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CONSTRUCTION

MAY - JUNE 2016



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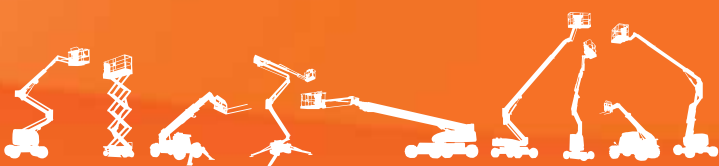
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Contents



On the cover:
Construction of vehicle test track in
China.
(page 68)

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NEWS

NEWS IN SOUTHEAST ASIA	12
NEWS IN EAST ASIA	20
NEWS IN INDIA	24
NEWS IN THE MIDDLE EAST & EUROPE	26
NEWS IN THE AMERICAS	28
GLOBAL NEWS	30
IPAF HIGHLIGHTS	38

EVENTS

CALENDAR OF EVENTS	32
INDUSTRY EVENTS	34

PRODUCTS

NEW IN INDUSTRY	40
FOUNDATION EQUIPMENT	46
EARTHMOVING EQUIPMENT	47
MIXED CATEGORY	49





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Contents

PROJECTS & SPECIAL FEATURES

APPLICATIONS ON SITE	52
RAILWAY PROJECT	62
EDUCATIONAL BUILDING	66
PAVING PROJECT	68
MARKET TALK	74
PRODUCT FEATURE	78
FOCUS ON AUSTRALIA	84
REVIEW OF WORLD OF CONCRETE 2016	92



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Country Garden unveils 'Forest City' in Malaysia

A joint venture between Country Garden Holdings Co Ltd and Johor's Esplanade Danga 88 Sdn Bhd plans to build 'Forest City', which will be located on four man-made islands in Iskandar Malaysia. It is believed to be Southeast Asia's first and largest mixed-use green development in terms of the number of units to be built with a vertical greenery and smart city design theme.

Spanning over 1,386.05 ha with an estimated investment of S\$58.3 billion over the next 20 years, Forest City is expected to fuel the economy in Iskandar region and neighbouring Singapore. Featuring a futuristic green design and smart technologies, it is also set to become a role model of future cities. Part of the first phase of the development will include condo and high-rise coastal residences.

Eight industries such as education, healthcare and tourism will be the main economic pillars to the growth at Forest City. As part of the long-term planning, Country Garden is also in discussions with Malaysian local government to set up dedicated entry points to Forest City, such as a light rail transit system and a ferry network that links to Singapore and to the planned high-speed rail between Singapore and Malaysia.

To date, Forest City is Country Garden's largest real estate project outside of China, part of the Group's internationalisation strategy to establish a larger overseas presence. The Group has



Above and left: The Forest City development will be located on four man-made islands in Iskandar Malaysia.

also completed residential projects in Australia and Malaysia and eyeing to launch real estate projects in Indonesia and Vietnam in the near future. ■

Manitowoc appoints new distributor in Indonesia

Manitowoc Cranes has awarded the distributorship of its Grove all-terrain (AT) cranes in Indonesia to Singapore-listed Sin Heng Heavy Machinery Limited and its subsidiary PT SH Machinery Indonesia.

"Sin Heng has established a strong presence in Indonesia over the years, selling equipment and providing service to many industries including oil and gas, ship building and civil construction," said Raman Joshi, VP and general manager for Manitowoc in Asia Pacific. "Manitowoc sees tremendous synergy in this working partnership. Sin Heng Heavy Machinery is at a stage where it is primed for growth and we are confident in the company's ability to deliver."

PT SH Machinery Indonesia is currently working from a three-storey office building in Kabupaten Tangerang. There are plans to further expand its facilities to maintain and stock equipment in anticipation of market demand for Grove cranes. At present, all Grove AT cranes sold in Indonesia are delivered directly to customers.

"Before we started selling Grove AT cranes, we looked at the repair costs for the cranes that we had operated previously in our rental fleet and we were pleasantly surprised at how low it was. We are focusing on Grove



From left: Renny Yeo, Sin Heng; Sally Lim, Manitowoc Cranes; Tan Ah Lye, chairman of Sin Heng; Jack Lee, Manitowoc Cranes; Tan Cheng Guan, Sin Heng; Teo Yew Boon, Manitowoc Cranes; and Chian Ker Jeng, Manitowoc Cranes.

AT cranes for now, but we hope to expand our Grove crane offerings in the future as we continue to develop our partnership with Manitowoc Cranes," said Tan Cheng Guan, executive director of Sin Heng Heavy Machinery.

Sin Heng Heavy Machinery's existing Grove crane fleet includes two GMK5130-2 units, a GMK5220, a GMK6220L and two GMK6300 units. It also operates an RT890 and an RT9130 from Grove's range of rough-terrain cranes. ■

Phnom Penh and Siem Reap airport extensions open

The Phnom Penh and Siem Reap airport expansions in Cambodia were recently open to the public. These projects, carried out within the framework of the concession held by Vinci Airports, the Vinci Group's airport subsidiary, in partnership with Muhibbah, double the capacity of the two airports from 5 to 10 million passengers per year.

The investments, amounting to more than US\$100 million in the 2013-2016 period, are designed to enable the airports to accommodate substantial air traffic growth. Over the past 20 years, the number of passengers has reportedly increased 10-fold, driven by the country's dynamic economy and tourism sector.

Vinci Construction Grands Projets, the Group's subsidiary dedicated to major structures, initiated the expansion works in 2013 and carried them out in the terminals, which remained open throughout the project, without disrupting their operation. The projects also used BIM (Building Information Modelling) technology to improve safety performance and construction schedule compliance. ■


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Surbana Jurong expands in Myanmar

Surbana Jurong has grown its consultancy business in the industrial and infrastructure sectors, after securing a number of major projects in Myanmar within the last 12 months.

Most notably, the company had partnered CITIC Group in the winning bid for Kyaukphyu Special Economic Zone's (SEZ) industrial park and deep sea port components, providing masterplanning, infrastructure and port planning services. When completed, the proposed 1,900-ha industrial park will house industrial clusters such as textile and garment, construction materials processing, food processing and marine supply. Given its strategic location in Western Rakhine, Kyaukphyu SEZ's deep sea port will also facilitate Myanmar's trade corridor between India, Africa, the Middle East and China, and provide further employment opportunities.

Prior to that, Surbana Jurong won a further three-year contract to continue overseeing the masterplanning, infrastructure development and project management services for the 160-ha i-Land Industrial Park in Bago. It is slated to be a key strategic economic node as well as the first and largest integrated industrial hub in the city.

Surbana Jurong also provided design and engineering consultancy services to the Hanthawaddy International Airport winning consortium. When completed, the airport is expected to have a capacity of 12 million passengers per year, making it the largest in Myanmar.

In addition, Surbana Jurong was recently awarded an Underground Engineering design services contract by Shwe Taung Development to build Myanmar's first underground pedestrian walkway. The underpass will connect the Practising High School, Yangon Institute of Education and Junction Square shopping centre, allowing pedestrians bypass heavy traffic on Pyay Road, Yangon's busiest thoroughfare. The underpass measures about 30 m long and when completed will help improve traffic flow and pedestrian movement significantly.

Teo Eng Cheong, CEO (International) for Surbana Jurong, said, "Since our branch opening in April 2014, Surbana Jurong has grown its presence rapidly in Myanmar. From two projects in April 2014 in



Surbana Jurong is providing design and engineering consultancy services for the future Hanthawaddy International Airport.

Yangon, we are now actively involved in 40 projects across the states of Yangon, Bago, Mandalay, Rakhine as well as Ayerwaddy Division. Our staff strength has also grown significantly to 33. Our recent wins in the industrial and infrastructure sectors underline our intention to go big in these sectors as Myanmar witnesses an economic and infrastructure boom."

Wong Heang Fine, Group CEO of Surbana Jurong, added, "Our fast expanding presence in Myanmar is fuelled by our mergers and acquisitions. The addition of KTP Consultants last year has helped to expand our service offerings in a number of mixed developments in Yangon, while the merger with Jurong has given us an edge in industrial development. Having also taken up an equity stake together with CITIC Construction on an IFC-led project in Kenya last year, we are now continuing to build on this strategic partnership for the Kyaukphyu Special Economic Zone in Myanmar." ■

Samsung C&T wins DTL contract in Singapore

Samsung C&T has secured a US\$610 million contract to build Xilin station and tunnels for the Downtown Line (DTL) 3 Extension project in Singapore.

Under the contract, the company will be responsible for the construction of Xilin station and associated tunnels with a total length of 1.2 km. Work also involves relocating a short section of the stream currently running through the site. This part of DTL 3 Extension will run along Xilin Avenue.

The 2.2 km DTL 3 Extension will see DTL 3 join the current East-West and future Thomson-East Coast lines. The construction of Xilin station was scheduled to begin in March 2016 and is expected to be completed by 2024.



An artist's impression of Xilin station.

In addition, Samsung C&T won the Marine Parade station of Thomson-East Coast Line (TEL) in November 2015 and is currently working on the DTL 3's Expo and Tampines East stations, as well as the TEL's Caldecott station that interchanges with the Circle Line. ■

Exova acquires majority stake in Admaterials Technologies

Exova Group plc, a global testing, calibration and advisory services provider, has acquired a majority stake in Admaterials Technologies Pte Ltd, a Singapore-based company that provides testing in the construction sector as well as chemical, environmental and mechanical testing and certification services.

Founded in 2008, Admaterials has competencies in the testing of building products and serves a range of national and international customers in the private and government sectors. Exova is headquartered in Edinburgh, the UK, with 144 laboratories and offices in 32 countries and employs around 4,500 people throughout Europe, the Americas, the Middle East and Asia/Asia Pacific. ■



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Keppel Land to develop prime waterfront site in HCMC

Keppel Land has entered into an agreement to subscribe for 40 percent equity interest in Empire City Limited Liability Company for a total consideration of US\$93.9 million. The other joint venture partners in Empire City include Vietnamese companies Tien Phuoc Real Estate Joint Stock Company and Tran Thai Real Estate Co Ltd, as well as Hong Kong-based real estate private equity fund Gaw Capital Partners.

Keppel Land and its partners plan to jointly develop a prime 14.6-ha waterfront site in the Thu Thiem New Urban Area, located in District 2 of Ho Chi Minh City (HCMC), Vietnam. The proposed development will comprise premium residential apartments, office and retail properties as well as an 86-storey integrated mixed-use tower complex.

Overlooking the Saigon River and the current central business district of HCMC, Thu Thiem New Urban Area is expected to become the largest economic, commercial and financial centre in HCMC, offering cultural, entertainment and recreational activities.

Keppel Land said that based on the latest market reports, Vietnam's macroeconomic conditions continue to improve, supported by high gross domestic product growth, low inflation and high consumer spending. The country's participation in the Trans Pacific Partnership as well as the ASEAN Economic Community will also spur foreign direct investments in the real estate sector. In addition, the recent relaxation of the Housing Law and Real Estate Business Law, improvements in public infrastructure, growing middle class as well as high urbanisation rate will continue to drive the demand for quality homes and investment-grade offices.

Tien Phuoc and Tran Thai are Keppel Land's current joint venture partners for various projects in HCMC. Together with Tien Phuoc, Keppel Land had successfully completed The Estella residential project and is currently developing Estella Heights. Keppel Land, Tien Phuoc and Tran Thai are also working on the South Rach Chiec township development, which is slated for launch later this year. ■

Gabe Carter named Aurecon's Buildings Unit manager in Vietnam



Global engineering consultancy Aurecon has appointed Gabe Carter (left) as its new Buildings Unit manager in Vietnam. He will take on the responsibilities of enhancing cross-country technical know-how and providing thought leadership in key areas such as sustainability, environmental protection, lifecycle performance and returns.

"Gabe's appointment and expertise in built environment will surely be instrumental in strengthening the Vietnam team's engineering capabilities, as we gear up to make our Vietnamese operations future-ready this year," said Tuyen Bui, country manager of Aurecon in Vietnam.

Mr Carter said, "This is a very exciting time to work in Vietnam's vibrant built environment sector, where developers and owners demand innovative and cutting-edge solutions for their projects. In Aurecon, we have a passion for complex projects and I look forward to bringing our global expertise to our clients' projects."

Mr Carter joined Aurecon in 2002 and is a chartered member of the Institution of Engineers Australia (Engineers Australia), bringing more than 13 years of building sector experience into his new role. In his previous stint as buildings technical director in Sydney, he was involved in a broad spectrum of major projects, displaying technical design expertise across multiple industry segments including healthcare, laboratory, entertainment and leisure, airport, commercial, defence and government. ■

Kobe Steel establishes new subsidiary in Thailand for air compressors

Kobe Steel has established a new subsidiary in Thailand to market and sell its standard air compressors, as well as provide after-sales services. Based in Bangkok, the new Kobelco Compressors (Thailand) Ltd (KCTH) anticipates to supply 800 compressor units in 2020, amounting to sales of about 3 billion yen.

Standard compressors are mainly used in factories to provide compressed air for such applications as powering equipment and machinery, painting and powder conveying. Utility equipment for these applications is widely used in numerous industries.

Featuring high efficiency and energy-saving features, the Kobelion series of standard compressors has one of the highest



The new Kobelco Compressors (Thailand) Ltd is based in Bangkok.

market shares in Japan and Southeast Asia, said Kobe Steel. As many Japanese electric machinery and electronics manufacturers have entered the Thai market, demand for compressors is expected to increase from the

current 3,000 to approximately 4,000 units in 2020, estimated the company.

Kobe Steel has built up a global network to market and service its standard compressors. The company's manufacturing locations are currently located in Japan, China and the US. Sales locations have been established in Singapore, Indonesia, Malaysia, the Philippines, Vietnam, Cambodia and India.

In addition, Kobe Steel said it is the only comprehensive compressor manufacturer in the world that can supply large-size screw, reciprocating and centrifugal compressors. The company has an estimated 50-percent share of the world market for these nonstandard compressors, or custom-engineered process compressors, which are used in petrochemical plants. ■

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Black & Veatch completes Philippines power plant

Black & Veatch has completed its prime EPC (engineering, procurement and construction) role at Therma South Units 1 & 2 near Davao City in the Philippines. The additional 300 MW of power added to the grid is expected to help alleviate the daily power cuts faced by millions of people in Mindanao.

The Therma South Units 1 & 2 is owned by Therma South Inc, a wholly-owned subsidiary of Aboitiz Power Corporation. The plant features a coal dome, designed in accordance with the environmental requirements set by the Department of Environment and Natural Resources of the Philippines. Its primary function is to minimise the surface area in which dust can settle and for the safe storage of the plant's fuel supply. To date, more than 20 distribution utilities and electric cooperatives have reportedly signed up to receive capacity from Therma South.

Black & Veatch was the overall project and commissioning manager for the 300 MW circulating fluidised bed coal-fired plant. The company provided balance of plant engineering and procurement services. It was also responsible for providing the EPC solution for material handling, plant wide fire protection and offshore piping for cooling water, in addition to site management and commissioning services.

In another development, Black & Veatch will be working on two upcoming desalination projects in Singapore and Hong Kong. Both central to each city's water resiliency planning, the two plants are set to establish new design and energy-use benchmarks for future water treatment plants.

In Singapore, the national water agency PUB has appointed Black & Veatch to provide consultancy services for the country's fourth desalination plant in Marina East. Planned with a capacity of 36 MGD, the plant will help meet future water demand in the city area and strengthen Singapore's drought resilience. It will be designed to treat two different sources of water: seawater from the Singapore Straits or raw water from the Marina Reservoir. Initially, Black & Veatch's role will include the preliminary design for the development of the plant under a Design-Build-Own-Operate (DBOO) arrangement.



© Black & Veatch

Black & Veatch has completed its prime EPC role at Therma South Units 1 & 2 in the Philippines. The plant features a coal dome, which is to minimise the surface area in which dust can settle as well as for the safe storage of the plant's fuel supply.

The Request for Proposal for the development of this desalination plant in Marina East under a DBOO arrangement is expected to be made in the second quarter of 2016. Black & Veatch will continue to provide services to PUB throughout the plant's development.

Furthermore, the Water Supplies Department of the Government of the Hong Kong SAR has appointed Black & Veatch as the owner's engineer to develop the first stage of Tseung Kwan O desalination plant. With an initial capacity of 36 MGD, the plant will meet about five percent of Hong Kong's water demand. Black & Veatch recently completed the plant's feasibility study, which identifies opportunities to harness green energy that could reduce electricity costs. The company will design and provide construction supervision across the first phase of the desalination plant. A further 36 MGD, phase two, is also planned. ■

Bogle Architects designs new international school in Vietnam

Bogle Architects has been commissioned to design the International School Ho Chi Minh City (ISHCMC), which will provide teaching facilities for over 900 students. The 1.15 ha site is located adjacent to the Saigon River. The school building will provide over 25,000 sq m of accommodation.

The entire building is elevated to provide natural ventilation to the ground floor. All the main facilities are arranged along an internal central spine or 'high street'. Each zone is located in order to optimise environmental conditions.

Pocket gardens sit at the base of the light wells on the lower levels, and bring greenery into the building. The roof is crowned with a football pitch and surrounded by a sculptural steel fence.

Mace Vietnam is the project manager, and Toan Viet JSC is the main contractor. Other team members include Sagen (local architect), WT Partnership (cost consultant) and Indochine Engineering (engineering). ■



An artist's impression of ISHCMC.

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China's tallest building completed

At 632 m, Shanghai Tower is currently the tallest building in China. It includes offices, commercial space, a five-star hotel, exhibition and conference halls as well as recreational facilities.

Shanghai Tower is also the world's second tallest building, after the Burj Khalifa in Dubai. At the same time, it is said to be the world's tallest double-skin building, with its distinctive helix-like facade.

Aurecon provided facade engineering design for the development, working with US architectural firm Gensler. In addition, Aurecon collaborated with New York engineering consultancy Cosentini Associates to provide mechanical, electrical and plumbing design services, including materials selection and schematic and development design.

Shanghai Tower's design is comprised of a circular central floor plate enveloped by a suspended outer skin, triangular in plan, twisting as it ascends. This feature also contributes to the tower's functionality and sustainability, greatly reducing wind load and enabling the easy capture of rainwater to be used in the building's air conditioning and central heating system.

The Shanghai Tower's sustainable features took the US Green Building Council and the Chinese 3-Star Green Building rating and certification systems into account. They consist of greywater recycling systems located at basement and mid-level to collect water for reuse; fifteen 3 kW vertical axis



At 632 m high, Shanghai Tower is currently the tallest building in China.

wind turbines located on the roof to provide 157 500 kWh of renewable electricity each year; two sets of natural gas turbines which generate electricity, chilled water and hot water, while reducing carbon dioxide by 49 percent; as well as a 12-storey 'sky garden' created by the interstitial spaces in the form which act as environmental buffer zones and maximise the usage of the double skins. ■

Sandvik Tiger in Korea



Sandvik Tiger DG700 drilling rig.

The first Sandvik Tiger DG700 equipped with a Caterpillar Tier 3 engine was recently delivered to its new owner, GMC Corporation in South Korea, and is now working at the company's Baekwoon limestone mine.

The Tiger DG series has been developed to give excellent rates of penetration with Sandvik rock drills. Blasting results are also enhanced due to the advanced Rock Pilot drilling control system that guarantees smooth collaring, thereby delivering better hole quality.

A soundproof, safe and spacious cabin with tailor-made user interface, delivers added operator comfort with all daily maintenance points being easily accessed from the ground level. ■

Liebherr LR 11000 for Hanchang

South Korean company Hanchang Heavy Equipment Co has taken delivery of a new Liebherr LR 11000 crawler crane. The unit was ordered with a full range of equipment: 108 m main boom, 114 m luffing jib, derrick system and ballast trailer. This will enable Hanchang to tackle a wide range of jobs.

Hanchang now has a fleet of 14 Liebherr crawler cranes. The LR 11000 will fill the gap between the company's 750-t and 1,350-t machine. ■



Hanchang Heavy Equipment has acquired a new Liebherr LR 11000 crawler crane.

Work on Japan's floating solar power plant begins

Kyocera TCL Solar, a joint venture of Kyocera Corporation and Century Tokyo Leasing Corporation, has started construction of the 13.7 MW floating solar power plant on the Yamakura Dam reservoir. Scheduled for launch in 2018, the plant will comprise approximately 51,000 Kyocera modules installed over a fresh water surface area of 180,000 sq m. The project

is expected to generate an estimated 16,170 MWh per year, while offsetting about 8,170 t of CO₂ emissions annually. ■

An artist's impression of the 13.7 MW floating solar power plant on the Yamakura Dam reservoir in Chiba Prefecture, Japan.



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Rolls-Royce and China Yuchai to jointly build MTU engines

MTU Friedrichshafen GmbH, a subsidiary of Rolls-Royce Power Systems, and Guangxi Yuchai Machinery Company Ltd (GYMCL), the main operating subsidiary of China Yuchai International Limited, have signed an agreement to set up a 50/50 joint venture for the production of MTU diesel engines in China. It will be based at GYMCL's primary manufacturing facilities in Yulin City, Guangxi Province, and is expected to begin production in 2017.

The joint venture plans to produce MTU Series 4000 diesel engines compliant with China Tier 3 emission standards, featuring power outputs ranging from 1,400 to 3,490 kW, primarily for the Chinese off-highway market, in particular for power generation and oil & gas applications.

This collaboration will open up new growth opportunities for both partners, particularly in China and Asia. It will enable better access to the Chinese market for the MTU Series 4000 diesel engines, via the extensive sales and service network operated by GYMCL. Meanwhile, GYMCL will be able to offer its customers technologically advanced engines.

The joint venture engines will be marketed by GYMCL and MTU Suzhou within China and by MTU and its subsidiaries exclusively outside China. From 2020, the sales territory of GYMCL will be extended to selected countries in Southeast Asia such as Vietnam,



MTU and GYMCL have signed an agreement to set up a joint venture for the production of MTU Series 4000 engines.

Thailand and Malaysia. After a ramp-up phase of three to five years, the scope of the joint venture could be extended to research and development activities as well as potentially direct sales from the joint venture to the customer. ■

Manitowoc's cranes delivered to China and Korea

The Chinese rental company Ningxia Wang Thai Engineering Machinery Co Ltd has recently acquired a Grove GMK6300L all-terrain crane, which will be used in a wide range of operations spanning wind power, chemical, industrial and general construction-related activities. The crane has the ability to extend its 80m main boom length up to 117 m with its maximum complement of jib. It also features the Megatrak suspension system and an advanced chassis design.

In South Korea, Shinui Petra has added a Manitowoc MLC650 crawler crane to its rental fleet. The crane features the Variable Position Counterweight (VPC), a design feature that allows for reduced ground preparation, ground-bearing pressure, space requirements and counterweight.

The MLC650 has 104 m of main boom to which up to 30 m of fixed jib can be added. A 101 m luffing jib is also available to reach a maximum 157 m. Shinui Petra has ordered the VPC-MAX attachment for the MLC650, which enables the crane to raise 140 m of boom or a boom and luffing jib combination of 205 m. In addition, its maximum capacity is boosted to 700 t with the VPC-MAX.

Suitable for infrastructure applications, the crane was already used to install concrete beams for the construction of an elevated road. On the project the MLC650 was rigged



A Grove GMK6300L mobile crane (above) was recently delivered to Ningxia Wang Thai Engineering in China, while a Manitowoc MLC650 crawler crane (below) went to Shinui Petra in South Korea.



with 56 m of main boom, its VPC-MAX attachment, 400 t of counterweight and with 10 parts of line on the hook. It lifted loads of up to 150 t out to working radii of up to 40 m. ■

Major order for Skyjack

Skyjack has completed a significant order for DC electric scissor lifts to S Rental in South Korea. The order includes SJIII 3219, SJIII 4632 and SJIII 3226 models, which were delivered through Skyjack's local dealer, Sky Korea.

The SJIII 4632 is the biggest in the DC electric scissor line from Skyjack. It has a platform height of 9.75 m, which equates to a working height of 11.58 m. The platform has a capacity of 318 kg, and the inside platform length of 2.1 m can be further extended by 1.2 m.

The SJIII 3219 has a 5.79 m raised platform height, which equates to a working height of 7.62 m. Platform length, as measured from the inside, is 1.63 m and this can be extended by a further 0.91 m. The SJIII 3226 offers work heights of up to 9.75 m and 30 percent gradeability. ■



S Rental has made a major order for Skyjack machines.

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'Bright prospects for construction industry in India'

Increasing investments in residential construction and transport infrastructure will drive growth in India's construction industry over the forecast period (2016–2020), according to a study by Timetric's Construction Intelligence Centre (CIC). Consequently, the average annual growth in real terms is expected to improve from 2.95 percent in 2011–2015 to 5.65 percent during the coming five years.

Timetric's CIC forecasts the industry to rise from a value of US\$428.1 billion in 2015 to US\$563.4 billion in 2020, measured at constant 2010 US dollar exchange rates. Due to industrialisation, urbanisation, a rise in disposable income and population growth, the demand for construction services is set to rise. Government efforts to improve India's residential and transport infrastructure will also play a vital role in supporting the growth.

Infrastructure construction accounted for 23 percent of the total industry's value in 2015. Based on Timetric's CIC, it will continue to expand over the forecast period, driven by public and private sector investments in public transport infrastructure. Thus, infrastructure construction is anticipated to be the industry's fastest-growing

market over the forecast period, with a CAGR of 9.94 percent in nominal terms, to value INR9.5 trillion (US\$140.1 billion) in 2020.

"The country's expanding population and urbanisation will continue to generate a need for infrastructure development. To improve trade competitiveness and cope with the population growth, the government is focusing more on infrastructure development, which is expected to result in regular investments in the maintenance and expansion of road infrastructure in the near future," said Danny Richards, economist at Timetric's CIC.

Residential construction was the largest market in the Indian construction industry during 2011-2015, and is anticipated to remain relatively sizable over the next five years, with a 30.6 percent share of the industry's total value in 2020. Construction activity in the residential market will be supported by rapid urbanisation, population growth and positive developments in regional economic conditions. Government efforts to clear slum areas by 2022 and reduce the country's housing deficit will also help the market grow. ■

Lee & Muirhead invests in Goldhofer

The logistics company Lee & Muirhead Pvt Ltd has invested in a Faktor 5 high girder bridge from Goldhofer. With a deadweight of 100 t, the vehicle can handle loads weighing up to 500 t. It has a load length in the 11–17 m range and above, plus variable axle configurations of 2x12 to 2x20 axle lines. Thus, the Faktor 5 is suitable for transporting transformers, generators and other heavy industrial components.

"In the next few years, more than 30 major refurbishment projects are scheduled in the powergen industry as the power stations no longer have the generating

capacities needed today. Tomorrow's power plants will be in the 660-800 MW range. We have to be prepared for these developments, especially with regard to the equipment required to transport the stators for the generators. They make very heavy loads, weighing anything between 350 and 450 t," said Pankaj Gadhia, CEO of Lee & Muirhead Pvt Ltd.

The suspension stroke of the bridge, not including the stroke of the heavy-duty modules in the load bearing area, is about 1.80 m. The vehicle also features load width infinitely variable between 3 and 6.75 m. ■



From left: Jean-Philippe Martin, Goldhofer's area sales manager; Stefan Fuchs, CEO of Goldhofer; Pankaj Gadhia, CEO of Lee & Muirhead Pvt Ltd; and Ruchit Saraf, project and transportation manager of Lee & Muirhead Pvt Ltd.

HN Construction adds Terex Explorer 5800 crane

HN Construction Pvt Ltd has taken delivery of a new Terex Explorer 5800 all-terrain crane. The unit features 13.2 m long and 3 m wide, and is configured with a 70 m boom and 21 m fixed jib. It is designed so that the 70.2 t counterweight can be automatically rigged, helping to reduce setup time.

The Terex Explorer 5800 employs a single engine concept, which uses the latest engine management system to enhance performance for both road travel and lifting. Fuel efficiency is maximised using stop/start technology for the upper cabin and engine remapping depending on what type of operation is being performed, lifting or travelling.

"It is our first Terex Crane, but we plan to add more in the future. This unit will be put to



From left: Saeesh Nevrekar, director sales and service, Terex Cranes India; Narendra Wahile, sales manager, Terex Cranes India; and Vidyanand Singh, director of HN Construction.

work right away on the campus of Bokaro Steel Plant, one of the oldest and largest steel plants in India," said Rajnish Gautam, managing director of HN Construction Pvt Ltd. ■

LafargeHolcim's new head of India

LafargeHolcim has appointed Martin Kriegner as its head of India. He will report to Eric Olsen, Group CEO and succeed Bernard Terver who has decided to retire.

Mr Kriegner joined LafargeHolcim in 1990 and has previously held several senior leadership positions in the Group, including CFO and CEO of the Group operations in Austria as well as head of Lafarge India and regional president cement for Asia.

LafargeHolcim has a distribution network that extends across the entire country and continues to see opportunities to further build its business in India through the network of over 100,000 dealers and retailers. ■

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Design for FC Barcelona's new arena revealed

FC Barcelona recently selected HOK and Barcelona-based TAC Arquitectes to design the New Palau Blaugrana. The venue, which will have a capacity of 12,000 for sporting events and 12,500 for social and cultural events, is a key component of a broader project to improve FC Barcelona's facilities, including a major renovation of the Camp Nou stadium, in creating the Espai Barça sports district.

Construction on the New Palau Blaugrana is expected to begin during the 2017-2018 FC Barcelona basketball season and finish during the 2019-2020 season. It will replace the 7,500-seat Palau Blaugrana, which opened in 1971.

The New Palau Blaugrana will be built on the current site of the Mini Estadi, a 15,276-seat stadium. The building acts as a physical and visual anchor that aligns with the district's existing architecture. It also opens up and integrates the club's venues into the Les Corts neighbourhood.

HOK and TAC have designed the seating bowl to emulate a theatre environment, with an asymmetrical design that provides more capacity on one side. Using customised digital tools, the designers calibrated the venue and bowl geometries to achieve optimal results for viewing quality, shape and dimensions of the event spaces. The compact building span reduces structural costs and improves operational efficiencies. The flexible, retractable seating configuration adapts for each use.



© HOK and TAC

The New Palau Blaugrana will have a capacity of 12,000 for sporting events and 12,500 for social and cultural events. The venue is a key component of a broader project to improve FC Barcelona's facilities.

The project also includes three independently functioning areas: an adjacent court with capacity for up to 2,000 spectators, an ice rink with seating for 800 fans and the FCB Escola academy training facilities, which include two football fields. ■

Vinci signs agreement for Iran's airport expansions

The Iranian Ministry of Roads and Urban Development, the Iran Airports Company and Vinci Airports have signed a memorandum of understanding (MOU) on the concession for the Mashhad and Isfahan airports, Iran's second and fifth largest airports respectively. This agreement is the first step in a process that should result in the establishment of concessions, which will renovate, extend and operate each of the two airports in 2016.

The airport in Mashhad, which recorded 8.2 million passengers in 2014, is located in the northeast of the country and serves the country's second largest city; while the Isfahan airport, with 2.6 million passengers in 2014, serves Iran's third largest city. With tourism increasing more than 35 percent in 2014 and the recent effective lifting of international sanctions, airport activity holds out major economic potential in Iran. ■

First SDLG LG958L sold in Turkey



Özyurt Maden has bought an SDLG CE-marked LG958L wheel loader (left). It is believed to be the first SDLG machine in Turkey.

Özyurt Maden specialises in the ready-mixed concrete, quarry, asphalt production and construction industries. The new LG958L will be put straight to work at a concrete plant in Istanbul, handling aggregate materials. The machine is fitted with a new engine to meet Stage IIIA requirements for emissions standards in Turkey.

The LG958L was sold by local equipment dealer, Ascendum Makina, which represents SDLG and has 18 branches across Turkey. The model has also been sold in other markets across Asia, the Middle East and the US. ■

Over US\$41 mil sold at Dubai auction

Ritchie Bros. started strong with its first Dubai auction of 2016, selling US\$41+ million of equipment and trucks from 1 to 2 March 2016 - a 54 percent increase in gross auction proceeds compared to the March Dubai sales last year.

"People from 71 countries registered for the auction, with buyers from as far away as Germany, Taiwan and the United States participating in person or online in real time," said Eduard Faig, regional sales manager, Ritchie Bros. "An international audience helped us achieve solid pricing despite challenges for some of our customers working in the oil and gas sector. In particular we saw strong demand for the Caterpillar D8R dozers, concrete pump trucks and mobile cranes in the auction."

In total, more than 925 people registered for the auction, including 400+ online bidders. Out-of-country buyers purchased US\$17+ million of the equipment (43 percent). All items were sold with no minimum bids or reserve prices.

Ritchie Bros. sold more than 2,000 items in the auction - 630 more than March 2015 - including 100+ excavators, 55+ dozers and 40+ cranes. ■



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Bechtel wins Edmonton Valley Line Light Rail project

TransEd Partners, a consortium including global engineering and construction company Bechtel, has been selected by the City of Edmonton to finance, design, supply vehicles, build, operate and maintain the first phase of the Edmonton Valley Line Light Rail Transit project. The Valley Line is central to the City of Edmonton's transportation plan, designed to meet the demands of Canada's second fastest-growing city that is expected to increase in size by 50 percent by 2040.

The project will be delivered using a public-private partnership (PPP) procurement model. Bechtel is the lead partner for the design and construction of the project. The company also helped to secure financing and will assist in the provision of the operations and maintenance during the service period.

The multi-phased, 27-km urban route will ultimately create 25 new stops and three stations for an estimated 100,000 daily commuters. The line will run southeast to west from Mill Woods to Lewis Farms, crossing through Edmonton's downtown core. The first phase of the Valley Line is the 13.1-km portion with 11 stops and



The first phase of the Valley Line is the 13.1-km portion with 11 stops and one two-storey station.

one two-storey station, which will run between Mill Woods and 102 Street, connecting commuters with the Capital Line and Metro Line at Churchill Station. Construction is due to start later this year. ■

Gomaco appoints new managing director for Latin America



Francisco 'Frank' Ortega (left) has joined Gomaco as the company's new managing director for Latin America. He will be responsible for the sales of Gomaco products and managing the distributor network within the region.

Mr Ortega has extensive sales and marketing experience, as well as distributor and construction knowledge working within CASE IH as a distributor development manager,

Trimble Navigation as a sales manager, and also for BMW of America and Volkswagen of America.

"The Latin American market is very important to Gomaco and Frank brings with him international sales experience and his bilingual Spanish and English skills," said Kent Godbersen, Gomaco's VP of worldwide sales and marketing. "Frank has vast experience working with distributorships and with customers. We welcome him to our Gomaco team as he builds on the relationships with our concrete paving customers and future customers in the region." ■

Arup involves in Pacifico 3 highway project in Colombia

Arup has served as advisor to the lenders on the Pacifico 3 highway project, which is being developed under a public-private partnership (PPP) scheme. The US\$648 million financing of the project is the first to reach financial close in Colombia's ambitious fourth generation (4G) infrastructure programme.

Pacifico 3 encompasses the improvement and construction of 146 km of roads, including a 3.4 km tunnel and approximately 1.7 km of bridges and viaducts, to connect the regions of Antioquia, Caldas

and Risaralda. Following construction, the sponsor will operate the project for 25 years.

Arup guided the lenders' decision-making and deal-structuring process by providing analysis of the key commercial, engineering, construction, environmental and operations risks. The financing for the project includes a US\$260 million bond issued pursuant to Rule 144A and Regulation S of the US Securities Act - it is said to be the first overseas bond for a Colombian toll road. ■

Muskingum River Hydro to deliver Ohio hydropower projects

FFP New Hydro LLC and AECOM Capital, a subsidiary of AECOM, have formed Muskingum River Hydro LLC to develop and construct six hydropower projects on the Muskingum River in southeastern Ohio, in the US. The new company will advance the development of these projects to construction and commercial operation.

In the state of Ohio, the projects will represent a potential investment of more than US\$100 million. Each project is expected to create 100 to 150 jobs during construction as well as continued staffing and service employment during operations.

The six projects, four of which have received Federal Energy Regulatory Commission (FERC) licenses, are expected to generate a total of 23 MW, enough to power 11,500 homes and sustainably transform the Muskingum River communities. These low-impact generation facilities will be added to existing lock and dam structures owned and operated by the Ohio Department of Natural Resources.

The projects are expected to start construction in 2017 and commence operations by 2018. ■

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Sandvik forms new business area

Sandvik will merge its two operations - Sandvik Mining and Sandvik Construction - into one business area, Sandvik Mining and Rock Technology. It will be organised in a decentralised business model with separate product areas based on the product offering. Each product area will have full responsibility and accountability for its respective business.

“Products developed for the customer segments mining and construction are based on common technologies with a similar aftermarket offering. In addition, manufacturing units are already largely shared with to some extent shared front line resources. By joining the operations into one business area we achieve a leaner and more efficient structure. The decentralised business model enables

an even clearer focus and faster response to our customers,” said Björn Rosengren, Sandvik’s president and CEO.

The new structure will be effective from 1 July 2016 and Lars Engström, currently president of Sandvik Mining, has been appointed president of the new business area (Sandvik Mining and Rock Technology). Dinggui Gao, currently president of Sandvik Construction, will leave the company as of 1 July 2016.

“I would like to take the opportunity to thank Dinggui Gao for his dedicated work in supporting the merger of the new organisation. I would like to express my appreciation for his work to drive Sandvik Construction, resulting in documented improvements. I wish him all the best in his future career,” said Mr Rosengren. ■

Terex brings back Demag

Terex Cranes has relaunched its Demag brand, which will cover 11 all-terrain cranes, ranging from 100 to 1,200 t of capacity and seven lattice boom crawler cranes, ranging from 400 to 3,200 t of capacity. The news was recently announced at the bauma exhibition that took place in Munich, Germany, from 11 to 17 April 2016.

“I am very excited that we are reintroducing the Demag brand. We’re doing it because our customers asked us to bring the Demag brand back. It is as simple as that,” said Ken Lousberg, president of Terex Cranes. “The Demag brand is a legend and through extensive conversations with our customers, we understand how much the brand still means to them, and what their expectations are that go along with it. It’s a brand they have depended on every day for decades, and it continues to be one of the most recognised brands in the industry.”

He added, “We will continue to operate as one organisation representing two brands and no matter if our customers buy Terex or Demag branded products, they can expect top quality, reliable products, and a team that is proud to stand behind the products and services we offer.” ■

Left: Ken Lousberg, president of Terex Cranes (on the right), relaunched the Demag brand at bauma.



Demag AC 130-5 all-terrain crane.

Robit has new CEO

Finnish manufacturer Robit has appointed Mikko Mattila as its new CEO, replacing Jussi Rautiainen, who will now be focusing on planning and execution of the company’s future structural growth. Mr Rautiainen spent 11 years as CEO of Robit, during which he played an important role in the growth of the company, expanding from a local to an international enterprise.

Mr Mattila has been with Robit for 15 years and most recently served as the company’s group executive VP in charge of global manufacturing, sourcing and offering. Prior to that, Mr Mattila was CEO of Robit Korea and was responsible for the take-over and integration efforts of the South Korean acquisition. Mr Mattila also has over 10 years’ experience in international sales management of the company.

Headquartered in Lempäälä, Finland, Robit manufactures top hammer products for rock drilling and casing systems for ground drilling. ■

Mikko Mattila (right) is now CEO of Robit, taking over from Jussi Rautiainen (left).



Eric Etchart retires from Manitowoc



Eric Etchart (left) has retired from Manitowoc Cranes, after 33 years with the company. He worked in France, Italy, Singapore, China and the US, and led Manitowoc Cranes as president and general manager from 2007 to 2015.

Mr Etchart will now use his extensive experience to pursue various business interests outside Manitowoc, including involvement in board memberships and non-executive directorships for global businesses outside the lifting industry. He has taken on a number of these in recent years. ■

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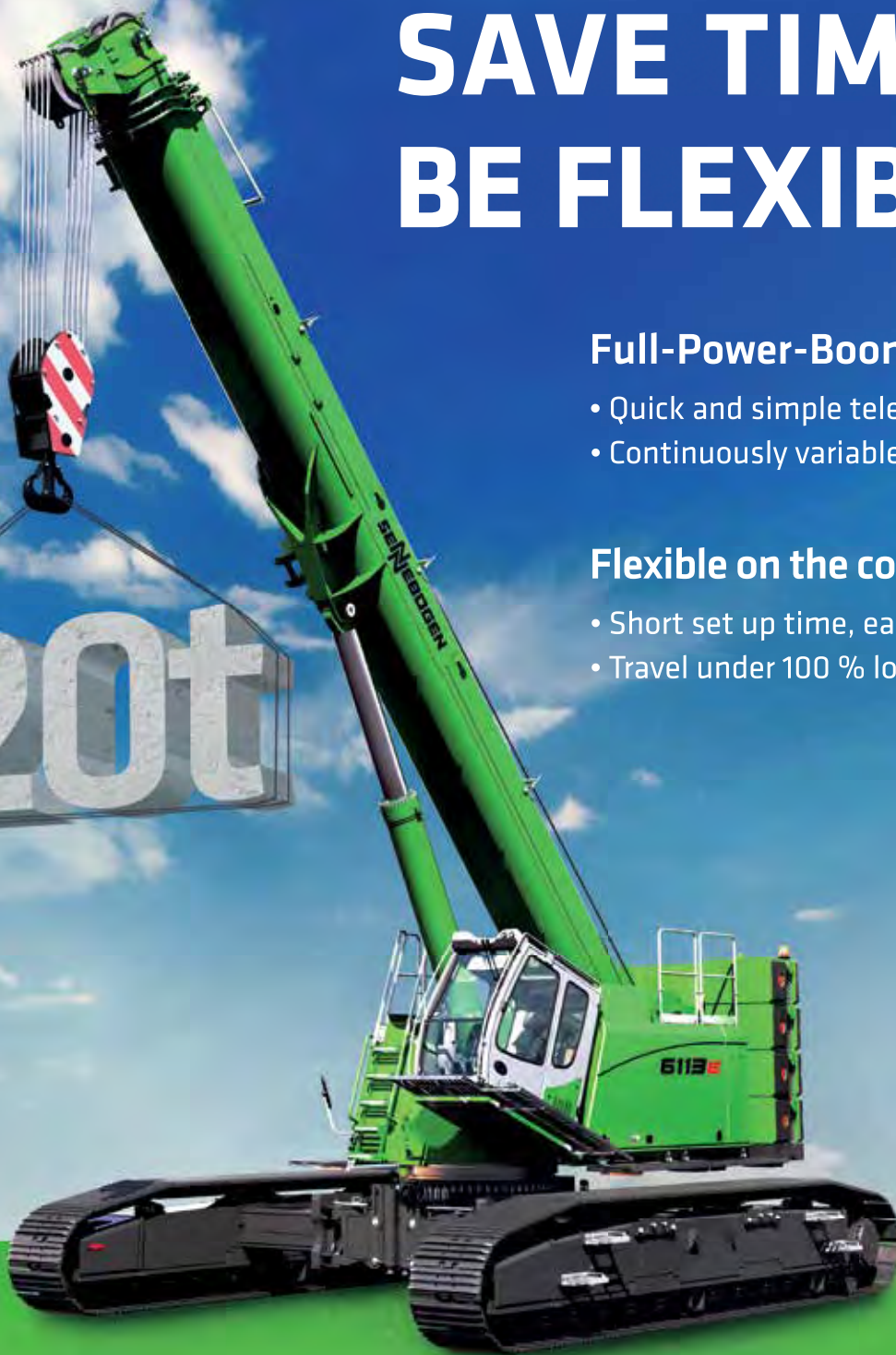
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Bernhard Kraus



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Maschinenfabrik GmbH

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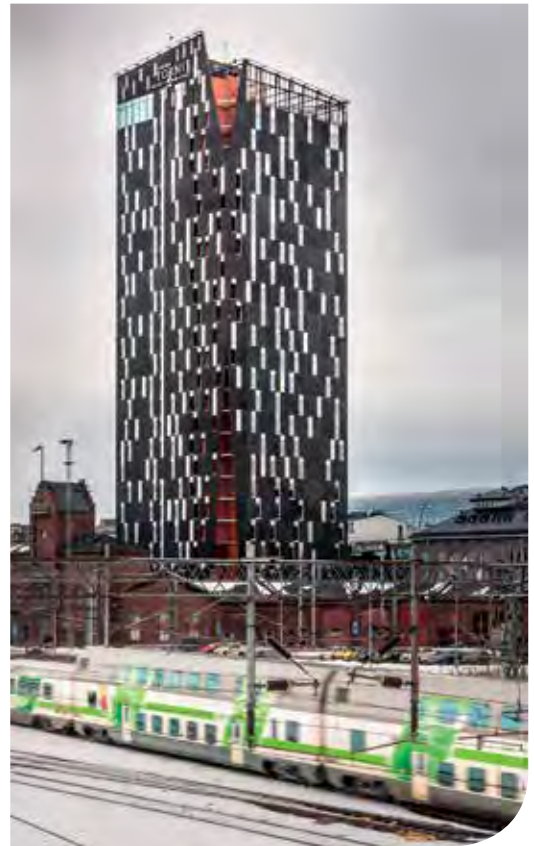
➔ bernhard.kraus@sennebogen.de

SENNEBOGEN

Date	Events in Asia	Organiser & Contact
17 to 19 May 2016	Coat & Corrosion Asia 2016 Putra World Trade Centre Kuala Lumpur Malaysia	ECMI ITE Asia Sdn Bhd Tel: +60 3 8023 0820, Fax: +60 3 8023 0830 Email: enquiry@ecmi.com.my Website: www.coatcorrosionasia.com
26 to 28 May 2016	BuildTech Yangon 2016 Myanmar Convention Centre Yangon Myanmar	Sphere Exhibits Pte Ltd Tel: +65 6319 4037 Email: lingoh@sph.com.sg Website: www.btyangon.com
8 to 10 Sept 2016	Cambuild 2016 Diamond Island Exhibition & Convention Centre Phnom Penh Cambodia	AMB Events Group Tel: +60 3 4041 9889, Fax: +60 3 2770 5301 Email: richard@ambexpo.com Website: www.cambuildexpo.com
14 to 16 Sept 2016	Concrete Show South East Asia 2016 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
21 to 23 Sept 2016	Concrete Asia 2016 IMPACT Exhibition and Convention Centre Bangkok Thailand	Impact Exhibition Management Co Ltd Tel: +65 6702 3005 Email: theresa.gan@giec.biz Website: www.concrete-asia.com
3 to 5 Nov 2016	OneBuild 2016 Kuala Lumpur Convention 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
9 to 11 Nov 2016	Konstruksi Indonesia 2016 Jakarta Convention Centre Jakarta Indonesia	PT. Infrastructure Asia Tel: +62 21 391 3037, Fax: +62 21 391 3349 Email: dwi@infrastructureasia.com Website: www.constructionindonesia.com
10 to 13 Nov 2016	Philconstruct 2016 SMX Convention Centre & World Trade Centre Manila The Philippines	Global-Link Exhibitions Specialist Tel: +63 2 893 7973, Fax: +63 2 550 1148 Email: info@gesi.com.ph Website: www.gesi.com.ph/philconstruct
22 to 25 Nov 2016	Bauma China 2016 Shanghai New International Expo Centre Shanghai China	Messe München GmbH Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bauma-china.com Website: www.bauma-china.com
12 to 15 Dec 2016	Bauma Conexpo India 2016 HUDA Ground, Gurgaon Delhi India	Messe München GmbH Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bcindia.com Website: www.bcindia.com
Date	Events outside Asia	Organiser & Contact
31 May to 4 Jun 2016	CTT 2016 Crocus Expo International Exhibition Centre Moscow Russia	IMAG Tel: +49 89 5529 12330, Fax: ++49 89 5529 12350 Email: christina.jaugstetter@imag.de Website: www.ctt-moscow.com
17 to 20 Jan 2017	World of Concrete 2017 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6379 Email: info@worldofconcrete.com Website: www.worldofconcrete.com
22 to 25 Feb 2017	Samoter 2017 Verona Exhibition Centre Verona Italy	Veronafiore Tel: +39 045 829 8111, Fax: +39 045 829 8288 Email: info@samoter.com Website: www.samoter.com
7 to 11 Mar 2017	Conexpo-Con/Agg 2017 Las Vegas Convention Centre Las Vegas, Nevada USA	Association of Equipment Manufacturers Tel: +1 414 298 4167, Fax: +1 414 272 2672 Email: international@conexpoconagg.com Website: www.conexpoconagg.com



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Preparations for bauma China 2016 in full swing

The next bauma China will take place from 22 to 25 November 2016 at the Shanghai New International Expo Centre (SNIEC), Shanghai, China. The organisers are planning for 300,000 sq m of exhibition space, covering 200,000 sq m of indoor area and 100,000 sq m outdoors.

Since its premiere in 2002 bauma China has grown from strength to strength. With 485 exhibitors and 32,068 visitors, the first event was relatively modest in size. But by 2006 those numbers had increased to more than 1,000 exhibitors and over 80,000 visitors. At the last event in 2014 the number of exhibitors exceeded the 3,000 mark for the first time; on the visitor side, too, a record was set, at just below 190,000.

bauma China started out with 41,000 sq m of exhibition space, but just two years later it covered over 100,000 sq m. And, since the 2012 event, it has been taking up the entire available space at the SNIEC.

A main objective of the Chinese government is to drive the country's economic growth, and one way of doing it is by the 'Made in China 2025' strategy, developed back in early 2014 by the Ministry for Industry and Information Technology. This focuses on promoting intelligent manufacturing (Industry 4.0) and strengthening the competitiveness of Chinese companies. For international companies the investments associated with this initiative offer great potential; for Chinese companies, it is a chance to become even more competitive.

The last bauma China in 2014 attracted a total of 3,098 exhibitors from 41 countries. This represents an increase of 14 percent as compared to 2012. And, despite the downwards trend in the market and the significant challenges confronting the sector,



Above and left: The last bauma China in 2014 attracted 3,098 exhibitors from 41 countries, and 189,732 visitors from 149 countries and regions.

the number of visitors was 189,732 from 149 countries and regions. The proportion of visitors coming from countries outside China rose to 12 percent. ■

Website: www.bauma-china.com

Inaugural Concrete Asia 2016

The first Concrete Asia 2016 exhibition and conference is scheduled to be held from 21 to 23 September 2016 at the IMPACT Exhibition and Convention Centre in Bangkok, Thailand. The event for the concrete construction industry is jointly organised by the Asian Concrete Construction Industry (ACCI) together with Globe International Events Consultancy Pte Ltd, Singapore and Impact Exhibition Management Company Thailand.

Concrete Asia 2016 will be part of the Asian Construction Week, which also comprises BMAM Expo Asia 2016 (the exhibition and conference on building maintenance and facilities management for the Asian region), GBR Expo Asia 2016 (the exhibition and conference on green building and retrofits for the Asian region) and PULIRE Asia Pacific 2016, which showcases the latest cleaning and hygiene technology for the institutional and industrial cleaning sectors in the region.

The Asian Construction week with the 4-in-1 exhibition and conference aims to attract over 450 exhibitors and trade professionals from across the region. The event's VIP buyer programme also expects to host more than 120 key buyers from across the region to facilitate close door buyer-seller meetings at Concrete Asia 2016.

In addition, Concrete Asia 2016 plans to organise a series of concurrent activities and conferences such as Concrete Asia Congress, Underground Construction Congress, Productivity in Construction and China-India Concrete Dialogue.

"Thailand has long been the strategic hub of Southeast Asia and is the second largest economy in the region located in the crossroad of Asia. Thailand's Infrastructure Development Plan from 2015-2022 with a budget of US\$75 billion as well as the planned increased government investment on infrastructure development by several neighbouring developing countries make it fitting for us to launch this event, which we envision as the leading trade, knowledge and networking platform for the concrete construction industry in Asia," said Prof Dai Xianming, president of ACCI.

He also explained that as the world enters the fourth industrial revolution, which is also known as 'Industry 4.0' defined by the application of Internet of Things (IOT), big data analytics, cyber-physical systems and many other advanced technologies, the concrete industry stands on the threshold of a major transformation that requires economies around the world, including Asia, to redefine and reinvent themselves in order to progress and thrive.

Other industry associations that support and endorse Concrete Asia 2016 include the Concrete branch of China Construction Industry Association (CCIA), Construction Institute of Thailand (CIT), Construction Industry Development Council, India (CIDC), Indian Society for Trenchless Technology (IndSTT), National Ready-Mixed Concrete Association of Malaysia (NRMCA), Ready-Mixed Concrete Association of Singapore (RMCAS), Thailand Concrete Association (TCA) and Thai Machinery Association (TMA). ■

Website: www.concrete-asia.com

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As of April 1st 2016, Kobelco Construction Machinery and Kobelco Cranes merged their management organizations to form Kobelco Construction Machinery Co., Ltd.

First APEX Asia to be held in 2017

The first APEX Asia is scheduled to take place from 31 October to 3 November 2017 at the Shanghai New International Expo Centre, Shanghai, China. It will be held parallel with CeMAT Asia, the trade fair for intralogistics and supply chain management. APEX Asia is an offshoot of the European APEX, which runs next from 2 to 4 May 2017 at the Amsterdam RAI Convention Centre in the Netherlands.

APEX Asia will be organised by UK-based publisher KHL Group and Netherlands-based exhibitions company Industrial Promotions International (IPI). Access International, the KHL Group magazine, and the International Powered Access Federation (IPAF), are APEX Asia supporters.

Like its European sister show, APEX Asia will cover the entire spectrum of access equipment, including scissor lifts, self-propelled booms, smaller vertical mast platforms and vehicle mounted platforms. Other equipment and services on show will include fall protection equipment, access towers, rental software suppliers and used equipment specialists. APEX Asia will be located in Hall W5 at CeMAT Asia with free movement of visitors between the two shows.

“Co-locating with CeMAT is an enormous benefit for APEX Asia. We are taking advantage of established links between the material handling and aerial platform sectors in China, where many early adopters of access come from the industrial truck sector. APEX Asia will expose aerial platforms to an enormous audience of current and potential buyers,” said Tony Kenter, managing director of IPI.

Alongside APEX Asia and CeMAT Asia, KHL will stage its International Rental Conference (IRC), an annual event for the



The first APEX Asia will be held from 31 October to 3 November 2017 in Shanghai, China. The show is an offshoot of the European APEX (pictured) that will return to the Amsterdam RAI Convention Centre in May 2017.

equipment rental sector that KHL has held in China since 2013. The conference - attracting up to 300 delegates - is organised by KHL publication International Rental News (IRN). Staging the conference alongside APEX Asia and CeMAT Asia will ensure a core audience of Asia's most important access rental managers and owners. ■

Website: www.apexasiashow.com

BuildTech Yangon returns with expanded focus

The third edition of BuildTech Yangon, Myanmar's trade show for the building and construction sector, will be held from 26 to 28 May 2016 at the Myanmar Convention Centre in Yangon. Organised by Sphere Exhibits, a subsidiary of Singapore Press Holdings (SPH), and co-organised by the Myanmar Construction Entrepreneurs Association (MCEA), BuildTech Yangon returns this year with an expanded focus, drawing approximately 120 exhibitors.

The show is also expected to attract over 4,500 visitors. It will feature four main areas, including onsite construction machinery and equipment; building materials and architectural solutions; interior furnishing; and facilities management.

“The third edition of BuildTech Yangon 2016 is indeed timely, with the new government preparing to take the reins to usher in a new era for the country. With the government prioritising infrastructure development in support of the country's burgeoning economic growth, the infrastructure construction in Myanmar is expected to achieve its fastest growth from the period 2012 to 2016,” said U Tha Htay, president of MCEA.

Construction Safety and Work at Heights are key highlights in this year's BuildTech Yangon Business Seminar Series. The seminar will cover a range of topics addressing key concerns in foreign investment, recent developments in construction laws governing building and construction investment in Myanmar, and infrastructure and construction management.

In addition, seminars focusing on Workplace Safety and Facilities Management have been added to the range of seminars



The outdoor area of BuildTech Yangon 2015.

for local professionals who are keen to attend a more technical and focused seminar platform. These seminars come with certificates of attendance from MCEA as well as industry points from Myanmar Engineering Council as part of its effort to encourage continued skills upgrading for professionals in the building construction sector.

BuildTech Yangon 2016 is supported by the International Facilities Management Association, Singapore Chapter; International Powered Access Federation; Malaysia Heavy Construction Equipment Owners Association; Myanmar Engineering Council; Myanmar Engineering Society; Myanmar Industries Association; Singapore Institute of Building Limited; VABM (Vietnam Association for Building Materials); Vietnam Electronics Industry Association; and WSH (Asia). ■

Website: www.btyangon.com

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New IPAF country representatives in Turkey, Nordic and Baltic regions

The International Powered Access Federation (IPAF) has appointed two country representatives to support its growing membership in Turkey as well as in the Nordic and Baltic regions.

Burcu Ünal is the IPAF country representative in Turkey. She is an occupational health and safety (OHS) professional based in Ankara, in her capacity as general manager at Platin OHS Consulting, Engineering & Trade Services. She is also an OHS expert and trainer, certified by the Ministry of Labour and Social Security (MoLSS), Turkey. Prior to that, she served as an OHS expert for eight years at the Directorate General of Occupational Health and Safety (DGOHS) under MoLSS.

Johan Friis is the IPAF country representative in the Nordic and Baltic regions (Denmark, Norway, Sweden, Finland, Estonia, Latvia and Lithuania). He is based



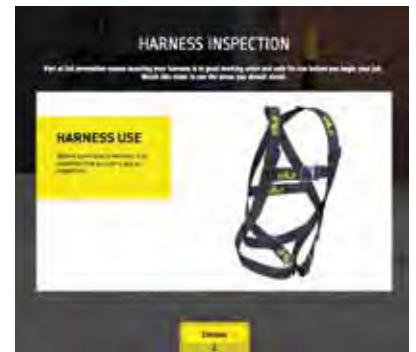
Burcu Ünal



Johan Friis.

in Finland and draws on his experience as managing director of Scan-Baltic Certified Construction, where he coordinates training and certification programmes for the Nordic construction market, working closely with Nordic construction companies, training companies and local authorities. He was previously country manager at Trackunit, and was responsible for its operations in Finland for fleet management services within the construction machine and rental industry. ■

IPAF instructors introduced to new learning tools



IPAF certified instructors have been given a preview of new learning tools that are set to rejuvenate IPAF's full training programme for operators of MEWPs. These new generation learning tools were the central theme at this year's series of IPAF Professional Development Seminars (PDS), which were attended by more than 683 instructors and covered 23 countries and eight languages.

The new tools include an eLearning theory module (pictured above), which delivers flexibility and interactivity, as well as an instructor-led theory course that uses the same graphics, animations and learning techniques. What remains the same in IPAF's operator training programme is the focus on practical training. Only trainees who pass a supervised theory test and a practical test are awarded a Smart PAL Card (Powered Access Licence) as proof of training.

IPAF instructors trained a record number of 145,094 people in 2015. This is an increase of 5.6 percent over the 137,436 people trained in 2014. Training available from IPAF-approved centres includes operator courses for which a PAL Card is issued, and harness and management courses for which a certificate is issued. IPAF issued a record 137,517 PAL Cards worldwide through its approved training centres in 2015, an increase of about 5.6 Percent over the 130,237 PAL Cards issued in 2014.

The PDS is the annual event for IPAF certified instructors and ensures that they remain up-to-date with legislation and training. Through attending the event, instructors gain Continuing Professional Development (CPD) points, necessary to maintain their IPAF instructor status. ■

Global MEWP rental fleet grows by 4 percent

There are now 1,170,000 mobile elevating work platforms (MEWPs) - also known as aerial work platforms (AWPs) - in the worldwide rental fleet. This is up 4 percent from the previous year, reveals new research commissioned by IPAF.

The US AWP rental market recorded moderate growth of 5 percent in 2015 to reach approximately US\$8.3 billion, according to the IPAF US Powered Access Rental Market Report 2016. The US AWP rental fleet expanded by 3 percent in 2015 to exceed 530,000 units. Due to the current slowdown in the oil sector, the proportion of construction end-markets in AWP rental increased slightly to reach 73 percent in 2015.

The Chinese MEWP rental fleet grew by about 35 percent in 2015 to reach approximately 12,200 units.

The European MEWP rental market grew by 3 percent in 2015 and is estimated at approximately €2.7 billion, according to the IPAF European Powered Access Rental Market Report 2016. Fleet expansion continued at a moderate pace to reach 313,000 units. The 10 European countries surveyed were: Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden and the UK.

Four groups can be identified among

the European countries: Spain and Italy are chalking up the highest growth and are well beyond the recession with growth at or above 5 percent in 2015; Sweden and Germany remain highly dynamic markets with continuous positive growth at +5 percent; The UK and Norway, traditionally dynamic markets, are showing signs of slower growth; Finland, France, the Netherlands and Denmark are showing stabilisation to slight growth, but are all exiting from recession.

The IPAF rental market reports highlight 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/AWP rental fleet worldwide, with a breakdown by region and machine type.

New aspects covered in the 2016 reports include: details on construction and non-construction sub-sectors in MEWP rental revenue, utilisation rates by equipment type (booms vs scissors), and preliminary estimates of the number of operators trained annually.

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. ■

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Terex Trucks unveils Generation 10 articulated hauler

Terex Trucks recently introduced its new Generation 10, 38 t articulated dump truck, the TA400. Featuring new livery and frontal design, the machine is the largest in the company's articulated range. To guarantee maximum uptime of the truck, investments have been made to ensure increased durability and protection of truck components, including upgraded hydraulic hoses, electrical interfaces, transmission mountings and brake pipes. To prolong hydraulic component lifecycles, the magnetic pressure filters reduce the risk of contaminants entering the system, and improves the cleanliness of the hydraulic oil.

Further lowering operational costs, as well as increasing safety, is the force-cooled multi-disc brakes. Supported by an electronic activated exhaust brake and a six-stage modulating transmission retarder, the TA400 benefits from longer brake component lifecycles. The transmission now features high performance oil that extends time between service intervals to 6,000 hours, and the powerful drivetrain maintains traction in even the most difficult terrain thanks to longitudinal and limited slip transverse differential locks.

The engine and drivetrain is well matched, utilising automatic adaptive shifting and a pre-selected two-speed transfer box (drop box), providing good performance and productivity for all haul conditions.

For enhanced operator comfort, ensuring a smooth haul and more productive operation, anti-vibration mounts for the engine and cabin, as well as cushioned stops on the steering cylinders have been integrated, and the cab features an improved air conditioning and ventilation system. Machine performance information has also been improved, including transmission diagnostics that informs the operator on the status of the machine, including the oil quality, oil level, filter life and fault codes/service indication.

Terex Trucks offers its articulated haulers to all global markets - the Stage IV range is designed for the European market, Tier 4 Final range for the North American market, and Tier 2 range for the non-regulated markets.

According to Terex Trucks, further models in its new generation articulated hauler range will follow later in 2016 and 2017. ■

Website: www.terextrucks.com



Above and left: The new Generation 10, 38 t Terex articulated dump truck, the TA400, features force-cooled multi-disc brakes, further reducing operational costs and enhancing safety. Supported by an electronic activated exhaust brake and a six-stage modulating transmission retarder, the TA400 benefits from longer brake component lifecycles.

Below: For enhanced operator comfort, ensuring a smooth haul and more productive operation, anti-vibration mounts for the engine and cabin, as well as cushioned stops on the steering cylinders have been integrated, and the cab features an improved air conditioning and ventilation system.

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New Grove GMK4100L-1 taxi crane from Manitowoc

Manitowoc's new four-axle GMK4100L-1 is part of a new generation of Grove taxi cranes, which will replace the GMK4100L. The new 100 t capacity crane delivers 6.9 percent better load charts overall when in its 26.2 t maximum counterweight configuration. In the taxi configuration with a 6.7 t counterweight, the GMK4100L-1 boasts an increase of 9.3 percent improved performance. Even when operated with the maximum roadable 19.9 t counterweight for up to 16.5 t per axle, the crane sets a new benchmark in its class.

Customers in North America will also benefit from the crane's fully removable counterweight, which reduces the basic crane's Gross Vehicle Weight to the lowest level in the four-axle category for a 100 t rated machine with a 60 m boom. Boosting the crane's overall reach is an 18 m telescopic swing-away jib, which can be extended with an 8 m boom extension for a total jib length of 26 m. The telescopic swing-away jib offers an improved offset of 0 - 45°.

The GMK4100L-1 is more compact than its predecessor, making easier to access narrow job sites. With 14-in tyres, the crane boasts a 2.55 m width versus the 2.75 m of the GMK4100L. Overall it is also 0.5 m shorter, making it more manoeuvrable on congested job sites.

The GMK4100L-1 is powered by a single engine, reducing the weight of the crane and thus allowing it to carry more counterweight. The Tier IV Final/Euromot 4 Mercedes-Benz OM470LA is a six-cylinder diesel engine with a 320 kW rating at 1,700 rpm and a maximum torque of 2,100 Nm at 1,300 rpm. Better profitability for users is available through the inclusion of the Fuel Saver function. The crane is also available with an equivalent Tier 3 engine.

In addition, the crane features Manitowoc's new Crane Control System (CCS) and the new Boom Configurator Mode. The standardised CCS is a user-friendly interface that Manitowoc is featuring on all new crane models. The CCS components and operating software have been specifically designed, developed and tested by Manitowoc to ensure the highest reliability standards. The highly intuitive Boom Configurator Mode makes it quick and easy to select the optimum boom position for a specific lift. The operator inputs the lift parameters such as radius, load or boom length to be moved and the system calculates the best boom configuration.



Above: The new GMK4100L-1 is part of a new generation of Grove taxi cranes, which will replace the GMK4100L.

Left: In the taxi configuration with a 6.7 t counterweight, the new GMK4100L-1 boasts an increase of 9.3 percent improved performance, compared to its predecessor.

Once the operator selects the preferred pinning system, Megaform boom shaping and Megatrak independent active suspension, are all included in the new GMK4100L-1. Deliveries of the new GMK4100L-1 are expected to start in the third quarter of 2016. ■

Furthermore, the look of the crane has been improved with a facelift that includes a new ergonomic carrier cab. Notable features such as the Twin-Lock boom

pinning system, Megaform boom shaping and Megatrak independent active suspension, are all included in the new GMK4100L-1. Deliveries of the new GMK4100L-1 are expected to start in the third quarter of 2016. ■

Website: www.manitowoccranes.com



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All-electric Genie boom lift for quiet performance

The Genie Z-60/37DC articulating boom combines the benefits of quieter, environment-friendly operation with the four-wheel drive performance of a traditional diesel-powered machine. Offering the advantages of zero emissions and full workday operation on just one charge, the new all-electric boom is ideal for indoor and outdoor applications, such as industrial plants, malls, convention centres and construction sites. As a result of its fast recharging capabilities that provide full charge from a 110-V wall power supply in less than 14 hours, operators can use this machine every day.

The Genie Z-60/37DC boom lift delivers 18 m of platform height, 11.15 m of horizontal outreach and 7.4 m of up-and-over clearance. Equipped with a jib that provides a high 70° up and 65° down range of motion, coupled with 160° of platform rotation, operators benefit from refined positioning power at the boom tip. The platform on this new all-electric articulating Genie boom machine is available in 1.8 m or 2.4 m versions with a capacity of 227 kg to provide two people access to the entire working envelope. Both platforms offer a side entry swing gate and front sliding mid rail as standard. The 2.4 m platform comes with an additional side sliding mid rail opposite the gate, for a total of three entry points.

Another benefit of this new unit is its Genie FastMast system, an efficient feature that enables the boom to be moved from full height to below grade and back with just one boom function. With the secondary fully elevated, the primary can reach all the way to the ground and then back to full height. Drivable at full height, the Genie Z-60/37DC boom lift is also equipped with a dual parallel linkage design so operators can vertically track a building by simply raising or lowering the secondary boom.

As a result of its rugged four-wheel drive design, operators will appreciate the 'go anywhere' capabilities of this quiet, zero-emissions articulating Genie boom. With fully sealed AC drive motors that can still perform while submerged up to 91 cm of water, it is also able to go 25 percent faster and climb slopes better than typical diesel-powered units. Engineered with a drive and oscillating axle system, the Genie Z-60/37DC boom lift performs similarly to other Genie rough-terrain machines, such as the Genie Z-62/40 and



S-60 boom lifts. It is equipped standard with all-terrain, non-marking tyres that give operators the flexibility to work in interior and outdoor applications.

Having a narrow footprint with the advantage of a low tail swing of just 58 cm with the boom elevated, the Genie Z-60/37DC boom lift can easily access confined areas at job sites. Combining a low machine weight of 7,530 kg with the advantages of an 8 m stowed length, the unit is also as easy to transport on a standard truck, as it is simple and smooth to operate.

The Genie Z-60/37DC articulating boom is available globally. ■

Website: www.genielift.com

Top and left: Genie's Z-60/37DC boom lift offers the advantages of zero emissions and full workday operation on just one charge.



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Bauer's ValueLine medium-sized platform series

Bauer's new rotary drilling rigs of the ValueLine series, the medium-sized platform range, is designed for bored piles with a diameter of up to 2.5 m and a drilling depth of up to 70 m. This new range includes BG 26, which is the lowest-priced model, and BG 30 in the larger version.

The core element of the medium-sized platform series is the common base unit BT, which was designed and constructed by Bauer. It offers high safety standards and very low noise emission values, said the company. The large cross-sections of the hydraulic lines provide optimal engine efficiency, which is reflected in the fuel consumption. For difficult conditions, a BTM torque converter or a casing oscillator can also be attached.

The ValueLine medium-sized platform series has other new features that make maintenance, assembly and disassembly easier. An integrated service platform allows easy and safe access for all maintenance work in the uppercarriage. There is a grating step that is connected to a part of the side panelling and that is pulled out from the uppercarriage. The side panelling thus serves as protection against falling. All the service points can be reached from the ground or from the platform without any difficulties.

According to Bauer, measurements taken during the initial construction site operations showed that the fuel consumption is up to 30 percent lower than that of the predecessor. ■

Website: www.bauer.de



Bauer's ValueLine medium-sized platform series includes BG 26 and BG 30 drilling rigs. The core element is the common base unit BT, which was developed by Bauer.

Innovative shaft inspection device

An important part of bored pile/drilled shaft construction is the cleaning and inspection of the bottom of the hole for cleanliness prior to the placement of reinforcement and concrete. It is often carried out by lowering a camera down the borehole, to give a rough idea of the thickness of any debris left at the bottom.

Pile Dynamics now offers SQUID (Shaft Quantitative Inspection Device), an alternative to the camera-based visual inspection of the excavated shaft base. It assesses cleanliness by measuring the thickness of the debris or non-competent material remaining at the shaft base, and can also provide a quantitative evaluation of the strength of the bearing layer.

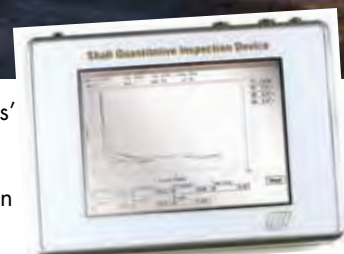
A drill stub column adaptor allows for a quick pinned connection to the Kelly bar of any drill rig; the rig itself lowers the SQUID body to the base of the shaft. The SQUID body includes three retractable contact plates attached to displacement transducers, and one instrumented cone penetrometer for each contact plate. The penetrometer cones move through the debris layer and into the bearing material under the weight of the Kelly bar and measure pressure, while the transducers measure displacement. The SQUID body connects by cable to a wireless transmitter at the edge of the borehole; the transmitter sends pressure and displacement data to the SQUID Tablet.

The wireless data transmission to the tablet - where data is visualised - allows for the user holding it to be positioned at a safe distance from the borehole. The SQUID Tablet displays, among other information, the depth of the non-competent layer and the maximum penetrometer cone tip pressure. ■

Website: www.pile.com/pdi



Above and inset: Pile Dynamics' Shaft Quantitative Inspection Device is an alternative to the camera-based visual inspection of the excavated shaft base.



Trimble's new machine control system for wheel loaders

Trimble has introduced version 12.81 of its GCS900 Grade Control System. This new version further expands the mix of machines supported to include wheel loaders, meeting the needs of contractors for construction technology across a mixed fleet and for all phases of the project life cycle.

The Trimble GCS900 version 12.81 release includes a new 3D configuration for wheel loaders. Such feature would be able to help contractors realise their productivity gains in both fine and rough grading applications. Operators can precisely control the amount of material being graded, improve fine grading accuracy and time, and reduce the potential for undercutting the surface during material placement or removal.

Using a wheel loader equipped with GCS900, contractors can track material weight with a Trimble Loadrite weighing system. In addition, material placement and grade can be monitored by adding a



The Trimble GCS900 Grade Control System version 12.81 includes a 3D configuration for wheel loaders.

VisionLink Project Monitoring subscription for a more accurate and complete picture of project progress. ■

Website: www.trimble.com

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Hyundai HX220 L hydraulic excavator

The new 22 t Hyundai HX220 L crawler excavator is fitted with an ECO Gauge, which enables the economic operation of the machine. The gauge level and colour displays engine torque and fuel efficiency level. In addition, the gauge indicates the status of fuel consumption such as average rate and the total amount of fuel consumed. According to Hyundai, the HX220 L can offer a reduction in fuel consumption of up to 12 percent - depending on the type of operation - in comparison to the 9A-series of machines. The IPC (Intelligent Power Control) controls power depending on work environments.

The HX220 L is powered by a 182.6 hp Cummins QSB6.7 four-cycle turbocharged air-cooled diesel engine, which complies with Stage IV emission standards. Hyundai said that compared to the 9A-series, the HX range boasts a 90 percent reduction in NOx. The company has chosen a combined solution with EGR and SCR technology.

The HX series provides higher productivity onsite by faster operation: the HX220 L can load trucks up to 5 percent faster and levels up to 4 percent faster than the 9A-series. In order to achieve efficient grading, the HX series can apply boom floating control using arm-in and arm-out operation only, allowing stable operation even in high-load work.

The machine's rear working lights have been repositioned for a better view. A new machine guard has been installed and the air filters are now more accessible for maintenance. The cabin has also been redesigned – a new larger front screen has been incorporated and the driver's door is now easier to open from the inside with an additional handrail. Furthermore, the interior of the HX-cab offers 13 percent more space for the operator (compared to 9A-series).

One of the highlights on the HX series is the new and larger 8-in touchscreen monitor – the cluster monitor displays information which mirrors what users would see on their smart phone and is 30 percent larger than previous models. It is also easy to read and the main view of the screen can be adjusted according to the preferences of the driver. It can be controlled via touch control and/or new haptic control switch, which is common in passenger cars.

New safety features include Hyundai's AAVM (Advanced Around View Monitoring) system for 360°-surround virtual operating view – which displays on the 8-in cluster monitor. The system consists of an Around View Monitoring (AVM) system that gives a 360°-surround virtual operating view and an Intelligent Moving Object Detection (IMOD) system that senses and warns the operator when objects come within 5 m of the machine.

On the Hyundai HX series, the cabs are all ROPS (Roll Over Protection Structure) certified, and with Hyundai's optional FOG (Falling Objects Guard), the cabs also meet FOPS (Falling Objects Protection Structure) Level 2 standards. Other safety features include boom safety lock as standard and arm cylinder locks as an option. An overload alarm with pressure setting customisable through the touch screen monitor is standard as well.

The machine is also fitted with Hi-Mate, which is a remote management system developed by Hyundai. Through its satellite powered technology, customers can enjoy a good level of service and product support. With one press of the button, users are able to remotely evaluate machine performance, access diagnostic information and verify machine locations. It is even possible to programme a virtual 'geo-fence' to prevent the machine from leaving a specific area. ■

Website: www.hyundai-ce.com



Top and above: The new Hyundai HX220 L crawler excavator can offer a reduction in fuel consumption of up to 12 percent, depending on the type of operation, compared to the 9A-series.

GRW diesel generators ideal for rental companies

Pramac's new range of mobile diesel generators, the GRW series, is capable of working in various applications where temporary power supply is needed. It is particularly ideal for rental companies, thanks to its versatility, high efficiency and high structural resistance.

The GRW series has low environmental impact due to its low noise emissions and fully bunded base frame able to retain 110 percent liquids, complete with a leak detection sensor. It is also long lasting and long running due to its 1000+H tested salt spray resistant canopy and large metal fuel tank (at least 20/24h autonomy depending on the genset model) with internal baffles.

In addition, the GRW series features wide access doors, forklift pockets, large and user-friendly control panel and canopy panels with washable soundproofing material – all for ease of use and maintenance. It also has fully waterproof air inlet openings, synchronous brushless alternator with reinforced insulation for tropical environment and tropical cooling system. With 20 to 560 kVA of power, the GRW series is provided with EU Stage 3A engines.

Based in Italy, Pramac designs, manufactures and installs a wide range of portable and stationary generators from 1 to 3,360 kVA. The company can also provide tailored solutions to meet specific requirements. ■

Website: www.pramac.com



Left and below: The GRW series can be used in various applications where temporary power supply is needed. It is particularly ideal for rental companies, thanks to its versatility, high efficiency and high structural resistance.



FAHH multi-purpose rig



The FAHH integrated rig (above) has many capabilities. It is designed to operate in challenging working conditions and can be easily transported from one jobsite to another. Suitable for 20-70 t hydraulic crawlers, the rig can be used as a hydraulic impact hammer (0.5-7 t capacity); continuous flight auger (diameter of 400-1,200 mm and depth of 10-24 m); down-the-hole hammer (diameter of 150-600 mm and depth of 10-24 m/1 pass); and for deep soil/cement mixing (diameter of 800-1,200 mm and depth of 10-24 m/1 pass). ■

Website: www.fnapl.com

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TIP Reporter shows soil profile and reinforcing cage.



www-foundations.cc



www.pile.com/tip
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Various compressors from Sullair

Sullair offers both portable and stationary compressors as well as the accompanying aftermarket equipment. Its portable compressors range from 185 to 1,600 cfm, with output pressures from 100 to 500 psi. They are designed to be highly durable in extreme field conditions.

The DS series of Sullair oil-free compressors is available from 75 to 250 kW. According to the company, this range is fast gaining popularity in Southeast Asia, with many units being installed across the region.

The GS series ranges from 15 to 75 kW. This water-injected oil-free compressor is designed to meet the most stringent requirements, featuring a double-screw structure. It offers high efficiency, low noise and low maintenance costs. The airend shell is made of bronze, treated for anti-corrosion and durability; along with the screws of stainless steel shaft and polymer ceramic rotors, the reliability of the equipment can be guaranteed. ■

Website: www.sullair.com



Sullair portable compressors range from 185 to 1,600 cfm, with output pressures from 100 to 500 psi. They are suitable for use in extreme field conditions.



Sullair DS series of oil-free compressors is available from 75 to 250 kW. This range has been widely used in the Southeast Asian market.

Tsurumi submersible pumps for flood countermeasures

Tsurumi submersible pumps for construction work can be used as rain drainage pumps to manage floodwater, simply by replacing the standard hose connection with the flange connection. As such, there is no need to install a new pump station or new drainage equipment, said Tsurumi.

The KRS-series is large-capacity pumps that provide a maximum flow rate of 12 cu m/min. They are easy to install and remove, and deliver reliability, durability and ease of maintenance as construction work pumps, making them practical countermeasures against flooding. The KRS-series features various models with discharge bore diameters of 80 to 250 mm and motor outputs ranging from 2.2 to 22 kW.

In addition to the KRS-series, Tsurumi offers a variety of pumps for construction work that can double as flood countermeasures. Tsurumi's pumps come standard with an anti-wicking cable and dual inside mechanical seals with silicone carbide faces. ■

Website: www.tsurumi-global.com



Above and below: Tsurumi submersible pumps for construction work can be used as rain drainage pumps to manage flood water, simply by replacing the standard hose connection with the flange connection.



Rammer builds new, tough PRO hammers

The new PRO hammers, the Rammer 2577 PRO and Rammer 5011 PRO, are suitable for carriers in the 21-32 t and 43-80 t weight range respectively. They have been specifically designed to work horizontally and undertake tunnelling duties in hard rock, being purpose built to withstand high levels of dust.

The 1,940 kg Rammer 2577 PRO and the 5,300 kg Rammer 5011 PRO are both based on the Rammer 2577 and 5011 hammers. These new models share many key features. They have an Idle Blow Protector that works regardless of working mode to provide greater levels of protection. They are also equipped with long-life, high-tension VIDAT tie rods for improved reliability, extended service periods and lower operating costs.

Customers choosing the PRO range also benefit from a sealed housing structure, which prevents the ingress of dust and dirt, thereby extending the working life of both the hammer and the tool. A top cover plate has sealed through apertures for stump hydraulic

hoses, and features sealed hose connections for grease, air and water.

The PRO hammers have a sturdy housing design and wear-resistant wear-plates that make them ideal for horizontal working duties. To match the demands of the extreme applications in which they will work, the Rammer PRO range models are also offered with special tools for horizontal primary breaking, which have been designed to work with a broad range of auxiliary systems.

In addition, Rammer has put together a full package of auxiliary systems and solutions to assist in tunnelling activities: the AGW unit (Air Grease Water). It comprises several features including the Ramair air flush system that prevents potentially harmful dust ingress; the Ramlube I automatic lubrication system to ensure consistent and thorough greasing; and the water jet dust suppression package to minimise the creation of dust during breaking. ■

Website: www.rammer.com



Rammer's new PRO hammers.

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'Safe climbing' at Singapore Chinese Cultural Centre

The Singapore Chinese Cultural Centre (SCCC) is an 11-storey building occupying a site of 5,074 sq m next to the Singapore Conference Hall along Shenton Way. Scheduled for completion in 2016, the development will provide venues for art performances, exhibitions and conferences.

The vertical elements of the building require a fair-faced concrete finish. For this, the Peri Vario wall formwork attached to the Peri RCS rail climbing system provides a smooth surface finish with safe working conditions at high levels.

Productivity is increased further with the use of Peri RCS landing platform. This offers additional space on the construction site where the PD 8 table form can be hoisted up. The Peri PD 8 table formwork has enabled the site to increase productivity on typical storeys by continuous reuse of the standard tables. Different table heights allow the contractor to work easily around complex slab and beam structures of various dimensions.

The cantilever slab, which is seven storeys high, was supported by the ST 100 stacking tower system. The SCCC site has also benefited from the system due to its flexibility; it has catered for the staggered floor layout and changing floor heights throughout the project.

The Peri ST 100 has been designed for fast assembly and disassembly. Individual components are fitted together without tools. While erecting the shoring system the ST 100 provides safe access by simply installing the decks on the frames.

Website: www.periasia.com



Top: The Singapore Chinese Cultural Centre is currently under construction. Upon completion, it will provide venues for art performances, exhibitions and conferences.

Above: Peri's PD 8 table form with handrails being used to increase safety during construction.

Left: Peri's RCS rail climbing system caters for shear walls and lift cores casted ahead of the slabs.



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KTC relies on Volvo fleet at Changi Airport T5 site

Singapore Changi Airport is currently undergoing a major expansion programme, which includes the construction of two new terminals, a third runway, airport apron and a new shopping mall. One of the key highlights is the S\$3 billion Terminal 5 (T5); once completed in 2025, it will be able to handle a capacity of 50 million passengers a year – more than Terminals 1, 2 and 3 combined.

To prepare for its construction, an estimated 45 mil cu m of earth will have to be moved. KTC Group Holdings, a specialist in earthmoving, has been tasked to handle a third – 15 mil cu m – of the site's earthmoving responsibilities.

At the moment, around 40 Volvo A40 articulated haulers plus a number of excavators operated by KTC are working 12 hours a day at the T5 site. The plan, eventually, is to transition to 24 hours a day to speed up the earthmoving process. During this peak period, KTC is expected to be moving an estimated 1.1 mil cu m of earth per month.

The Volvo A40 articulated haulers can handle payloads up to 36 t, and are equipped with the all-Volvo drivetrain to deliver maximum productivity. According to KTC, Volvo machines have a 5 to 10 percent lower consumption rate than others.

Volvo CE said there are currently a total of 111 Volvo machines used by main contractors, sub-contractors and rental companies working on T5. Seventy eight of these arrived new at the site, while the others are either existing local units or have been shipped in from overseas. ■

Website: www.volvoce.com



Top and above: A fleet of Volvo machines has been working on Singapore Changi Airport's Terminal 5 project.

Haulotte boom lifts help build Katong Square

Haulotte machines are being used on the development of Katong Square, located along East Coast Road in Singapore. This new complex will feature a commercial centre and two hotels, Hotel Indigo and Holiday Inn Express by Intercontinental Hotel Group, whilst conserving the former Joo Chiat Police Station, a two-storey building constructed in the 1920s.

The Haulotte HT23 RTJ telescopic boom lift and HA18 SPX articulating boom lift are both carrying out facade work on the project. The HT23 RTJ features a working height of 22.5 m, a platform height of 20.5 m and a horizontal outreach of 18.3 m. The HA18 SPX has a working height of 17.2 m, a platform height of 15.2 m and a horizontal outreach of 10.6 m.

Expected to open soon this year, Katong Square is owned by Katong Holdings, which is jointly owned by Grasp Contract Providers, Keong Hong Development and Asia Improvement. The new development will offer 20 F&B outlets, 300 parking lots and 600 hotel rooms. ■

Website: www.haulotte.sg



Haulotte HA18 SPX articulating boom lift carries out facade work at Katong Square.

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Sandvik drilling rigs work on Nepal hydropower projects

Himal Hydro has recently been involved in a number of hydropower projects across Nepal, including the Mai Hydropower Project (22 MW) in Ilam District, AndhiKhola Hydropower Project (5.1 to 9.4 MW) in Syangja District, and Bhairabkunda Hydroelectric Project (3 MW) in Sindhupalchowk District.

For the projects, Himal Hydro decided to use a Sandvik surface drilling rig, the Commando DC125R. It is a hydraulic, self-propelled drilling machine on a four-wheel drive carrier, which can manoeuvre easily in tight places and tough conditions in the mountains of Nepal. It is also suitable for foundation drilling, road cutting, trenching, demolition works and other related activities involved in Himal Hydro's projects.

Himal Hydro was founded in 1978, jointly owned by the Government of Nepal, United Mission to Nepal and Nepal Jalabidyut Prabardhan Tatha Bikas Ltd (NJPB).

In addition, High Himalaya Hydro Pvt Ltd (3HC) has invested in a Sandvik DD321 drilling jumbo to undertake hydropower and other infrastructure projects in Nepal. The company is primarily owned by M/S Jupiter Hydro & General Construction Pvt Ltd, with M/S Megatech Hydro & Infrastructure Pvt Ltd and M/s Road show Investment Company Pvt Ltd also owning significant interests.

The DD321 drilling jumbo is ideal for 3HC's small scale tunnelling operations. Powered by new efficient rock drills, robust booms and a wide selection of feeds, it offers an optimal coverage of 49 sq m. The carrier layout is specifically designed for safe access to all service points, and all daily maintenance is conducted at ground level. Adjustable drilling settings of the new hydraulic control system optimise drilling performance in any conditions. To ensure highly accurate drilling results and enable valuable feedback information of the drilling process, the rig may also be equipped with TCAD+ instrumentation. ■

Website: www.construction.sandvik.com

Middle: The Commando DC125R is a hydraulic, self-propelled drilling machine on a four-wheel drive carrier, which can manoeuvre easily in tight places and tough conditions.

Right: The Sandvik DD321 drilling jumbo is ideal for small scale tunnelling operations. Nepalese company 3HC has acquired a unit of DD321 to work on some projects.



Above: Sandvik's Commando DC125R surface drilling rig on a Nepal hydropower project.





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www.sullair.com

Manitowoc's solution for Singapore's rail project

Two Manitowoc crawler cranes, a 100 t capacity Manitowoc 11000-1 and an 80 t capacity Manitowoc 8500-1, are being used by Fuchi Pte Ltd in Singapore to support strutting and waler positioning efforts at Springleaf MRT Station. Work for the cranes started in 2015 and is expected to conclude in 2018.

Springleaf is one of the MRT stations along the new Thomson Line, which is being built by the Land Transport Authority of Singapore (LTA). When completed in 2019, the 30 km Thomson Line will have 22 stations including six interchange stations connecting to all other existing MRT lines.

Fuchi, which specialises in groundwork and activities such as strutting, sheet piling and shoring, was commissioned to work on the Thomson Line by the project's main contractor John Holland. Project management is a joint venture of Leighton-John Holland, which comprises John Holland as well as Leighton Asia, India and Offshore, with John Holland acting as main contractor. Fuchi's work on the project is temporary support specialist for tunnelling projects.

Both Manitowoc crawler cranes were supplied to Fuchi by local dealer, JP Nelson. Prior to arrival on site the cranes were assessed by the LTA to ensure acceptable levels of safety, reliability and capability.

The first part of Fuchi's work involves lifting steel struts, which

weigh between 2 t and 6.5 t, and lowering them into the excavated ground of the station to support the earth while the concrete walls are built. These struts are lifted by Manitowoc crawler cranes at radii to 16 m. To handle the lifting work, the Manitowoc 11000-1 is rigged with 37 m of boom, and the Manitowoc 8500-1 with 36 m of boom.

On average, one or more struts can be placed each day with the rate of placement dependent on the size and positioning of each strut as well as other scheduled work for the day. Given that almost 400 struts have to be set, the job site virtually runs 24 hours a day to prevent delays. Once the concrete walls are set in the tunnels, the Manitowoc cranes will be used to remove the struts and walers.

The Manitowoc 11000-1 and 8500-1 are available anytime, although lifting work is typically minimised between 10 pm and 5 am due to noise disturbance – affecting nearby residents – and visibility factors attributed to a lack of natural light.

In addition to the steel struts, the crawler cranes will be involved in positioning walers, which serve as brackets to hold the struts in place. The cranes are relocated on a weekly basis to different positions on the job site but generally do not move too far, with the aim of handling as much work as possible from a single location. ■

Website: www.manitowoccranes.com



Left and right: Manitowoc's crawler cranes being used by Fuchi Pte Ltd to support strutting and waler positioning efforts at Springleaf MRT Station in Singapore.

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Dynaset equipment offers high mobility on site

Maanrakennus Haapioniemi has been tasked to install ground anchors all over Finland. These anchors are being installed with 1,200 mm steel bars by a hydraulic hammer. For electricity and compressed air production, the company has selected a Dynaset HG hydraulic generator and HKL hydraulic compressor, which are integrated into its excavators.

The compact Dynaset HG3, 5 kVA hydraulic generator converts the hydraulic power of an excavator into high quality electricity. The hydraulic generator runs the electric hammer drill, other electric tools and additional working lights, making the work easier since electricity is always available.

The Dynaset HLK400 hydraulic compressor is installed on the excavator to produce compressed air for a hammer drill. The hydraulic compressor allows the operator to use various pneumatic tools. Maanrakennus Haapioniemi employs both electric and hydraulic hammer drills. The hydraulic hammer drill uses compressed air to enhance drilling; the compressed air is targeted at the head of the drill bit.

The Dynaset hydraulic equipment allows Maanrakennus Haapioniemi to be highly mobile and follow tight schedules, thus increasing its work productivity on the jobsite. ■

Website: www.dynaset.com



Top and above: Maanrakennus Haapioniemi installs ground anchors with the help of Dynaset hydraulic equipment.

Terex's rock-solid support for Zimbabwean quarries

Zimbabwean granite aggregate producer Davis Granite has recently added a TR45 to its fleet of four Terex Trucks rigid haulers. Now operating at its Bulawayo and Harare quarries, the fleet includes two TR45s and two TR60s. The machines are hauling approximately 80,000 t per month of stone products, 12 hours a day and five days a week.

Headquartered in Bulawayo, Davis Granite handles the extraction, production and supply of stone, builders aggregate and sand for road building and other civil applications throughout Zimbabwe. As one of the nation's largest producers of granite aggregates, Davis Granite relies on Terex Trucks rigid dump trucks to haul its stone from the pit to the crusher. The addition of the second TR45, with a maximum payload of 41 t, will increase productivity and uptime for the company's Bulawayo operation.

Davis Granite has operational quarries in Bulawayo, Harare, Hwange, Marondera and Gweru, as well as a mobile mining contracting and crushing plant, which can be installed as per customer requirements for larger orders. Davis Granite said Terex Trucks rigid haulers perform well, especially in terms of their capability to haul heavy loads uphill. The cab is also spacious and comfortable, with good seat suspension, which is a great advantage while working for long hours on the rocky quarry roads. ■

Website: www.terextrucks.com



Top and above: Davis Granite uses Terex rigid dump trucks to haul its stone from the pit to the crusher.

Rebuilding at Ground Zero continues with Doka

The World Trade Centre Tower 3 in New York, the US, is scheduled to open in 2017, featuring an overall height of 357 m. The building is planned to be the third highest on the World Trade Centre area, with a design that combines concrete and steel. The core made of reinforced concrete is enveloped by the silhouette of a steel structure, while the facade features glass panels. Most storeys will accommodate offices; shops and technical facilities are slated to occupy the podium covering the first eight levels. A massive reinforced steel core with built-in lifts and staircases dominates the interior of the building.

Doka's formwork solution has been chosen for the project, comprising an automatic climbing formwork, a timber-beam formwork, a table lifting system and innovative floor props for above-average ceiling heights.

The SKE100 automatic climbing formwork plus capable of transporting up to 10 t per unit is ideal for repositioning large working platforms consisting of Frami S framed formwork and Top 50 S large-area formwork. The automatic climbing formwork is used on the outside of the building. The platform levels are completely enclosed, so that the site crew can work safely in any weather condition and even at wind speeds up to 72 km/h.

The self-climbing TLS table lifting system that is attached to the exterior wall is a safe way to reposition floor-slab formwork, tools and other equipment without the need for a crane. The inner building core is poured using the high-performing automatic climbing formwork, the Super Climber SCP.

Other systems used on the project include the 10k shoring system and Doka stair tower 250. ■

Website: www.doka.com



The World Trade Centre Tower 3 is situated right next to the 9/11 memorial.



Right: Doka's self-climbing TLS table lifting system that is attached to the exterior wall repositions floor-slab formwork and tools without the need for a crane.

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BANGKOK MRT PURPLE LINE

The MRT Purple Line in Bangkok, Thailand, is currently under construction. Costing an estimated THB61 billion, the project was conceived as a solution to the travel and traffic woes faced by commuters in Nonthaburi Province, northwest of the Thai capital. When completed, this new metro line is expected to take some 50,000 passengers off saturated roads during rush hour.

For the past eight years, Aurecon has worked closely with the Mass Rapid Transit Authority of Thailand (MRTA) and Italian-Thai Development (ITD) to oversee the design, planning and construction of the track works for the Purple Line.

“Once operational, the Purple Line will help ease traffic conditions and provide residents in Nonthaburi Province with a quick and convenient means to travel to and from the central and southern parts of Bangkok,” explained Sakorn Kruemai, country manager of Aurecon in Thailand.

Design and construction work has been completed for the 23 km of elevated tracks and 16 stations, as well as for a 330 m bridge across the Chao Phraya River and a three-storey depot building. The Purple Line’s headquarters is home to a train depot, train stabling building, workshop, car park and office space. The project is currently in a testing and commissioning phase and is expected to be ready to start operations in mid-2016.

Ballastless tracks

Aurecon’s commission with ITD started in November 2012, when the company was called in to consult on trackwork design services, including the track plinth and slab design, the selection of track components (the fastening and third rail system), and stray current protection design. The company also contributed its expertise to the rail structure interaction analysis.

As part of its work on the design and in compliance with client requirements, Aurecon specified ballastless tracks throughout. Although this track structure is a higher capital cost when compared with traditional rail track design, it has the advantage of significantly reducing the need for frequent maintenance, which in turn reduces overall lifetime costs and operational disruptions, according to Aurecon.

The company explained that unlike



Above and left: Construction work on the Purple Line is ongoing and passenger operations are on track to begin in August 2016.

Below: Aurecon specified ballastless tracks throughout. Such design significantly reduces the need for frequent maintenance, which in turn reduces overall lifetime costs and operational disruptions.



Continued on page 64...

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Continued from page 62...

conventional tracks, ballastless tracks are supported on a continuous slab of reinforced concrete with robust stress resistant properties; by comparison, traditional track designs require frequent maintenance because of the wear and tear that welded rails and supporting sleepers experience.

Phra Nang Klao Bridge

During the construction, one of the most notable engineering achievements was the construction of the 330 m Phra Nang Klao Bridge over the Chao Phraya River. The bridge was designed by MRTA's project consultant and constructed by a local civil works contractor. For Aurecon, its work on the bridge included the analyses of the trackwork over the bridge, plus the design of the ballastless track, which was then constructed by ITD. Aurecon's analyses made up a crucial part of the bridge project, by determining the need for, and the location of, the rail expansion joints.

The bridge's design consists of a five-span continuous rigid frame connected by single cell prestressed concrete box girders. Using prestressed concrete in the design meant the bridge's spans could be longer because of the higher tensile strength prestressed concrete has versus traditional reinforced concrete, said Aurecon. The bridge was constructed using a balanced cantilever erection method with the assistance of form travelers.

At approximately 15 m, the above-average depth of the Chao Phraya River also represented a significant foundation challenge for the Phra Nang Klao Bridge.



Above and left: The Ministry of Public Health Station (above) and Yaek Tiwanon Station (left) are part of the Purple Line.

Below left: The Purple Line's headquarters is home to a train depot, train stabling building (pictured), workshop, car park and office space.

To overcome this, the design team selected groups of 2 m diameter piles arranged under pile heads as the most efficient solution. The

elevation of pile caps was determined by taking reference from an existing road bridge located 42 m downstream.

To support the bridge on the river bed, substructure wall type piers with Convex-Lens cross-sections were used for their aesthetic appeal. The bridge's superstructure comprised 1,800 mm round bottoms, selected to achieve consistency in structural design. Keeping in mind that round bottoms are inefficient for bridge structures, a structural depth increase of 400 mm was then required to boost the dead load and compensate, explained Aurecon.

Construction work on the Purple Line is ongoing and passenger operations are on track to begin in August 2016. Initial services will be with a three-car train, which will increase to six-car trains in future. As of this moment, a Monitoring & Evaluation (M&E) system has been set up to oversee various aspects of the Purple Line's final phase of construction, which will lead into the final stages of getting the train line operational. ■





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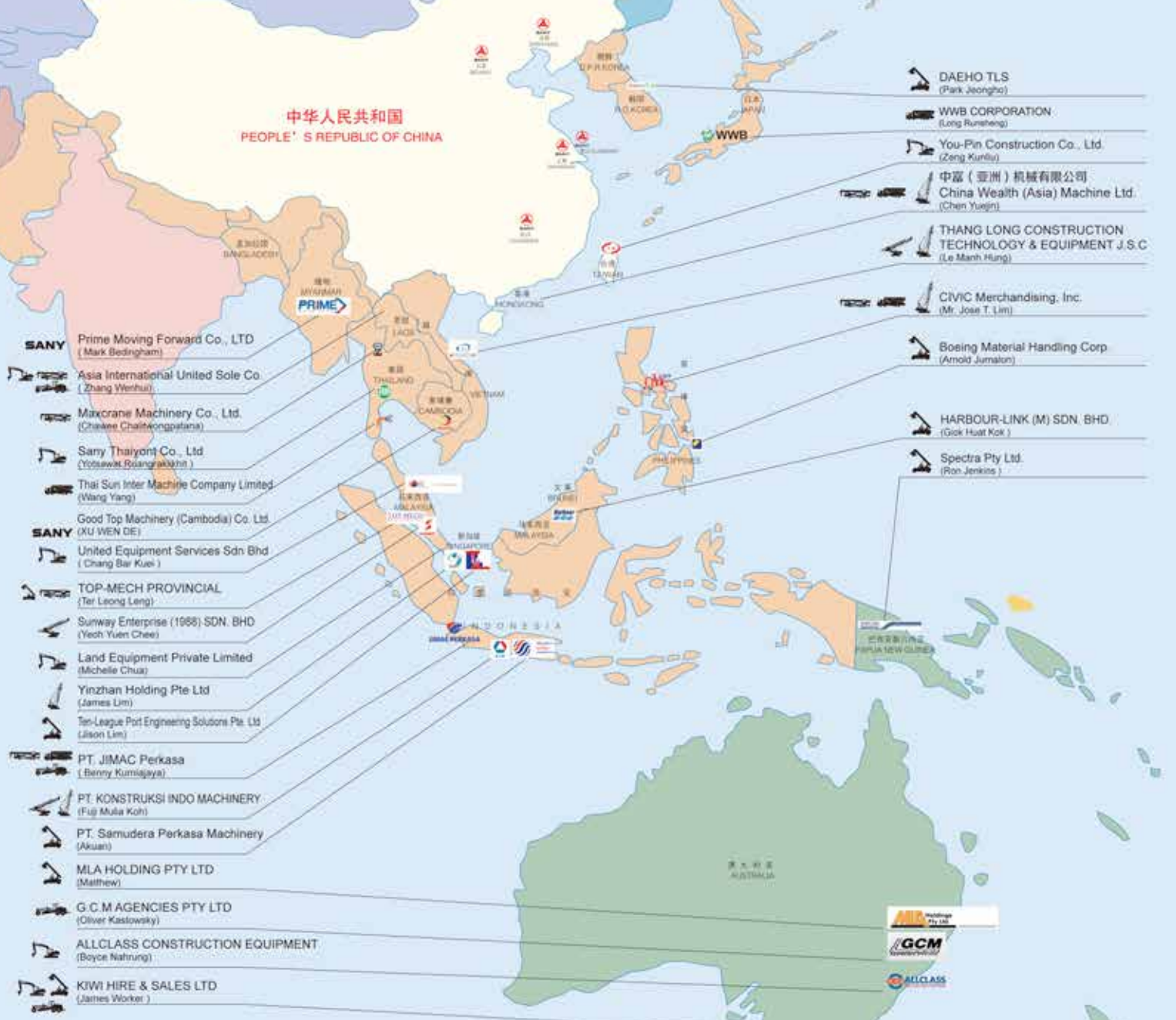
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SHARJAH PLANETARIUM



The Sharjah Centre for Astronomy & Space Sciences (SCASS) was opened in April 2015, providing a new digital and hybrid planetarium for the Middle East region. Located approximately 35 km from Dubai, the 200-plus-seat planetarium features an 18.5 m hemispherical dome screen.

The circular planetarium is surrounded by 40,000 sq m of gardens. This design represents the solar system, where the

planetarium building with its golden ceramic roof symbolises the sun in the centre, which can be seen from miles away. The designer of the project was Art & Design Engineering Consultants, and the contractor was United Engineering.

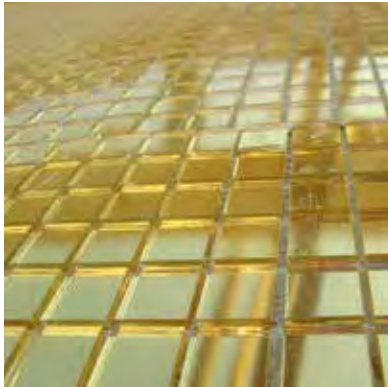
Golden dome

The application of the golden glass mosaic on the GRC (glass fibre-



Top: The Sharjah Centre for Astronomy & Space Sciences provides a new digital and hybrid planetarium for the Middle East region.

Above, left and right: The installation of the golden glass mosaic on the planetarium's dome roof was believed to be the most challenging part of the building project, which was carried out with the help of a tower crane.



Above and below: Mapei system was applied on a 1,400 sq m area of the roof.



reinforced concrete) dome, carried out by Choiceway Technical Works, was believed to be the most challenging part of the building project. Scaffoldings were only allowed up to a certain point of the dome. As such, the installation and tiling works for anything above the scaffoldings had to be reached with the help of a tower crane.

Mapei provided a complete system for the installation on an area of 1,400 sq m. The company supplied its Primer G synthetic resin primer for treating the substrates, Adesilex P10 + Isolastic adhesive system to bond the mosaic, Kerapoxy Design anti-acid, decorative, translucent epoxy mortar mixed with MapeGlitter metal-effect coloured glitter gold, and Kerapoxy Cleaner special cleaning solution for the cleaning operations. ■

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A view from the service road at the top of the test track shows the full transition of the track, from the flat section to the full 43 degree angle, or 1:1 slope.

THE CURVY CHALLENGE

In 2014 Gomaco was commissioned to pave Hyundai's new test track for its vehicles manufactured in China. This new track, located near Yantai in Shandong Province, is a 4.3 km oval with transitions from flat to up to a 43 degree angle, a 1:1 slope. The configuration of the track starts with an 862 m flat area into a 378 m transition. It stays in the curve for 609 m before transitioning back over 378 m into the second flat section. The equipment would need to be able to pave both the concrete track and the base material.

The solution was found using Gomaco cylinder finishing equipment normally used on bridge decks or canal paving projects. The three machines chosen for the project include a track-mounted RC Conveyor to place the concrete, a track-mounted SL-750 slope cylinder finisher, and a 4000 series Spanit work bridge with rubber tyres. All three pieces of equipment had to be modified for the requirements of the oval test track. The result ultimately led to the first 3D-controlled cylinder finisher application (patent pending) for placing both the 152 mm of lean base material and the 254 mm thick concrete track, said Gomaco.

The Gomaco RC Conveyor is a concrete placer that works on flat slabs or slopes. On this project, the receiving hopper was mounted to the end of the framework on the high side of the track so ready-mix trucks could discharge into it from the service road at the top. A diverter car on the conveyor discharges the concrete up and down the slope. It is equipped with a telescoping tremie. As the diverter car runs up and down the slope, the tremie telescopes so concrete can be placed as close to grade as possible and the tremie pivots to keep the placement perpendicular to the horizon while travelling up or down the slope.

The Gomaco SL-750 cylinder finisher is designed for widths up to 36.6 m. Pin-connected sections make up its mainframe and allow it the versatility to fit exact job requirements. For this project, the total width of the frame is 21.5 m. The frame can be outfitted with power transition adjusters (PTAs) that are hydraulically-operated for on-the-go grade elevation changes. The SL-750 has a finishing cylinder that operates on an undercarriage or can be equipped with an optional trimmer undercarriage assembly. Automatic advance on



Above: The Gomaco SL-750 cylinder finisher working on the Hyundai test track has become the first finisher to be controlled with a 3D guidance system.

Right: The Gomaco RC Conveyor with telescoping tremie places the lean base material onto the slope of the test track. To prepare the lean base, the SL-750's undercarriage is equipped with an auger that helps level the material.



the SL-750 finishing passes advances it the preset limit, and starts again automatically on the next finishing pass, creating a final smooth finished surface.

The Gomaco 4000 series Spanit work bridge is also made up of pin-connected sections and is self-powered. The frame is fitted with a slope wedge to break the bridge at the top and allows for manual adjustments to closely match the profile while giving workers a secure platform to finish from.

Controlling the equipment

With the equipment decision made, Gomaco had to devise a method to steer and control the equipment through the slope and shape changes. The legs of the equipment have to always stay vertical while keeping the

framework close to the surface of the new concrete for placing and finishing work.

The frame of the RC Conveyor has adjustable wedge inserts added to the top to allow its framework to break over for the loading of concrete into the hopper. The tracks are mounted to pivoting end cars so they can always stay flat on the ground. An adjustable mount on the console allows the ground crew to keep it horizontal or plumb.

The Spanit has similar modifications. It is equipped with large turnbuckles that can be ratcheted from the top and bottom to make manual slope adjustments to the Spanit.

The RC Conveyor and Spanit are both steered using stringline. Steer wands are placed ahead and behind the front and rear tracks on the machines to allow automatic steering in forward and reverse.



The SL-750's auger is 1,524 mm long and has a diameter of 248 mm.

The SL-750 required the most engineering time and features several innovations to accomplish the paving of the test track, explained Gomaco. Six programmable PTAs were added, placed in between the different sections of frame at strategic areas where the frame needs to adjust to match the slope. Software was created for managing the PTAs and their on-the-go adjustments were implemented into a PTA computer mounted to the side of the SL-750.

The track on the operator's end of the SL-750 features a sliding, self-widening end car to make necessary width adjustments. The track on top of the slope has a pivoting end car with a slope sensor. The slope sensor keeps the legs of the finisher vertical, or plumb, so they are always lifting straight up or down.

The undercarriage of this SL-750 can be equipped with either an auger for preparing the first layer of lean base or a cylinder finisher for the concrete surface. The auger is 1,524 mm long with a diameter of 248 mm. The finishing cylinder is 1,524 mm long with a diameter of 254 mm.

3D-controlled undercarriage

All of these extra points of adjustments allow the SL-750 to match the changing profile very closely, but not exactly, said Gomaco. To achieve the exact profile of the surface of the test track, a new hybrid system of control needed to be created, a combination of stringline and 3D. Stringline would steer the finisher. A 3D system was created to control the undercarriage, raising and lowering it to match the surface elevation of the profile.

Gomaco's undercarriages normally do not vertically adjust. They stay at a fixed height and the cylinder finishes as it travels back and forth across the width of the bridge deck or canal. To create a hydraulic vertical adjusting undercarriage, Gomaco modified 'smart' cylinders normally used for a dowel bar inserter. The cylinders have 381 mm of stroke to raise and lower the undercarriage.

A Leica Geosystems 3D guidance system with one mast and prism, normally used on a 9500 trimmer, was used to control the rear 'smart' cylinder's vertical movement. Because they're 'smart' cylinders, both move in the same ratio to each other; so if the rear cylinder is raised 1 mm, the front cylinder moves 1 mm as well. This can be overridden in the computer, if needed, to change the draft of the cylinder finisher.

The undercarriage is outfitted with the 3D mast with prism, as well as a slope sensor. The mast is needed to get the prism high enough for the total station to see



The Gomaco 4000 series Spanit work bridge is fitted with large turnbuckles that can be used to make manual slope adjustments.



Below: A mast with a Leica Geosystems 3D prism and a slope sensor are used to control the rear 'smart' cylinder's vertical adjustments.

Above: The SL-750 finisher features a variety of innovations to help it finish the test track, including six PTAs, adjustable end cars and 3D guidance, among others.

without interference from placed concrete or workers. The sensor is needed for the slope of the mast to calculate the position of the finishing cylinder. The 'smart' cylinders adjust based on the calculated position of the bottom of the drum, which is the top of the concrete surface of the new test track.

The information to move the undercarriage is collected through a series of measurements taken and computed by the Leica Geosystems components, including the prism, slope sensors as well as a total station, long-range Bluetooth radios and 3D computer.

The total station measures the prism and mast slope and sends it to the 3D computer to calculate the machine reference point. This information is compared against the



Continued on page 72...



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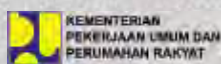
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Continued from page 70...

original design data (e.g. the 3D cross section) provided by Hyundai. Corrections are sent to the undercarriage based on that comparison and the 'smart' cylinders adjust up or down or stay at the correct elevation. This process is happening 10 times per second throughout the paving day.

Daily production would average up to 100 m per day so two total stations were needed for the 3D system. One controlled the SL-750 and the second was for leap frogging and grade checks behind the finisher.

Paving of the track began in 2014 with a Gomaco service representative and a Gomaco 3D controls engineer on site to help assemble the equipment, train the workers on both the finishing equipment and 3D stringless guidance system, and monitor the first paving of the base layer and concrete surface.

According to Gomaco, the equipment performed as expected with successful results before China's cold winter months shut down paving for the year. ■

Website: www.gomaco.com



Above and below: The track's shape was constantly changing as it went from flat to curved sections. It created a design challenge for Gomaco.





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CATERPILLAR 'ADJUSTING TO NEW NORMAL'

Southeast Asia Construction recently had the opportunity to meet up with Tom Pellette, Caterpillar's group president of Construction Industries, when he was visiting Singapore. Mr Pellette spoke further about the company's major restructuring plans and where it will go from here.

1. Mr Pellette, Caterpillar has been facing a tough time in recent years. How is the Construction Industries segment doing?

Tom Pellette (TP): Just as tough! This is the first time in a long while that all segments (Construction Industries, Resource Industries and Energy & Transportation) are depressed at the same time. We are expecting another decline in sales revenue this year, which would mean for the first time ever, four consecutive years of a decrease in sales after the peak in 2012.

Although the US economy is doing well, and Europe has seen some improvements, there are still some headwinds - Brazil is in deep recession, lower oil prices are affecting the Middle East and Russia, and China's economy is slowing down, affecting its construction sector by as much as 80 percent compared to 2011.

Unfortunately, you can't control your external world; but you can control how you execute your business. Because of these challenges, we have had to adjust our capacity.

2. As part of Caterpillar's restructuring and cost reduction plans announced last year, would you be able to tell us how many employees and facilities in Asia Pacific that would be affected?

TP: I can't give specific numbers, but overall it is expected that there will be less impact on the Asia Pacific region than on other parts of the world. Most of the impact has been in North America. In Asia Pacific, we announced we will be closing one facility in China and one in Japan. In Singapore, we closed our remanufacturing operations but are in the process of transitioning the facility into the headquarters for our Caterpillar Marine businesses in the region.

3. Do you think China's economy will return to its heyday, given its significance to the construction industry?

TP: No, it's going to be different now. China forecasts a slower growth rate annually - 6.5 to 7 percent in 2016. But as China continues to push for economic reforms, it will bring positive changes, as they seek to transition from a low-end manufacturing-oriented economy to one that is focused on higher quality and more environment-friendly manufacturing and one that is service-oriented as well. We just have to get used to this new normal.

China remains our biggest market in Asia Pacific. We've been there for a long time; we have 28 manufacturing facilities throughout the country. In a way, it is also home to us.

4. What about other Asia Pacific countries? Are they also contributing to the growth of Construction Industries segment?

TP: Absolutely! Our other large construction markets include Japan, Australia, Thailand, Indonesia and India. Many of them, including smaller markets such as Laos and Cambodia, are reinvesting in major infrastructure projects that will stimulate economic growth. These are creating stability for our business.

Asia Pacific remains very important to us. Even though we have seen the regional contribution to our global construction business



Tom Pellette, group president of Construction Industries (centre), with Jeffrey Hardee, Singapore country manager (left) and Phillip Pollock, general manager of sales & marketing, Global Construction & Infrastructure, Asia Pacific.



Above and below: Caterpillar's Asia Pacific headquarters is located in Singapore, which also includes the Asia distribution centre (pictured below) and Singapore training centre.





Top and above: Caterpillar's machines carry out land preparation works on the Changi Airport Terminal 5 project in Singapore.

reduce from 30 percent in 2012 to around 20 percent in 2015, this is the region with strong long-term growth opportunities.

5. So with such unfavourable market conditions, what is your top priority right now?

TP: We are pretty much focused on stabilising and even growing our position in the market, so that when the global economy rebounds, we should see an improvement in our business. We continue to improve our operations, enhancing our product quality, raising our already high bar on safety, and improving lead times while also taking costs out through restructuring.

We continue to invest in R&D spending and putting a high priority on product development. We must ensure that we have a broad product range - for instance, excavators from 1 to 100 t - to meet the needs of our customers in various markets.

We have seen many economic cycles and no one knows when the rebound will take place, but we believe we are in the right businesses and the right industries. The world will continue to require cities and highways and other infrastructure as well as the raw materials and energy to build them and sustain them.

6. Speaking of product development, do you still see a major difference in technologies for mature and emerging markets?

TP: Not really! The world is getting smaller and we often encounter similar situations in both mature and emerging markets. There may

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be some differences in requirements, but generally we need to create technologies that can be applied globally. Take our hybrid machines as an example; they are not only sold in Europe and the US, but also in Australia and China (the 36 t excavator). Tier 4 engines are also used in Asia Pacific, depending on the markets.

For the mining sector, we have autonomous trucks operating in places like Australia and Japan.

7. Your autonomous mining trucks seem to be doing well. Will we also get to witness autonomous construction equipment in the near future?

TP: I believe so. In fact, we just released semi-autonomous excavators in the US, Europe, Australia and New Zealand.

Construction sites are more difficult because they are constantly changing, so it takes more time to build the right equipment. But we will keep developing new technologies for the construction sector.

8. From your perspective, what are other emerging trends in the construction industry?

TP: I'll talk about two trends. The first is data analytics. We've invested in Uptake, a provider of predictive diagnostics and fleet optimisation solutions. The systems allow our customers to monitor their machines. Using Uptake's data analytics expertise, we can translate the incoming data into relevant information, which helps our customers make quick, accurate decisions on the spot, and optimise their equipment.

The second trend is the sharing economy. We are working with Yard Club, a San Francisco-based company that has developed an online peer-to-peer rental platform. Basically, with this platform, contractors who are not using their machines can rent them out to other contractors. This way, machine owners can earn extra income and eventually reduce their total cost of ownership. It's like the Uber of construction equipment.

These are two of the up-and-coming trends that can lead to better productivity, safety and sustainability for our customers, and may change the way the industry works in the future. ■

Website: www.caterpillar.com

Right: Caterpillar provides engine training to its staff in the Asia Pacific region. Here is one of the workshop rooms at the Singapore training centre.



Top: The 336D2 XE excavator is designed with hydraulic hybrid technology developed by Caterpillar. This 36-t model is not only sold in Europe and the US, but also in Asia Pacific.

Above: The Cat autonomous mining trucks have also been operating globally. According to Mr Pellete, autonomous construction equipment will be a possibility in the near future.



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RIDING HIGH

Haulotte Singapore recently celebrated its 10th anniversary. To mark this milestone, the company introduced three products for the Asian market - HA20 RTJ PRO articulated boom lift, Optimum 8 electric scissor lift and STAR 10 vertical mast lift. Southeast Asia Construction was invited to attend the launch event.

The PRO-fessional

The HA20 RTJ PRO rough-terrain articulated boom lift features a working height of 20.6 m and a lifting speed of 48 seconds. The unit offers a horizontal outreach of 12.1 m and an up and over clearance of 8.1 m. With a maximum weight of less than 9.5 t, a transport height of 1.8 m and a length of 6.4 m, the HA20 RTJ PRO is very compact. According to Haulotte, two units can be transported together on a low flatbed trailer.

The anti-corrosion treatment is applied on all pivot points and non-painted parts, thus increasing the machine's durability. The pre-diagnostic screen and plugs enable the connection to Haulotte Diag in order to receive an advanced diagnosis when needed. The Haulotte Diag diagnostic tool can be installed on PCs, laptops and tablets. It works in conjunction with a wireless VCI box that allows remote access for technicians to programme, troubleshoot, calibrate and diagnose all Haulotte machines.

To alert the operator to the potential risk of overhead trapping or crushing, the HA20 RTJ PRO is also fitted with the Haulotte ACTIV'Shield Bar secondary guarding device. This system features a Safety Gap, which protects the operator from full entrapment. Following the alert, only reverse/lowering movements are permitted, allowing the possibly panicked operator to get out of trouble without making the situation worse. And, after being triggered, the system is easy to reset and reactivate from the basket - meaning there is no machine downtime.



Haulotte HA20 RTJ PRO rough-terrain articulated boom lift.

The ACTIV'Shield Bar complies with machinery directive 2006-42-EC, particularly when the machine is used in confined areas where the risk of overhead trapping is high. The system has been designed to preserve the machine's working envelope and maintain easy access to controls, so there is no change in working practices for the operator.

Bright STAR

The STAR 10 vertical mast lift has a 3 m outreach and is suitable for day-to-day tasks, both indoors and outdoors. The unit can manoeuvre easily around restrictive work environments and accommodate up to two operators.

The Haulotte Activ'Screen on-board diagnostic delivers real-time critical information to save time and facilitate maintenance operations. It provides operators with key information such as alarms, troubleshooting, as well as battery charge and maintenance alerts. It also lets technicians use their access code to programme and calibrate the machine, as well as diagnose malfunctions, with



Haulotte Optimum 8 electric scissor lift.



Haulotte STAR 10 vertical mast lift.



Above and right: The Haulotte ACTIVShield Bar secondary guarding device alerts the operator to the potential risk of overhead trapping or crushing.

Left: The Haulotte Diag diagnostic tool allows remote access for technicians to programme, troubleshoot, calibrate and diagnose all Haulotte machines.



no additional tools. For a complete diagnostic, the STAR10 is compatible with the Haulotte Diag universal tool.

The asynchronous motors deliver precise control over the machine to access the most difficult places. These motors do not require any routine maintenance, said Haulotte. The machine's upper control box integrates a new joystick for exact positioning and safe operation, and zero tail swing allows the operator to work safely on 360°.

Other highlights of the STAR 10 include the integrated chassis forklift system; easy slinging and stowage; 25 percent gradeability to easily climb truck ramps; and centralised battery filling.

'Optimum' reliability

The Optimum 8 electric scissor lift can move with great precision in difficult areas, thanks to its asynchronous motor. The unit is flexible both in elevation and while driving, with its extremely narrow turning radius of 1.50 m. And with its forward speed of 5 km/hr, it can move quickly for maximum productivity.

The Optimum 8 is able to navigate indoor and outdoor jobsites in winds up to 45 km/hr while maintaining its load capacity of 230 kg. Equipped with an automatic pothole protection system, the unit can easily surmount obstacles and has no trouble making it up truck ramps during the transport phase.

The counterweight is positioned at the back of the chassis, increasing the machine's robustness. It acts as a shock-absorber, thus preventing any damage to the platform access; is able to withstand repeated hits and knocks; becomes a skid-resistant step plate integrated to the design of the machine to enhance the operator safety; and includes a veritable storage area for charger cables and plugs and offers electrical plugs in the tray.

The Optimum 8 is also compatible with the Haulotte Diag universal tool and integrates the Haulotte Activ'screen on-board diagnostics. In addition, the unit is fitted with two easy-open swing-out trays for easy maintenance (one for batteries and the other for hydraulic and electrical systems).

Embracing the future

Haulotte Singapore is responsible for Asia operations, providing equipment sales, spare parts and service supports for Haulotte machines across the region. Located in Changi North Way, the 30,000 sq ft facility was first established in 2001 as a representative office and later in 2005 as an official subsidiary of Haulotte Group.

The Singapore office serves the local market directly; outside the country, it works closely with distributors in Malaysia, Indonesia, Thailand, Philippines, Vietnam, Hong Kong, Taiwan and South Korea.



Damien Gautier, Haulotte's managing director for Asia Pacific, joined the celebration of Haulotte Singapore's 10th anniversary in December 2015.



Above: Haulotte Singapore's 10th anniversary was celebrated with a Customer Day event at the company's headquarters in Changi North Way.

Left: Haulotte Optimum 8 electric scissor lifts are already working on the Bedok Integrated Complex project in Singapore.



Continued on page 82...

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Continued from page 80...

“We are continuously strengthening our coverage through an extensive distribution network managed from Singapore. This strategy has clearly led to Haulotte’s success in the region,” said Damien Gautier, Haulotte’s managing director for Asia Pacific.

Speaking further about the company’s growth in Asia Pacific, Mr Gautier explained that mature markets such as Japan and Australia are still dominant. “We have doubled our market share in Australia in the last five years, thanks to our key rental customers and new products. We recently celebrated our 1,000 units delivered to United Forklifts and Access Solutions, our reseller and one of our key rental customers.

“The Japanese market has also peaked within the last two years, driven by rental fleet replacement activities and post-earthquake rebuilding efforts in northern Japan. For the past five years, we have had a strong business growth by partnering with major rental companies, among which includes our Pan Asia distribution agreement with Nishio Rent All, one of Japan’s largest rental companies that has presence in Southeast Asia.”

Although the biggest growth currently comes from the advanced markets, Mr Gautier stressed the importance of emerging markets such as China and Southeast Asian countries, which offer strong growth prospects in the long term. “China’s rental market has developed rapidly in the last three years and we saw a 30 percent growth in our 2015 sales. We have also built a relationship with Chinese rental customers that possess significant growth potential.

“Southeast Asia is catching up, but there is plenty of room for growth and opportunities. The market has improved, with more and more customers focusing on product quality. They also have better awareness of safety issues; recent talks about secondary guarding systems in Singapore is a good illustration of this.”

In terms of safety, Mr Gautier said that Singapore has been leading in the Southeast Asia region with the implementation of new and updated safety regulations. “The active involvement of IPAF (International Powered Access Federation) has also greatly contributed to raising safety awareness,” he added.

However, Mr Gautier admitted that safety risks are still evident in some places. “Despite the progress, safety is not yet enough of a priority in many Asian countries and cost remains the main



The STAR 10 vertical mast is also suitable for indoor use.

deciding purchasing factor. As an example, India continues to import very old used equipment that is not on par with current safety standards.”

Furthermore, Mr Gautier shared how the slowing Chinese economy has impacted on Haulotte. “It affected our end-user sales, and the weakening of Southeast Asian currencies also affected investors in most Southeast Asian countries. Nevertheless, the rental sector growth has been and will continue to be the main market driver,” he said.

Amidst such unfavourable market condition, the Haulotte Group recorded a strong revenue growth in Asia Pacific (up by 27 percent) in 2015. Moving forward, Mr Gautier is no doubt optimistic about the future of the industry.

“There are major growth opportunities for AWP’s (aerial work platforms) in Asia, especially in China, India and most Southeast Asian countries - which are still under-equipped significantly, if we were just to compare numbers with developed countries. Together with our partners, we are positioning ourselves strongly to take advantage of these opportunities when they arise.” ■

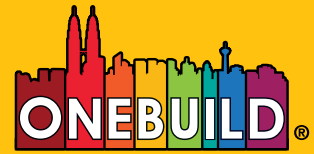


The HA20 RTJ PRO articulated boom can manoeuvre easily on rough terrains.

Website: www.haulotte.sg



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ZERO TOLERANCE

Boral recently oversaw the asphalt paving works of the A\$160 million NSW Ports’ Intermodal Logistics Centre at Enfield in southwest Sydney, Australia. The facility will have a throughput capacity of 300,000 TEU per year, moving in and out of the site. Doing so productively and safely requires a design with a very uniform surface and a minimum slope for effective surface water drainage.

On that note, some very tight tolerances during the paving works, particularly on its Intermodal rail (Terminal) section, where the heavy loads are transferred for distribution. The desired paving tolerances had average conformance of 0 mm and standard deviation of 4 mm

across an area of 92,000 sq m.

“Typically, asphalt is paved with rideability in mind,” said Andrew de Villiers, project manager with Boral. “Few pavements require precision placement to design levels.”

To help meet the desired tolerances, Boral opted for the Trimble 3D paving control system. “Because of the project demands, 3D paving was discussed early on,” said Mr de Villiers. The initial goal was to meet the tight tolerances, but he said other benefits were also apparent.

“Flexibility was important due to the numerous work areas of the overall site,” said Mr de Villiers. If paving could not occur as



Left and above: NSW Ports' Intermodal Logistics Centre at Enfield will have a throughput capacity of 300,000 TEU per year. Doing so productively and safely requires a design with a very uniform surface and a minimum slope for effective surface water drainage. This led to some very tight tolerances during the paving works.

Below: To help meet the desired tolerances, Boral decided to use the Trimble 3D paving control system.



planned on one area of the jobsite, the crew could quickly move to another. "An entire design can be uploaded within 30 minutes," he said. The fact that no surveyors were required on the ground during paving also increased the safety of the site.

The flexibility not only kept crews productive, but also ensured asphalt that was in transit did not go to waste when plans had to be changed. The cost would have been substantial. Up to 1,150 metric tons per day were placed.

Crucial to the process was the local SITECH Dealer, SITECH Solutions, who helped to ensure a smooth flow from software design, to Universal Total Station setup, to quality control.

Tight tolerances

The objectives was to place 200 mm of asphalt in three layers, provide a minimum overall structure of 635 mm from the top of the base layer, and do so evenly to prevent ponding and ensure a smooth uniform surface.

Tolerance targets were the toughest goals, with the desired result final surface average conformance of 0 mm and standard deviation of 4 mm with longitudinal grade ranged from -0.4 to -0.9 percent, with a cross fall up to 0.9 percent.

Other considerations were eliminating human error; providing a productive and cost-effective approach; and increasing safety by

reducing or removing crew members from direct exposure to the mobile plant.

3D paving

SITECH Solutions supported Boral by seamlessly integrating all Trimble products. Trimble's Business Centre – HCE software was used to create an uncompacted surface design to be used by Trimble PCS900 Paving Control System. This design accounts for the compaction aspect of asphalt and helped ensure a smooth final surface even when the underlying layer was 'wavy.'

Business Centre – HCE used the survey information of the existing condition and a compaction factor for the asphalt to create a model that yielded a smooth final surface once density was achieved by the asphalt roller. The result was a 3D-paved and compacted surface that matched the design profile created.

The Trimble PCS900 Paving Control System includes a Trimble SPS930 Universal Total Station setup on-site combined with a mast mounted on the tow arm of the paver with a Trimble MT900 prism on top and a slope sensor on the bottom for highly accurate positioning; a radio to communicate with Trimble SPS930 Universal Total Stations; and a Trimble CB460 control box that displays the 3D design model and the position of the screed.

The design files are stored in the Trimble CB460 installed on the paver for guidance. This is significant, as no staking or manual levelling work was required, said Trimble.

Trimble SPS930 Universal Total Stations were strategically placed around the site for paving, tracking the MT900 prism as the paver moved around the Intermodal Terminal. The Universal Total Station sends position data to the paver via the radio with precise measurements (accuracy within millimeters) and compares that position to the design if elevation corrections were needed, commands were sent through to the Trimble 2D grade and slope control system, moving the tow arms for the screed to adjust accordingly. For long paving runs, the MT900 can be transitioned to the closest Universal Total Station with the press of a button, never having to stop the machine, to ensure precise 3D positioning across the entire project.

The 3D design information was uploaded to the Trimble control box so the 'grade checker,' who walked behind the paver, could verify that the placement matched the design.

"We were able to achieve an average standard deviation of 4 mm across the entire 92,000 sq m on the surface lift," said Mr de Villiers. According to Trimble, the results at



Top, middle and above: The Trimble PCS900 Paving Control System includes a Trimble SPS930 Universal Total Station setup on-site combined with a mast mounted on the tow arm of the paver with a Trimble MT900 prism on top and a slope sensor on the bottom for highly accurate positioning; a radio to communicate with Trimble SPS930 Universal Total Stations; and a Trimble CB460 control box that displays the 3D design model and the position of the screed.

Enfield have led to breakthrough Trimble 3D PCS900 sales for major projects in Australia, including A\$1.5 billion Legacy Way Tunnel

and Wagner new Wellcamp Airport at Toowoomba. ■

Website: www.trimble.com



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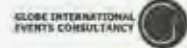
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‘CROSSING’ DUCK CREEK



The new bridge over Duck Creek in New South Wales, Australia, is part of an extensive upgrading of a 2.3 km stretch of the Pacific Highway, between Pimlico Road and Teven Road.

The Brisbane-based company Universal Cranes has helped Leighton Contractors to build a new bridge over Duck Creek, close to Ballina in New South Wales, Australia. The bridge forms part of the much larger Pacific Highway update project, which has been commissioned jointly by the Australian and New South Wales governments.

The 965 km Pacific Highway is one of the busiest roads in Australia, running along the central east coast. The highway is in the process of being upgraded into a dual carriageway, with a four-lane divided road, to keep up with increased traffic flows between Sydney and Brisbane. Work started in 1996 and is expected to complete in 2020.

Bridge lifting

To handle the lifting work on the 117 m long Duck Creek Bridge, Universal Cranes selected its two cranes, a 450 t capacity Grove GMK7450 all-terrain crane and a 275 t capacity Manitowoc M-250T lattice boom truck crane. The units worked in tandem to install 21

bridge beams, each weighing up to 82 t.

Universal Cranes proposed the tandem lift solution as an alternative to using a single large crawler crane for the work, thus saving both time and money. In addition to providing and managing the cranes, Universal also managed the delivery of the bridge beams, using special beam transportation trailers to move the loads from the company's casting facility, 200 km away in Coffs Harbour.

For the lifting part of the project, Universal engineered a custom-built load triangle as part of the rigging, to equalise the weight distribution between the two cranes. The design of the load triangle also allowed each beam to be lifted between the two cranes as they were placed.

“There were many factors to consider in the transportation and lifting work for this job,” said Nick Morris, engineering and sales manager at Universal Cranes. “Particularly the logistics of the transportation work, the design of the load triangle and the positioning of the cranes. In the end, the combined lifting power of the Grove and Manitowoc cranes ensured the project was completed

efficiently and within budget.”

The Manitowoc M-250T is ideal for bridge beam installation given the strength of its lattice boom and excellent load chart. The crane offers a maximum capacity of 275 t and its boom can be configured up to 54.9 m.

The Grove GMK7450 has a lifting capacity of 450 t. This seven-axle crane features a 60 m main boom, which was rigged with the capacity-enhancing MegaWingLift attachment to boost its lifting power on the Duck Creek Bridge project.

Apart from the two main lift cranes, Universal also used its new 60 t capacity GMK3060 all-terrain crane to assist with rigging and general material handling duties on the job.

The project was completed in two weeks. Duck Creek Bridge is part of an extensive upgrading of a 2.3 km stretch of the Pacific Highway, between Pimlico Road and Teven Road. This work is all overseen by Leighton Contractors as part of its job to manage the Woolgoolga to Ballina Pacific Highway upgrade, which will be split into three phases. ■

Website: www.manitowoccranes.com



To handle the lifting work on the 117 m long Duck Creek Bridge, Universal Cranes used a 450 t capacity Grove GMK7450 all-terrain crane and a 275 t capacity Manitowoc M-250T lattice boom truck crane. Both units worked in tandem to install 21 bridge beams, each weighing up to 82 t.

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STREET SMART

The Brisbane City Council recently purchased two Arrow 750XL customised slipform kerb machines for its kerb replacement programme. Both machines have now been running for several months, with one located on the north side and the other covering jobs in the southern suburbs. Crews work day and night as well as weekends to keep up with the demand.

The 750XL from Arrow Machinery is small and light in weight, suitable for subdivision, reconstruction and highway projects. The Council chose the machine for several reasons, explained Arrow. Access in

parts of the Brisbane CBD is a challenge and with the machines' low profile and regulation width, permits are not required; clearing low slung tree branches in some of the leafy suburbs can also be easily accommodated.

In addition, being able to transport the machine on a standard 6 t truck allows access to streets with weight restrictions, as the machine only weighs 4,000 kg. A small crew of three people can also go out and pour as little as 6 m runs, ideal for the installation and upgrade of the many bus stops and smaller works. And when larger

runs are required, an additional two people can pour up to 500 m per day.

According to Arrow, every conceivable option was considered when customising the machines for the Council: rear wheel drive to handle the steep grades, side shift mould unit for quick adjustment due to excavation width and road camber, and left side chute feeding that allows the concrete truck to be well clear of the excavated trench. For operator comfort and safety, the machine was fitted with emergency stops, revolving beacon, night work light kit, reverse beeper, compression seat and UV protection.

The Arrow 750XL slipformer is a fully automated machine equipped with the latest digital technology from Moba, including remote slope set for on the run camber adjustment and off machine steer control. Power is provided by a turbo charged 37 hp Yanmar diesel engine, coupled to the latest in hydraulic components from Bosch Rexroth and Minnich vibration equipment. Options include Spitwater wash-down system, TCH belt feeder, Alford hydraulic mould skid kit, front and side feed option, left or right configuration and console canopy. ■

Website: www.arrowmachinery.com.au



Left and below (left and right): Two Arrow 750XL customised slipform kerb machines have been chosen by the Brisbane City Council for its kerb replacement programme.



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VIVA LAS VEGAS!

This year's World of Concrete, which was held from 2 to 5 February 2016 in Las Vegas, USA, drew 60,110 registered professionals, up from 55,779 in 2015. The show also featured more than 1,532 companies exhibiting across more than 743,889 net sq ft of space, an increase of more than 67,000 net sq ft from 2015. This was the largest World of Concrete in seven years, according to the organiser, Informa Exhibitions.

"We are very pleased with the results of the show in all categories, from the increase in the number of exhibitors (up almost 300 companies) to the increase in attendees (up 8 percent) to the increase in the number of seminars taken (up 6 percent). This helps solidify WOC as the event for concrete and masonry professionals," said Tom Cindric, vice president of Informa Exhibitions US, Construction & Real Estate.

"It was apparent that companies are bringing more of their crews to the show to gain valuable knowledge with our world-class education programme and to experience the exhibit floor and outdoor exhibits filled with leading suppliers. In addition, the international representation increased this year to 22 percent. This is a very positive sign that the industry continues to grow and thrive," said Jackie James, director of World of Concrete.

Highlights of the 2016 edition included the opening ceremony awarding the World of Concrete Legacy Award to recipient Ward Malisch. Mr Malisch's work history has given him a wide perspective on the concrete industry. He taught at several universities; worked for the contractor that



built Missouri's first nuclear power plant; joined the World of Concrete seminar staff; became editor in chief of Concrete Construction magazine; left to be director of engineering at ACI; joined the PCA as director of educational services; returned as editor in chief of CC; and back to ACI as senior managing director. Currently, Mr Malisch is the technical director for the ASCC, where he spends most of his time as a contractor advocate.

Also presented was the Weatherton Scholarship, providing funds to help the next generation of concrete professionals attending the CIM

(Concrete Industry Management) Programme. Jerhard Evangelista from New Jersey Institute of Technology was the recipient of the US\$2,500 scholarship. In addition, CIM held its annual unreserved silent and live auctions at World of Concrete. The silent and live auctions raised an initial tally of approximately US\$900,000.

World of Concrete 2017 will return from 17 to 20 January 2017 (seminars from 16 to 20 January) at the Las Vegas Convention Centre, Nevada, USA. ■

Website: www.worldofconcrete.com



All images: Scenes from World of Concrete 2016.

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LIEBHERR

Liebherr's mobile twin shaft mixer can be set up easily under a typical dry-batch plant, without or with minor modifications to the plant. The plant with the attached twin shaft mixer is capable of producing many concrete mixes such as roller compacted concrete (RCC), cement treated base (CTB), self-compacted concrete (SCC), zero slump concrete, etc.

The twin shaft mixer is easy to transport by limiting the transport height to 4.06 m. Furthermore, its hydraulic unfolding system allows quick installation. The conveyor can be unfolded into three different positions that are specific for truck mixer loading, dump truck loading or for maintenance activities.

The 48-in belt guarantees maximum output. Discharge of concrete is possible with slump 0-150 mm. The discharge gate is adjustable. Essential components of the mixer, such as belt frame, platforms and railings, are galvanised. The design of the mixer ensures easy access for cleaning, inspection and service. The special trailer for the mobile twin shaft mixer complies with NAFTA standards and is equipped with airbags and adjustable support legs.

The mixer is available in four sizes (2.25 cu m, 2.5 cu m, 3 cu m and 4.5 cu m) with output capacities from 100 to 180 cu m/h. The corresponding mixer drive systems are 75 kW for the smallest and 2 x 75 kW for the largest version. Total weight ranges from 31.1 to 34.6 MT. To meet individual requirements, Liebherr has various options for the mobile twin shaft mixer. These include high pressure cleaner with spraygun and retractable water hose, cable remote control and additional folding platforms around the mixer.

Liebherr also offers the 37 Z4 XXT truck-mounted concrete pump. Configured in four sections, the 37 m distributor boom in Z-fold design is torsional-resistant, resulting in low-vibration boom movements on the building site.

The concrete pipeline on the Liebherr 37 Z4 XXT truck-mounted concrete pump is configured close to the boom on the left and right-hand sides, for a balanced weight distribution. The pipe bends of the concrete pipeline feature a large radius of 275 mm, ensuring minimal losses in pressure over the length of the distributor boom. To minimise the necessity of stockpiling different wear parts, Liebherr predominantly use pipe bends of the same type.



The XXT-narrow support from Liebherr is sturdy and torsional-resistant. The company said it is the only manufacturer on the market to offer this innovative system. The front and rear outriggers are secured directly to the boom pedestal of the distributor boom, whereby the forces are channelled directly into the supports from the boom, without deviation. All four outriggers are pivot-mounted, allowing maximum flexibility and a particularly extensive working range of the distributor boom with narrow supports.

The 37 Z4 XXT truck-mounted concrete pump is equipped with high-performance pump units in three different output sizes, in accordance with customer requirements. Liebherr offer pump units with maximum flow rates between 125 and 163 cu m/h. Smooth changeover of the S-pipe is facilitated by the hydraulic cylinder with end-of-stroke damping. Chassis from various truck manufacturers may be selected by the customer as underbody for the truck-mounted concrete pump.

There is a wide range of optional accessories and equipment for the 37 Z4 XXT. This includes extra storage compartments, an additional diesel tank or an auxiliary access point on the left-hand side to suit customer requirements. A magnetic rotating beacon ensures extra safety and a pneumatic end hose pinch valve prevents continued discharge of the concrete when repositioning the boom.

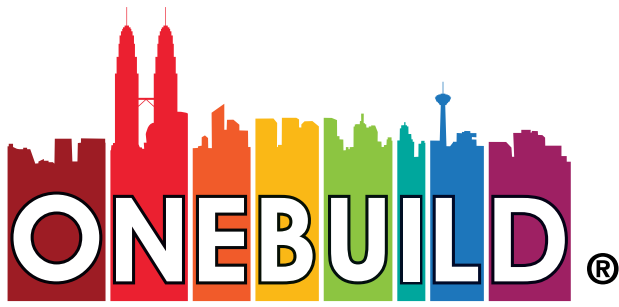
Apart from the Z-fold boom design, the truck-mounted concrete pump featuring



Top: Liebherr mobile twin shaft mixer.

Above: Liebherr 37 Z4 XXT truck-mounted concrete pump.

a reach of 36.8 m is also available with a rolled fold boom design. Liebherr also offer the XXH- and ST-supports as an alternative to the XXT-narrow support. ■



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GOMACO

Gomaco's new GP3 slipform paver is ideal for widths up to 9.14 m. It features Smart Frame Widening to accommodate multiple width changes, Smart Leg Positioning and Smart Steering with full-steer tracks, all controlled by the G+ digital control system.

The GP3 paver has a roller frame with dual telescoping capabilities of up to 2.13 m on each side of the paver, for a total of 4.26 m of automatic frame widening. Double parallel, hydraulic telescoping frame members in the front and rear of the mainframe allow the dual telescoping capability. Smart cylinders in the roller frame allow Smart Telescoping with accurate frame widening and automatic width reference for steering setup. The T-beam mounting rail is incorporated into the telescoping frame.

The GP3's Smart Leg Positioning includes sensed, hydraulic rotational drives on the pivot arms of each of the paver's four legs. The Smart Pivots on the legs provide the G+ control system with information on the angle of rotation and work together with the track rotation sensors to maintain the tracks in the straight-head steering line. Sensed, hydraulic rotational drives are also located on each of the paver's four tracks for the ultimate in Smart Steering technology and extreme steering with the tracks having the ability to steer further than ever before. The Smart Track Rotation provides the G+ control system with exact track location and position. The GP3 easily turns radii with Smart Leg Positioning and Smart Track Rotation. They work with the G+ control system to automatically control the direction and speed of the track travel through a radius.

The GP3 has been designed for easy transport. The paver is put into the Transport Mode by simply driving the legs around to the transport position with its full-steer tracks and hydraulic rotational sensed pivot arms. With the legs in the transport position, G+ travel is switched to 'Transport' for complete control. It has a retractable, sliding operator's console to reduce the shipping width of the machine. The paver has a minimum transport width of only 2.59 m and 10.15 m minimum transport length.

The GP3 was designed to be easy to operate with the G+ control system, as well as comfortable for the operator while offering a complete view of the entire job site. Vibrator modules are positioned across the front of the operator's platform for easy accessibility and operation visibility. G+ allows quiet running technology and also load-sensed hydraulics for maximum paving performance and optimised fuel efficiency. The paver has an isolated operator's platform for operator comfort during a long day of slipform paving.

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

Furthermore, Gomaco is believed to be the first to introduce 3D-controlled cylinder finisher applications on its complete line of finishing machines. The first Gomaco cylinder finisher with 3D guidance was put to work in November 2014 on a test track in China. A Gomaco SL-750 slope cylinder finisher was used for placing the lean base material and the concrete track. The surface of the track had to meet the unique profile so Gomaco and its 3D team created a system to control the undercarriage, raising and lowering it to match the surface elevation of the profile.



Above:
Gomaco GP3
slipform paver.

Left:
Gomaco is
believed to
be the first
to introduce
3D-controlled
cylinder finisher
applications.

Gomaco modified smart hydraulic cylinders to create a vertical adjusting undercarriage. The hydraulic cylinders have 381 mm of stroke to raise and lower the undercarriage. A 3D guidance system with one mast and prism controls the rear smart cylinder's vertical movement, with both cylinders moving in the same ratio to each other. The undercarriage is outfitted with a 3D mast with prism, as well as a slope sensor. The mast raises the prism high enough for the total station to see it without interference from other job-site obstacles. The hydraulic smart cylinders make adjustments based on the calculated position of the bottom of the finishing drum, which is the top of the concrete surface. The information to move the undercarriage is collected through a series of measurements taken and computed by the 3D system's components, including the prism, slope sensors, long-range Bluetooth radios, and 3D computer.

Gomaco's exclusive G+ control system seamlessly integrates with all of the major 3D guidance systems, including Topcon, Leica Geosystems and Trimble. ■

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GENIE

To enhance performance in rugged work environments, the Genie Z-62/40 articulating boom is now available with three new options: four-wheel steering, the exclusive Genie TraX track drive system and a Deutz 74-hp turbocharged Tier 4F diesel engine. With these new options, the boom lift offers operators even more versatility to work in indoor and outdoor applications based on the work environment, terrain, climate and the job at hand.

The four-wheel steering option on the Genie Z-62/40 boom enables operators to get to and from work areas efficiently, even over rough terrain, and provides additional manoeuvrability around the jobsite. Four-wheel steering provides operators with the ability to steer the front wheels and the rear wheels at the same time, resulting in improved steering responsiveness and precision, a smaller turning radius and increased manoeuvrability in tight or limited access areas. Combined with the enhanced manoeuvrability of the Z-62/40 boom's four-wheel steering capability, the four-wheel drive and full-time active oscillating axles increase wheel contact with the ground on irregular terrain, improving the smoothness of the ride for the operator.

When working on a site with mud, sand, snow or gravel, or just generally soft underfoot conditions, the Genie Z-62/40 TraX machine is built for the job. It can be used in most applications like a wheeled machine, allowing operators to maximise utilisation on jobsites. The exclusive Genie four-point TraX track drive system option provides this boom with exceptional terrainability and lower contact pressure for reduced damage to sensitive ground surfaces. The TraX unit has wide, rubber tracks for increased flotation and



Above and below left: Genie Z-62/40 articulating boom.



traction, so soft, wet, rough terrain or other sensitive surfaces like turf won't slow operators down.

The Genie Z-62/40 articulating boom is available with a new 74-hp Tier 4F Deutz TD 2.9 water-cooled, four-cylinder inline engine that boasts cooled, external exhaust gas recirculation with turbocharging. The engine utilises a DVERT oxidation catalytic converter (DOC) for maintenance-free operation under all application and ambient conditions. This engine choice provides this boom lift with plenty of power to get the job done, as well as the ability to work more efficiently in higher altitudes. This engine package is required when using a Genie Z-62/40 boom equipped with the TraX track drive system option.

The Z-62/40 boom lift continues to offer the same great features it is known for, including a working height of 20.87 m and provides excellent horizontal outreach with a maximum of 12.47 m. It delivers excellent up and over clearance of 7.80 m with a maximum lift capacity of 227 kg. It also offers zero rear tail swing and minimal front turntable tail swing in the stowed position and has a below ground reach of up to 1.68 m.

The Z-62/40 boom lift has a 1.52 m jib with 135 degrees range of motion. With its Genie Fast Mast boom system, operators can descend and retrieve needed tools or materials and quickly return to working height with just one boom function. The dual parallelogram lift linkage allows precise positioning of the platform on the jobsite for improved productivity. A proportional control system provides the users with smooth operation.

The Genie Z-62/40 articulating boom options are expected to be available globally within the second quarter of 2016. ■

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SPECTRA

The Spectra Precision FOCUS 35 RX is a new range of motorised total stations designed for high-speed, accuracy and precision in measurement. The FOCUS 35 RX robotic instrument moves the power of the observer from the instrument to the range pole, delivering the highest level of productivity – a one-person layout solution. The speed of observation and precise positioning of the FOCUS 35 RX Robotic Total Station is provided by StepDrive motion technology, which controls the horizontal and vertical motion of the motors. The FOCUS 35 RX includes a tracking sensor that uses LockNGo FastTrack tracking technology, enabling the instrument to constantly lock onto the prism.

The FOCUS 35 RX is available in 2-in, 3-in or 5-in accuracies, features market leading extended operating time with its dual battery system and is controlled externally by Spectra Precision Ranger or Nomad data collectors running Spectra Precision Layout Pro field software.

The Spectra Precision Nomad 1050 Data Collector has more RAM (512 MB), more Flash (8 GB) and more speed (1 GHz), compared to the Nomad 900. The other major enhancement is a new 3.75G dual-mode GSM and CDMA WWAN modem to provide fast and versatile connectivity for Spectra Precision customers. Also, the new WWAN module uses an internal antenna eliminating the need for an external antenna. ■



Above and inset: Spectra Precision FOCUS 35 RX.

Right: Spectra Precision Nomad 1050 Data Collector.

G&Z

The new G&Z S400 concrete paver is designed to tackle a wide variety of applications, including city streets, ramps, shoulders, highways, airports, dual-lane, off-set, zero- or minimum-clearance projects and barrier walls.

With its standard telescopic range of 2 to 5 m, the S400 allows contractors to pave most single-lane applications without the need for bolt-on extensions. With optional extensions, the S400 paves out to 7.5 m, giving contractors a combination single and dual-lane slipform paver to increase machine utilisation. Designed around a multi-purpose tractor frame boasting a universal bolting pattern, contractors can easily take advantage of this S400's design feature to easily mount barrier moulds, offset kit hangers and attachments, allowing them to pave multiple applications without major machine reconfiguration.

The G&Z S400 is compatible with most options and attachments available on larger G&Z slipform paver models, including paving kit, tie bar inserters, trailing finishing pan, final finisher, etc.

The AccuSteer and SmartLeg functions work together to move the track and swing leg on the fly as well as semi-automatically reconfigure the S400 into 90-degree, counter-rotate and transport modes, dramatically saving time. The VariWidth and TeleEnd reduce paving kit and tractor width change time from days to a quick two hours, in most cases.

The G&Z S400 has a double telescopic tractor frame, access walkway and hose hinges for a nominal working range of 2 to 5 m with up to 1.5 m of telescopic ability per side. With the addition of optional bolt-in tractor frame extensions, the S400 tractor can extend up to nom. 7.5 m. In transport mode, the S400 is 3.25 m high x 3 m wide x 6.6 m + paving width length. At 5 m, the S400 is 21,719 kg without options.

When the tractor frame is equipped with G&Z's VariWidth System, major tractor width changes can be done quickly. The S400 is also available with G&Z's TeleEnd, the telescopic Paving Kit End Sections that allow hydraulic telescopic ability of 915 mm per end. In addition, the S400 can be equipped with a mechanical dowel bar inserter (DBI) and can be supplied with hydraulic or electric poker vibrators. ■



G&Z S400 concrete paver.

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CHEMGROUT

ChemGrout manufactures a wide range of standard and custom built grouting equipment. Among them are colloidal and paddle type grout mixers, as well as a variety of grout pumps, including piston, plunger and progressing cavity.

At the show, ChemGrout introduced its new in-line protected pressure gauge. The company explained that non-clogging pressure sensor is an ideal way to protect instrumentation and ensure accurate, dependable pressure measurement. Utilising a full 360-degree circumferential heavy-duty diaphragm, this flow through design assures complete isolation of the instrumentation from process material, thus preventing clogging, and can be flushed

clean without removal or disassembly.

The protected gauge assembly is complete including 1-in or 1 ¼-in camlock fittings for gauges up to 600 psi and hammer unions for gauges over 600 psi. Available gauge ranges are: 0-30 psi, 0-100 psi, 0-300 psi, 0-600 psi, 0-1,000 psi, 0-1,500 psi and 0-2,000 psi. All gauges are dual scale (bar & psi), glycerin dampened and include the protective rubber boot. ■



ChemGrout manufactures a wide range of grouting equipment. The company recently introduced its new in-line protected pressure gauge (left), which helps ensure accurate, dependable pressure measurement.

SKYJACK

Skyjack has launched a new range of telehandlers, the TH series, which is expected to replace the existing VR series. There are four models in the TH series, including SJ643 TH, SJ843 TH, SJ1044 TH and SJ1056 TH. Like other Skyjack telehandlers, the last two digits represent the maximum lift height in feet, while the number in front indicates maximum capacity in thousands of pounds.

Compared with older models, the TH range offers simpler rear axle stabilisation, hydraulics systems, outriggers, controls, engine servicing, electronics and option packages. By using improved gearing, high torque engines and a simplified, high efficiency hydraulics package, Skyjack designed the TH series to employ 74 hp engines while delivering the same on-site job performance as higher power units.

The new TH series comes with 74 hp Deutz engines as standard and 107 hp Deutz engines as options on the SJ1044 TH and SJ1056 TH. The TCD 2.9-l 74 hp engine provides 221 lb/ft of torque and 18,000 lbs of tractive effort on the SJ643 TH and SJ843 TH, while the 74 hp TCD 3.6-l delivers 287 lb/ft of torque and 20,000 lbs of tractive effort (an increase of 5 percent over the 110 hp VR1056E) on the SJ1044 TH and SJ1056 TH.

Skyjack believes in simplifying products so that they are easier to operate and maintain from the inside out. The 74 hp engine does not require the same complicated engine programming or computer logic of DEF equipped units. It also allows enhanced access for service and maintenance and the low profile engine cowling offers operators better visibility.

The TH range also features READYHOOK, a yoke mounted lifting hook. With capacities that match the maximum lift capability of the telehandler the hook allows the safe under-slinging of loads and avoids the practice of using the forks as an underslung lifting device.

In addition, the TH ranges offers FLEXCAB, an innovative cab design that allows fleet operators to easily convert between open and



Skyjack SJ843 TH telehandler.

enclosed cabs with simple hand tools, providing increased flexibility for fleet movement and fast response to customer demands.

Finally, the machines feature concepts carried forward from other Skyjack product families such as SKYCODED, a simplistic control systems using Skyjack's colour coded and numbered wiring system that make the machines easy to troubleshoot and repair. Skyjack's 4AXLDRIVE gives positive traction and excellent rough ground terrainability.

Other standard features on the TH series include external extension cylinder and top mounted extension chain; oversized engine bay with full repairable fibreglass cowling; simple control panel design consistent with other Skyjack products; and cast rear counterweight with hitch pin incorporated. Optional features include rear axle stabilisation (standard on 1044 and 1056 models); and axle mounted outriggers (standard on 1056 and optional on 1044). ■

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TEREX

The Terex Bid-Well 2418 workbridge allows finishers to complete work on a wide range of concrete paving applications including bridges, roads, canals, side slopes, dams, airports and slabs. Capable of being installed to either or both sides of the machine, telescoping end segments offer up to 3 m of leg travel – from 4.6 m retracted to 7.6 m extended – so the machine's width quickly adapts to project paving widths and provides on-the-fly paving width adjustments.

The 2418 workbridge features a frame design that allows the machine to fit in between barrier wall steel on bridge decks. This positions workers closer to the concrete surface to boost efficiency of hand finishing and spray-curing slabs. Built with a 61-cm-wide walkway and 45.7-cm-deep truss frame, the 2418 workbridge enables crew members to cross freshly laid concrete surfaces and efficiently perform required finishing tasks behind the paver at widths reaching 32 m. Available 0.9-, 1.8- and 3.7-m truss inserts offer excellent flexibility for meeting a variety of operating widths.

The 2418 workbridge offers different wheel options to meet a variety of paving applications. Concave wheels are available for riding screed pipe on bridge projects, while pneumatic tyres are available for finishing slab-on-grade paving jobs. Optional barrier brackets are available so the lightweight workbridge can ride on the rail attached to barriers.

Whether used for bridgework or roadwork, the 2418 workbridge can be manually advanced, so finishing operations can keep pace with the paver. An optional 7 hp power drive unit is available to give the operator simple switch-control of forward and reverse machine movement. With its low 17.9 kg/m weight, the standard-duty 2418 is the smallest workbridge in the Terex Bid-Well line.

In addition, the Terex Bid-Well 3600 automatic roller paver is powered by the 21-hp Kohler ECH650 engines. The engine's advanced oxygen sensor automatically analyses the exhaust's air/fuel mixture to deliver more reliable operation at altitude. Offering advanced diagnostic capabilities, technicians can quickly troubleshoot engine issues with the aid of a computer.

Working equally as well for concrete deck placement and the paving of standard duty slab-on-grade projects to increase machine utilisation, the Terex Bid-Well 3600 paver offers a variety of standard paving widths ranging from 2.4 to 26.1 m. Its standard 5.5-m end segments offer 4.6 m of leg travel, so the paver can instantaneously offer up to 9.1-m variable width paving.

The paver's available universal power crown adjuster makes quick and efficient crown adjustments, regardless of whether the machine is paving inline or at a skew. Independent motors for the front and rear frame enable the crown adjusters to be mounted inline or moved to adjacent hinge points opposite each other, giving operators the ability to quickly adjust the crown when paving at a skew.

Equipped with the Terex Bid-Well exclusive swing leg design, the 3600 paver delivers zero-clearance paving, often required when paving in tight applications such as rehabilitation work and bridge deck overlays. When paving at cross slopes greater than 4 percent, the optional pivot leg configuration on display brings the paver to a true vertical operating position, reducing side forces placed on the rail system and eliminating the need for and expense of additional shoring.

Powered by its own 21-hp gas engine, the paving carriage features segmented upper and lower sections, keeping the upper



Terex Bid-Well 2418 workbridge.



Terex Bid-Well 3600 paver.

segment clean to improve carriage longevity. The carriage's exclusive Rota-Vibe system generates up to 83.3-Hz vibration to effectively consolidate the slab's top 63.5 mm of concrete, reducing the chance for chemical penetration through the surface down to the rebar.

The single drag pan configuration helps to effectively seal the concrete surface. The pan is equipped with the optional Terex Bid-Well fogging system, which atomises the water to produce a true, light fog that keeps the concrete from drying too quickly to reduce cracking and produce a stronger surface. The system's independently adjustable nozzles can be positioned to direct the fog where it is needed to adjust for wind, mix conditions or certain specifications.

Both the paving carriage and paver's frame are equipped with lights from the available Terex Bid-Well LED lighting system. This feature increases machine visibility during nighttime paving and decreases the harsh shadows thrown by tower lights. ■

FLOWCRETE

Flowcrete introduced Isocrete, a range of fast-cure, cement-based floor levelling compounds that can be used for sloping, patching and levelling the concrete substrate prior to the installation of floor finishes. Isocrete systems are easily installed, can be applied to green concrete and offer fast-cure properties to reduce downtime or alternatively in new-build scenarios to minimise any halt to construction.

Once cured, Isocrete underlayments offer excellent compressive strength, moisture resistance and non-shrinkage properties and can be covered with ceramic tiles, carpet, laminate, vinyl or polymer floor finishes. Systems available in the range include Isocrete 1500, a rapid drying, pre-mixed, self-levelling cement-based compound installed at >3/16 in and best suited to general-purpose use and traffic conditions. Isocrete 1500 offer protection against external moisture ingress, condensation and spillages.

Designed to tackle more arduous, heavy load bearing environments, is Flowscreed Industrial Top, a rapid drying, pre-mixed, self-levelling cement-based compound, installed at >3/16 in, containing durable quartz aggregates for added strength under high traffic conditions.

Completing the range is Isocrete 4000, a trowel-applied, protein-free cement-based mortar, installed between ¼ in and 4 in, which has been designed to repair, slope or level structurally sound, interior and exterior concrete surfaces that are pitted, worn, scaled or spalled.

Isocrete range has been used on many landmark projects across the globe including Dubai International Airport, London's Wembley Stadium and The Wynn Resort & Casino in Macau as well as a number of major shopping centres and institutional facilities. ■

Right: Isocrete is a range of fast-cure, cement-based floor levelling compounds that can be used for sloping, patching and levelling the concrete substrate prior to the installation of floor finishes.



MINNICH

Minnich Manufacturing's concrete barrier wall drill helps contractors maximise the efficiency and safety of drilling vertical holes for the pins used to secure temporary concrete traffic barriers. Air-driven and self-propelled, the concrete barrier wall drill straddles and rides along the top of the temporary wall. A tethered controller enables the operator to simultaneously drill three accurate, consistent pin holes - through pre-moulded holes in the wall, through the road, into the sub-base - while positioned on the non-traffic side of the barrier.

Now a standard Minnich product offering, the Minnich concrete barrier wall drill previously proved its speed, power, accuracy and consistency as a special-application drill.

Minnich can customise the concrete barrier wall drill to fit F-shape barriers, Jersey barriers or any other barrier wall profile. The drill spacing and hole depth of the Minnich concrete barrier wall drill are fully adjustable. The unit can be easily moved with a forklift and loaded onto the wall with a backhoe or service crane. ■

Right: Minnich concrete barrier wall drill.



BROKK

The new Brokk 120 Diesel is believed to be the world's smallest diesel-powered demolition robot, weighing less than one-fourth of the Brokk 400 Diesel. The six-gallon fuel tank and efficient operation allow run times longer than eight hours before refuelling.

The Brokk 120 D's compact size - 31 in wide, 80 in long and 49 in high - enables it to pass through any standard door opening as well as manoeuvre in tight spaces. Meanwhile, its light weight - about 2,700 lbs - allows it to drive over weight-restricted floors and helps make it easy to transport to and from sites.

Powered by a compact and efficient diesel engine, the Brokk 120 D can run a full shift independent from any power source. This flexibility comes without sacrificing any of the power and performance of its similar-sized electric-powered sibling, the Brokk 100. Plus, the Brokk 120 D uses the same attachments and generates the same hydraulic power as the Brokk 100, increasing its versatility.



The Brokk 120 D can be used for a variety of applications. It fulfils emergency response needs for search-and-rescue efforts, explosive ordinance disposal and firefighting. It is suited for use in the nuclear industry due to its compact size and power. The construction industry can benefit from its easy transport, diversity of attachments, and light weight that make it ideal for a variety of jobs, including demolition and cutting. The B120 D also fits well in the process and underground industries, where use of a power cable can be inconvenient or inadvisable.

The Brokk 120 D is the third, and smallest, diesel-powered machine in Brokk's lineup. The Brokk 400 Diesel and Brokk 800 Diesel have been available for several years, but are significantly larger than the Brokk 120 D. ■

Brokk 120 Diesel demolition robot.

PETTIBONE

Pettibone's new Extendo 944B is the first model in its new generation of telescopic handlers. The unit has been designed to offer an excellent lift capacity and reach for a wide array of material handling applications.

The Extendo 944B is powered by a 117-hp Cummins QSF 3.8 Tier 4 Final turbo diesel engine, featuring electronic control and protection with SCR aftertreatment. A Parker IQAN-MD3 display has been added to provide instant engine and aftertreatment diagnostics. The Dana T12000 Powershift series transmission offers three speeds, forward and reverse, and is complemented by a heavy-duty transmission cooler.

Delivering a maximum load capacity of 9,000 lbs, the 944B provides forward reach up to 30 ft 3 in, and a maximum lift height of 44 ft 4 in. Single joystick, pilot operated controls allow for smooth control of all the Extendo's boom and auxiliary hydraulics. For operation in tight areas, the 944B offers four-wheel, two-wheel and crab steering modes and has a turning radius of just 14 ft 1 in. The unit is powerful, yet compact enough to fit under an 8-ft doorway.

The robust design of the Extendo features two wide-stance, heavy-duty lift cylinders with innovative automatic fork and load levelling that eliminates the need for slave cylinders. To further improve load stability, the 944B offers 24 degrees of frame sway (12 degrees left and right of centre) and is equipped with a rear axle stabilisation system.

New service access doors allow users to remove only the front half of the enclosure to perform daily engine and transmission fluid checks, rather than the entire cover. A battery disconnect switch is now standard and accessible from the cab. Formerly an option, a cab



Pettibone Extendo 944B telehandler.

step has been added as a standard feature, allowing the operator to more easily climb into and out of the machine. Engineered with comfort in mind, the Extendo also comes with an adjustable suspension seat and adjustable right-side armrest. In addition, the 944B comes with a variety of standard fixed and side-tilt carriages from 48 to 72 in, and several optional attachments are available. ■



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GENERAL

General Equipment's CS8 random crack saw is specifically designed for following and cutting irregular crack patterns in both asphalt and concrete surfaces. Utilising a 203 mm diameter, dry-cut diamond blade, the saw features a centre-mounted blade in order to produce smooth-sided cuts for proper crack filling procedures.

Power is supplied by a 13-hp Honda GXV390, four-stroke engine equipped with a cyclone-type air filter system for maximum protection against fine-grained dust contamination. The maximum cutting width is 1/2 in and the maximum straight-line cutting depth is 1 1/2 in.

The General CS8's centre-mounted blade configuration lets the machine pivot about its own axis to more easily follow random crack patterns. This design helps maximise blade life by minimising undercutting. Furthermore, because the saw is pulled during operation, it offers more natural operator control than side-mount blade saws, and affords excellent, direct-line visibility of the crack.

To best handle the rigours of any jobsite, the CS8 features a unitised, welded steel-plate frame with extra heavy-duty, sealed swivel casters and extra capacity, twin-row externally greased bearings.

Other standard features include an infinitely adjustable blade-height control and the Quik-Pitch blade engage/disengage lever. Also, an integrated dustpan helps collect the high volume of fines



General CS8 random crack saw.

produced during sawing and discards them away from the operator for simple collection and disposal. An optional water mist control system is available for wet cutting applications. ■

ADVERTISERS' INDEX

AMMANN	9	GOMACO	OBC	PERI	1
ASEANMACH 2016	83	HAULOTTE	39	PHILCONSTRUCT 2016	99
ASTEC	17	HYUNDAI	25	PILE DYNAMICS	49
AUGER TORQUE	43	JCB	63	PRAMAC	41
BAUMA CHINA 2016	IBC	JLG	7	SANDVIK	IFC
BC INDIA 2016	103	JP NELSON	11	SANY	INSERT
BOMAG	89	JPN	67	SENNEBOGEN	31
BUILDTECH ASIA 2016	91	KOBELCO	GATEFOLD	SHENXI	53
BUILDTECH YANGON 2016	4	KOBELCO CRANES	35	SULLAIR ASIA	57
CAMBUILD 2016	6	KONSTRUKSI INDONESIA 2016	77	TEREX TRUCKS	13
CONCRETE ASIA 2016	87	LINK-BELT	19	THE BIG 5 CONSTRUCT INDONESIA	97
CONCRETE SHOW SEA 2016	71	LINNHOF	51	TIGER MACHINE	61
CONEXPO-CONAGG 2017	73	MANITOWOC	27	TROPIC	47
CRRC	3	MAPEI	59	TSURUMI	29
DYNASET	45	METALGALANTE	75	VERMEER	21
ELEMATIC	33	MTU	15	WIRTGEN	23
EVONIK	55	MYANBUILD 2016	101	WOC 2017	65
FOUNDATION ASSOCIATES	2	ONEBUILD 2016	95	XCMG	5
GENERAC	37	OS+H ASIA 2016	81		

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