 million
- Construction Period: 27 months
- Gross Floor Area: 116,825.68 sq m

- **Notable achievements:** High CONQUAS score at 92.4 points; high productivity of 0.52 sq m per manday; average 9.5 day RC cycle per typical floor; HDB Construction Awards 2014 Merit; HDB Construction Safety Awards 2014 Merit; and BCA Green & Gracious Builder Scheme (GGBS) with Merit.



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Residential Buildings – Below S\$1,800/sq m Category

PUNGGOL CREST (PUNGGOL WEST CONTRACT 9)



Six residential blocks with 750 units and one MSCP.

- **Main constraints:** Close proximity to railway protection zone, residential buildings and secondary school.
- **Alternate designs/products:**
 - Changed cast insitu cantilevered roof facade to precast;
 - Changed precast roof water tank to two-ring water tank for ease of hoisting;
 - Counter proposed to reduce redundancy for minor sewer works.
- **Notable features:**
 - Used Android-based mobile quality checking system (MQCS) for inspection;
 - Precinct pavilion canopy roof was fabricated on the ground and launched in one operation.
- **Notable achievements:** High CONQUAS score at 92.3 points; project productivity at 0.5 sq m per manday; and BCA Green & Gracious Builder Scheme (GGBS) Excellent.

Project Team

Builder: Teambuild Engineering & Construction Pte Ltd
 Developer: Housing & Development Board
 Principal Consultant: P&T Consultants Pte Ltd
 Architectural Consultant: P&T Consultants Pte Ltd
 Structural Consultant: P&T Consultants Pte Ltd
 M&E Consultant: United Project Consultants Pte Ltd
 Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
 Construction Cost: S\$85.1 million
 Construction Period: 32.6 months
 Gross Floor Area: 69,601.67 sq m



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Residential Buildings - S\$1,800/sq m & Above Category

THE GLYNDEBOURNE



Eight blocks of five-storey with 1½ basement high-end condominium.

• Main constraints:

- A tree conservation zone - saved 29 1.5-2 m girth trees;
- Close proximity to Raffles Town Club and existing landed housing.

• Alternate designs/products:

- Redesigned the basement carpark layout to maximise the vehicular carpark requirement and reduced the basement footprint by approximately 260 sq m;
- Used lightweight Cobiax modular void former system to displace the concrete used for the structural slab, reducing the dead load of the overall structural system.

• Notable features:

- Used grout mixed piles as the temporary retaining wall for the 12 m deep excavation for basement;
- Used prefabricated bathroom units (PBU) and precast panels;
- Used iXpress flexible water piping system;
- Adopted the public drain at the perimeter and maintain in tip-top condition as a concerted effort to fight dengue;
- Adopted BIM throughout the design, construction and as-built stage.

• Notable achievements: High CONQUAS score at 97.0 points; QM tiered rated Star; BCA Green Mark Gold Platinum Award; achieved an impressive figure of CUI ≤ 0.35 to qualify as sustainable construction; RoSPA Gold Award for 2012, 2013 and 2014; PUB ABC Award

Project Team

- Builder: Tiong Seng Contractors (Pte) Ltd
- Developer: Cophorne Orchid Hotel Singapore Pte Ltd
- Principal Consultant: Team Design Architects Pte Ltd
- Architectural Consultant: Team Design Architects Pte Ltd
- Structural Consultant: LSW Consulting Engineers
- M&E Consultant: Parsons Brinckerhoff Pte Ltd
- Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
- Construction Cost: S\$104 million
- Construction Period: 31 months
- Gross Floor Area: 25,604.40 sq m

(2014); SEC Eco Office (2012-2014) and Happy Toilet Award; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Residential Buildings - S\$1,800/sq m & Above Category

THE INTERLACE

Twenty three blocks of 6-, 12-, 18- and 24-storey condominium with a basement, housing 1,040 units.

• **Main constraints:**

- Terrain at north-east region was sloping downwards to AYE that required filling and strengthening with ground anchors;
- Conservation of 32 existing trees and additional two by builder.

• **Alternate designs/products:**

- Changed the 10 m deep RC spine wall with cross walls to a mere 2.5 m deep transfer box girder based on post-tensioning concept;
- Grade 80 high strength concrete was used for the circular mega columns where container blocks intercepted at various levels significantly to slim down the sizes and increased the unit size too;
- Replaced piles with pad footings due to good soil condition.

• **Notable features:**

- Construction of 20 transfer decks using 'balanced cantilevered' method (as used for bridge construction) significantly reduced construction load on heavy duty shoring below by casting each box girder in stages as the transfer deck was self-supporting;
- Space within the transfer deck girder was used to route M&E services;
- BIM was utilised to determine the complex construction sequencing in the interconnecting of container boxes;
- A combination of various system formwork systems, precast elements and prefabricated steel components were carefully adopted to increase productivity.

- **Notable achievements:** High CONQUAS score at 96.0 points;

Project Team

Builder: Woh Hup (Private) Limited

Developer: Ankerite Pte Ltd

Principal Consultant: RSP Architects Planners & Engineers (Pte) Ltd

Architectural Consultant: RSP Architects Planners & Engineers (Pte) Ltd

Structural Consultant: T.Y.Lin International Pte Ltd

M&E Consultant: Squire Mech Pte Ltd

Quantity Surveyor: Langdon & Seah Singapore Pte Ltd

Landscape Architect: ICN Design International Pte Ltd

Construction Cost: S\$442.2 million

Construction Period: 42.5 months

Gross Floor Area: 169,800.00 sq m

QM tiered rated Excellent and average QM score was 91.0; completed 2.5 months ahead of time; BCA Green Mark Gold Plus Award (2010); SHARP Awards 2011, 2012, 2013 and 2014; Workplace Safety and Health Awards for Supervisors 2012, 2013 and 2014; UK RoSPA Occupational Safety Award for 2011, 2012, 2013 and 2014; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Residential Buildings - S\$1,800/sq m & Above Category

TERRENE AT BUKIT TIMAH



Three blocks of five-storey condominium consisting 172 units with a basement.

• Main constraints:

- Reconstruction of existing drain, which encompassed ¾ of the development (over 300 m) to 5 m deep box drain cum footpath, avoiding damages to neighbouring properties;
- Mix ERSS designs for basement construction to address the more than 4 m height difference in terrain.

• Alternate designs/products:

- Precast elements were introduced as much as possible to manage wastage and improve productivity;
- Replaced terra-cotta external feature screen and mild steel railings with aluminium type;
- Replaced brick wall with drywall;
- Replaced Adobe Stones at high wall with granite stone, minimising maintenance cost;
- Reengineered the new box drain foundation by using the existing CBP wall as drain base support, improving timing and reducing additional cost for piling.

• Notable features: Used Bedec heavy duty formwork shoring system with integrated access and safety barricade to eliminate unproductive and hazardous external scaffold system for low rise buildings.

Project Team

Builder: Unison Construction Pte Ltd
 Developer: Premier Land Development Pte Ltd
 Principal Consultant: Consortium 168 Architects Pte Ltd
 Architectural Consultant: Consortium 168 Architects Pte Ltd
 Structural Consultant: KTP Consultants Pte Ltd
 M&E Consultant: Alpha Consulting Engineers Pte Ltd
 Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
 Landscape Consultant: Peridian Asia Pte Ltd
 Construction Cost: S\$51.5 million
 Construction Period: 29 months
 Gross Floor Area: 18,615.83 sq m

• Notable achievements: High CONQUAS score at 92.9 points; QM tiered rated Merit and average QM score was 88.72; BCA Green Mark Gold Plus Award (2011); UK RoSPA Gold Award for 2012 and 2013; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Residential Buildings - S\$1,800/sq m & Above Category

ARDMORE RESIDENCE

A luxury condominium with 58 units.

• **Main constraints:** Lifting of huge PC panels.

• **Alternate designs/products:**

- Converted GRC external elements to PC, improving durability and performance with minimal impact to overall aesthetics. It also cut cost by combining the structural and architectural elements;

- Redesigned the core wall reinforcements with minimum rebar, which eased construction;

- Reconfigured the profile of the mega columns into one.

• **Notable features:**

- Precast concrete and system formwork had been widely utilised to enhance the constructability;

- Oversized PC panels were produced on site to mitigate the logistic problem especially in hoisting;

- Used precast concrete formworks (PCF) for external walls and columns, eliminating touching up;

- Used RailScafs (multi-level scaffold) for both structural and architectural works, improving safety;

- Used BIM and 3D design for the curved precast facade.

• **Notable achievements:** High CONQUAS score at 92.9 points; QM tiered rated Star and average QM score was 84.28; MOM SHARP Award 2012 (Commendation) & 2013 (Qualified); and BCA Green & Gracious Builder Scheme (GGBS) with Excellent Award.

Project Team

Builder: Shimizu Corporation

Developer: Irvine Investments Pte Ltd

Principal Consultant: Architects 61 Pte Ltd

Architectural Consultant: Architects 61 Pte Ltd

Structural Consultant: Web Structures Pte Ltd

M&E Consultant: J Roger Preston (S) Pte Ltd

Quantity Surveyor: Langdon & Seah Singapore Pte Ltd

Construction Cost: S\$96.5 million

Construction Period: 33 months

Gross Floor Area: 17,177.97 sq m

Residential Buildings - S\$1,800/sq m & Above Category

CUBE 8



A 177 unit-condominium comprising 36 stories, two basement carparks, swimming pools and various communal facilities.

• Main constraints:

- Restricted working hours due to sensitive neighbours;
- Protected sensitive neighbour's cars from dust by installing carpark shelter.

• Alternate designs/products:

Repositioned storey shelter from inside the unit to the emergency staircase, providing more usable space in the unit.

• Notable features:

- Vertical rebar prefabricated yard improved safety, productivity and reduced wastages;
- Used external cantilever facade platform, stair platform, working platform and internal shaft platform, eliminating full height scaffolding;
- No plastering required for surface produced by metal formwork system;
- Retractable cage formworks were used for lift shafts and ventilation shafts, enabling concrete pouring at one go;
- Incorporated numerous precast components including PBU, bay windows, zig-zag walls, screen walls, etc;
- Structural slabs were cast up to finished level, which eliminated conventional screed works;
- Drywall partition system for internal walls.

• Notable achievements: High CONQUAS score at 96.7 points; QM tiered rated Excellent; average six day cycle per floor; BCA Green Mark Platinum Award (2010); MOM SHARP Award for 2012, 2013 and 2014; UK RoSPA Gold Award for 2012, 2013 and 2014; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Project Team

Builder: Dragages Singapore Pte Ltd
 Developer: City Developments Limited
 Principal Consultant: ADDP Architects LLP
 Architectural Consultant: ADDP Architects LLP
 Structural Consultant: Meinhardt (Singapore) Pte Ltd
 M&E Consultant: CONTEEM Engineers Pte Ltd

Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
 Landscape Consultant: COEN Design International Pte Ltd
 Construction Cost: S\$84.6 million
 Construction Period: 36 months
 Gross Floor Area: 20,804.76 sq m

Residential Buildings - S\$1,800/sq m & Above Category

BOULEVARD VUE



A 33-storey condominium with 28 units.

• Main constraints:

- Customised unit layout and finishes (white plan);
- Construction of 3 m thick transfer slab at the fourth storey using customised high capacity modularised shoring system at 27.5 m high.

• Alternate designs/products:

- Foundation piles were shifted in and incorporated debonding piles due to 3 m underground reserve MRT line requirement;
- Integrated design for TERS and retaining wall;
- Diagonal stress free supporting design (using ring slab as stress) semi top down method for basement construction;
- Replaced membrane system with concrete additive waterproofing system for basement and E deck.

• Notable features:

- Obtained BCA (PIP) for reengineering of RC vertical components with integrated steel face system formwork and working platform;
- Obtained BCA (PIP) for self-climbing integrated external platform and construction protection screen;
- Obtained BCA (PIP) for advanced high-capacity modularised shoring system for the construction of 3 m thick slab at the fourth storey;
- Obtained BCA(PIP) for reengineering construction of typical slab and beam with advanced formwork system;
- Used unitised curtain wall system;
- Innovative design for toilets, trench and shallow floor waste/trap system (white plan).

• Notable achievements: High CONQUAS score at 96.4 points; QM certified, average QM score was 94.46 and 100 percent passed in the first attempt; and BCA Green & Gracious Builder Scheme (GGBS) with Merit Award.

Project Team

Builder: China Construction (South Pacific) Development Co Pte Ltd
 Developer: Far East Organization
 Principal Consultant: Ong&Ong Pte Ltd
 Architectural Consultant: Ong&Ong Pte Ltd
 Structural Consultant: Beca Carter Hollings & Ferner (SE Asia) Pte Ltd
 M&E Consultant: Rankine & Hill (Singapore) Pte Ltd

Quantity Surveyor: Rider Levett Buckall LLP
 Project Management Consultant: Acradis Project Management Pte Ltd
 Landscape Consultant: Ong&Ong Pte Ltd
 Construction Cost: S\$68.6 million
 Construction Period: 42 months
 Gross Floor Area: 11,635.00 sq m

Residential Buildings - S\$1,800/sq m & Above Category

TREE HOUSE CONDOMINIUM



Four blocks of 24-storey residential building with 429 units and a basement for carpark.

• **Main constraints:** Restricted working hours due to sensitive neighbours.

• **Alternate designs/products:**

- Prefabricated steel modular structure system for construction of the greenwall minimised welding on site. In situ planter boxes were changed to GFRC type;
- Changed the raft foundation with soil improvement design to bored pile - raft foundation system to increase productivity and improve safety;
- Adopted Cobiax slab system that significantly reduced load and concrete used;
- Changed the club house 3D curved roof design to a composite system to ease installation;
- Redesigned the curved roof into five precast segments for ease of installation. A special caterpillar working platform was fabricated to install the curved precast roof panels safely;
- Redesigned the GYM structure to steel.

• **Notable features:** Optimised productivity with integration of various systems including PBU, customised formwork for staircase, MV shaft construction, modular platform for lift core shaft construction, advanced system formwork, pre-cage reinforcement, precast for facade and external wall including the curved roof.

• **Notable achievements:** High CONQUAS score at 96.1 points; QM tiered rated Star and average QM score was 93.0; average seven-day cycle for structural works and 10-day cycle for architectural works; BCA Green Mark Platinum Award (2010); WSHC Safety Innovation Bronze 2011; WSHC Best EHS Supervisor Award 2011; UK RoSPA Gold Award for 2011, 2012 and 2013; BCA Green & Gracious Builder Scheme (GGBS) with Star Award; and five-star Happy Toilet.

Project Team

Builder: Tiong Seng Contractors (Pte) Ltd
 Developer: Chestnut Avenue Developments Pte Ltd
 Principal Consultant: ADDP Architects LLP
 Architectural Consultant: ADDP Architects LLP
 Structural Consultant: DE Consultants (S) Pte Ltd

M&E Consultant: United Project Consultants Pte Ltd
 Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
 Construction Cost: S\$146 million
 Construction Period: 42.5 months
 Gross Floor Area: 52,437.92 sq m

Residential Buildings - S\$1,800/sq m & Above Category

MARINA BAY SUITES

A 66-storey condominium with 221 units.

• **Main constraints:**

- Heavy traffic and space constraint due to various ongoing sites hindered movement and restricted works;
- Construction of the UPN (under pass/pedestrian network) between PUB drain and CST;
- Construction of the high volume refuge floor/transfer floor at level 6, 27 and 46.

• **Alternate designs/products:**

- Integrated existing piles of PUB drain with new steel micropile to design as permanent structure instead of new RC pile for UPN tunnel underneath of PUB drain part;
- Adopted sinking box construction method to construct lift pit raft.

• **Notable features:**

- A combination of adaptation of DFS Kumkang aluminium formwork, concrete pump and placing boom, Peri Alum, PVC panel formwork for lift core wall, Peri auto climb safety screen and working platform, etc increased productivity;
- Peri propping system allowed level 6, 4 m thick transfer slab to be cast in one operation;
- Used smart levelling machine for screedless floor.

- **Notable achievements:** High CONQUAS score at 95.6 points; completed one month ahead of time; BCA Green Mark Gold Award (2014); BCA DESEA Award (2014); SHARP Awards 2011, 2012, 2013 and 2014; Workplace Safety and Health Innovation Awards (2013); Workplace Safety and Health Awards for Supervisors (2013); UK RoSPA Gold Award for 2011, 2012, 2013 and 2014; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Project Team

Builder: Woh Hup (Private) Limited

Developer: Marina Bay Suites Pte Ltd

Principal Consultant: Architects 61 Pte Ltd

Architectural Consultant: Architects 61 Pte Ltd

Structural Consultant: Meinhardt (Singapore) Pte Ltd

M&E Consultant: Meinhardt (Singapore) Pte Ltd

Quantity Surveyor: Langdon & Seah Singapore Pte Ltd

Architectural Design Consultant: Kohn Pedersen Fox Associates

Construction Cost: S\$188.1 million

Construction Period: 38.5 months

Gross Floor Area: 47,816.18 sq m

Residential Buildings - S\$1,800/sq m & Above Category

HUNDRED TREES CONDOMINIUM



A D&B contract for the condominium development featuring eight residential blocks with 369 units.

• Main constraints:

- Proximity to landed residential areas;
- Presence of existing steel piles including redesigning 73 of them.

• Alternate designs/products:

- Integrated precast system incorporating structural, architectural and M&E services;
- Added Cobiax system in floor slab, reducing load and concrete;
- Changed 80 percent of toilets to PBU – unitised type;
- Changed timber flooring to laminated timber floor;
- Changed timber service doors along corridor to metal type.

• Notable features:

- A careful combination of adaptation of system formwork, PBU and precast components increased productivity;
- Used PERIcad software for advanced formwork design and planning;
- Used rebated internal timber door with lift-off hinge;
- Used modular ACO drain;
- Precast kerb for drywall installation;
- Used IX press fitting pipes.

• Notable achievements: High CONQUAS score at 95.5 points; QM tiered rated Star and average QM score was 92.3; BCA Green Mark Platinum Award; UK RoSPA Silver Award for 2012, and Gold Award for 2013 and 2014; BCA Productivity Award (Project) - Platinum (2014); achieved seven day floor cycle; and BCA Green & Gracious Builder Scheme (GGBS) with Star Award.

Project Team

Builder: Tiong Seng Contractors (Pte) Ltd
 Developer: City Developments Limited
 Principal Consultant: Ong&Ong Pte Ltd
 Structural Consultant: KTP Consultants Pte Ltd
 M&E Consultant: Squire Mech Pte Ltd
 Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd

Interior Design Consultant: Index Design Pte Ltd
 Landscape Consultant: Salad Dressing Pte Ltd
 Construction Cost: S\$112.4 million
 Construction Period: 30 months
 Gross Floor Area: 43,729.65 sq m



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