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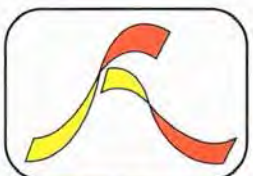
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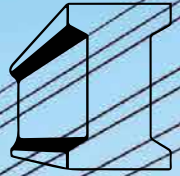
  

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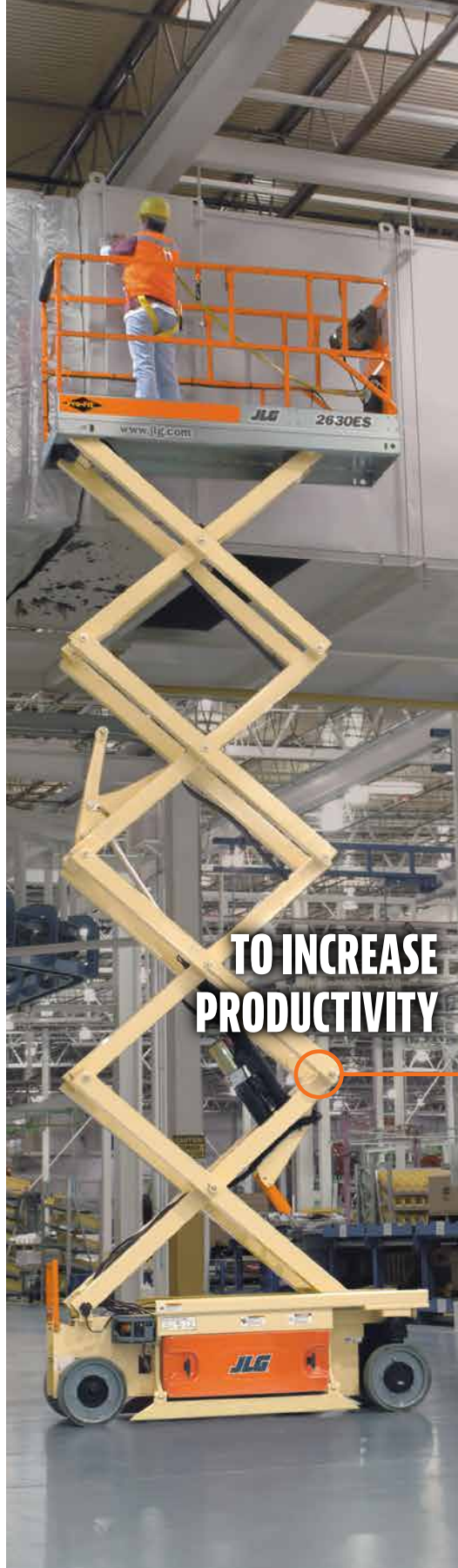
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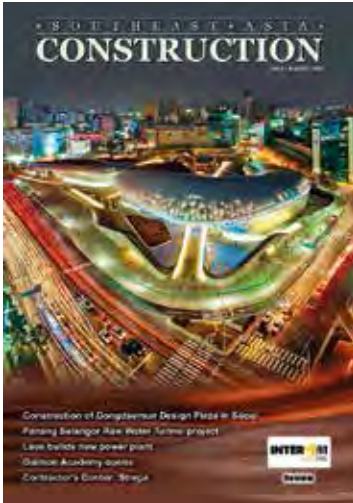
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Contents



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The Dongdaemun Design Plaza in South Korea.
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Cover designed by
Fawzeeah Yamin

Publisher
Steven Ooi
steven.ooi@tradelinkmedia.com.sg

Editor
Fabia Sugandy
seac@tradelinkmedia.com.sg

Group Marketing Manager
Eric Ooi
eric.ooi@tradelinkmedia.com.sg

Marketing Manager
Felix Ooi
felix.ooi@tradelinkmedia.com.sg

**Head of Graphics Department/
Advertisement Coordinator**
Fawzeeah Yamin
fawzeeah@tradelinkmedia.com.sg

Graphic Designer
Siti Nur Aishah
siti@tradelinkmedia.com.sg

Circulation
Yvonne Ooi
yvonne.ooi@tradelinkmedia.com.sg

Any other matters : info@tradelinkmedia.com.sg

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 Email: info@tradelinkmedia.com.sg

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INTERNATIONAL SALES OFFICE:

T. Asoshina/Shizuka Kondo, ECHO Japan Corporation
 Grande Maison Rm 303, 2-2, Kudan-Kita 1-Chome, Chiyoda-ku, Tokyo 102, Japan
 Tel: +813 3263 5065, Fax: +813 3234 2064
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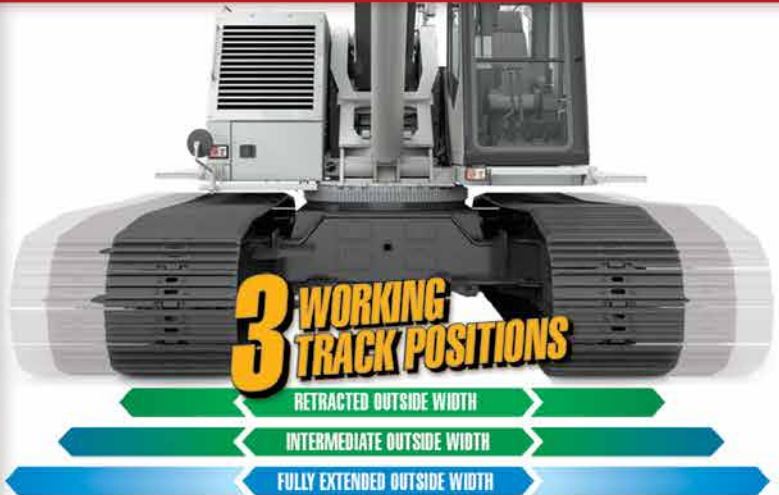


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1MDB RE and Lend Lease to develop TRX Lifestyle Quarter

1MDB Real Estate (1MDB RE) and Lend Lease have formed a partnership to develop Lifestyle Quarter at the upcoming Tun Razak Exchange (TRX) financial district in Kuala Lumpur, Malaysia. The Lifestyle Quarter will be a retail led mixed use development of over 17 acres comprising a new retail mall, several residential towers and a hotel connected to a multi layer central park and the largest Mass Rapid Transit (MRT) station in Kuala Lumpur.

“TRX has successfully played a catalyst role to attract a significant FDI commitment in Malaysia’s premier financial district. We will announce more commitments from top tier local and international investors in the coming months,” said Dato’ Azmar, CEO of 1MDB Real Estate. “With this Lifestyle Quarter partnership sealed, 1MDB RE will focus on delivering major infrastructure upgrades for TRX and the Imbi area with a view to accelerate the development of TRX to meet strong and tangible demand.” The 1MDB RE is the master developer of TRX.

The Lifestyle Quarter will form the social heart of the TRX precinct. It aims to offer a series of modern lifestyle experiences and set new benchmarks not only in terms of design, but also for the types of retailers, dining establishments, outdoor spaces, leisure activities and entertainment options it provides.

Envisioned to be a highly liveable financial district, the iconic 70-acre TRX development will be enhanced by smart, innovative and sustainable technologies, further supported by excellent connectivity including an integrated underground MRT interchange station. The entire TRX project is expected to be completed in phases over the next 10 - 15 years. Phase 1 of TRX, scheduled for completion during 2017-2018, will feature office towers, residential towers, five-star hotels, a retail mall and a central urban park.

Lend Lease is an international property group offering fully integrated services including investment management, development, construction, project management and asset and property management. The company was selected from a pool of international and local bidders to partner with 1MDB RE in the Lifestyle



Above: An artist’s impression of Tun Razak Exchange (TRX).



Left: 1MDB RE, the master developer of TRX, will be working together with Lend Lease to develop the TRX Lifestyle Quarter.

Quarter development in June 2014. TRX will be one of the largest developments in Lend Lease’s current portfolio of global projects.

1MDB RE - a wholly owned subsidiary of 1MDB - is a master developer of strategic developments that support the Malaysian Government’s Economic Transformation Programme (ETP). The Lifestyle Quarter has a forecast gross development value of over MYR8 billion upon completion, with Lend Lease owning 60 percent of the partnership and 1MDB RE owning 40 percent. ■

Shantui exports hydrostatic bulldozers to Philippines

Shantui has completed its first bulk export of hydrostatic bulldozers, delivering them to the Philippines. The shipment included 27 units of 100 hp hydrostatic SD10YE and 51 units of 130 hp SD13-2. The machines are planned to be used by the Philippines customer on a large-scale infrastructure development project.

To ensure that the machines operate properly, and to provide the customer with Shantui’s trademark value, a full-time service representative was assigned to manage the order. Shantui’s technicians travelled to the customer’s location to provide on-site service training and machine operation instruction, and they will remain on standby at the Shantui Singapore subsidiary company. Shantui is also providing service training for its local distributor, strengthening its ties to the local market.

According to Shantui, this sale marks a milestone for both the company’s product development and performance in overseas markets. The SD10YE hydrostatic bulldozer was designed based on the customer demand from developed markets by Shantui’s R&D centre. Utilising a Rexroth hydraulics system, the SD10YE reduces energy consumption dramatically compared to similar models from competitors, said Shantui. It also meets Euro Stage 3B and US Tier

Shantui’s SD10YE hydrostatic bulldozer.



4I standards. The SD10YE is quickly gaining popularity worldwide, having recently achieved sales in the US and Europe, and is now making headway in Southeast Asia. ■

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Keppel Land expands Myanmar portfolio

Keppel Land is expanding its hospitality business in Myanmar with a new 29-storey Inya Wing at its Sedona Hotel Yangon, which is expected to be completed by the end of 2015.

“As Myanmar is expected to enter into a phase of sustained economic growth, the property market in Yangon is poised to deliver healthy performance over the next few years. We are excited about the opportunities to grow with Myanmar as it opens up and attracts more businesses and foreign investments, as well as tourists,” said Ang Wee Gee, CEO of Keppel Land.

“Myanmar continues to enjoy increasing tourist arrivals, with a forecast to reach 4.5 million in 2015 and 7.5 million in 2020. As evident from the topping-up of Sedona Hotel Yangon’s Inya Wing today (29 April 2015), we have expanded and refurbished our hotels to cater to the rising demand.

“At the same time, Keppel Land, together with our partner Shwe Taung Group, is meeting the needs of international businesses expanding in Myanmar. Specifically, our joint venture of a 23-storey office tower, integrated into the mixed development of Junction City, will fill the gap for Grade A office space in Yangon’s central

business district. The office tower is expected to be completed in the first half of 2017.”

Myanmar’s real gross domestic product (GDP) growth has reportedly increased from 5.5 percent in 2013 to 6.4 percent in 2014. The growth was supported by rising investments fuelled by improved business confidence, commodity exports, buoyant tourism and credit growth, which were spurred on by the government’s structural reform programme. The International Monetary Fund (IMF) has forecast Myanmar’s GDP to grow at an average of 7-8 percent over the next 10 years, backed by its strategic location, competitive labour force and continued influx of foreign direct investments.

According to the Myanmar Investment Commission, foreign direct investments into Myanmar during the 2014-2015 fiscal year ended 31 March 2015 reached a record US\$8 billion, more than double compared to the year before. And based on the Ministry of Hotels and Tourism, a total of 3.05 million tourists arrived into Myanmar in 2014, which represented an increase of 49.5 percent from 2.04 million in 2013 and generated US\$1.14 billion in direct revenue. The Ministry forecasts tourism arrivals to reach 4.5 million in 2015. ■

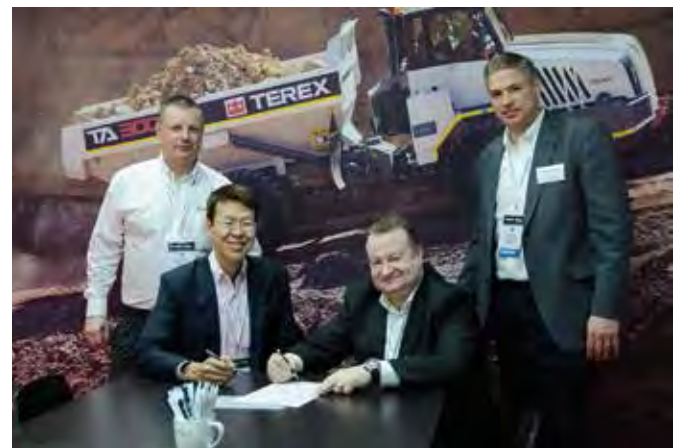
LHM invests in Terex TR100 rigid dump trucks in Myanmar

Terex Trucks has sold nine TR100 rigid haulers to Leadway Heavy Machinery (LHM) in Myanmar. The contract was finalised and signed at the Intermat Paris trade show in April 2015.

“We have developed a good relationship with Terex Trucks over the last two years and we’re looking forward to a rise in sales and further opportunities to drive our business forward following the company’s acquisition by Volvo Construction Equipment,” said Jimmy-Chakart Seanchan, CEO of LHM. “We’re already seeing benefits from Volvo CE’s solid structure, support and understanding, not to mention its comprehensive financial solutions, which are invaluable for our customer base.”

LHM was appointed as Terex Trucks’ official dealer in Myanmar in 2013, and has since delivered 26 TA400 articulated dump trucks into Jade mine operations in the region. Its latest purchase of nine TR100 rigid dump trucks is a good sign of the pick-up in the market, having opened up to investment and development in recent years. Apart from jade mining operations, there is also an increase in projects in railway construction and mining high-quality, high-value deposits including gems, oil and natural gas, explained Mr Seanchan.

Due to its minimum maintenance needs and tough design, the Terex TR100 is ideal for working in demanding job sites in the ever-changing, tropical monsoon climate of Myanmar. “The TR100 has a good configuration which is well suited for our market. Terex Trucks products offer good fuel saving, and have an overall low cost



of ownership, which is key for our customers,” said Mr Seanchan.

Established in 1996, Leadway Heavy Machinery is the official Terex Trucks dealership for Thailand and Myanmar. In addition, LHM has an affiliated company, Yangon-based Aung Hein Min (AHM), which provides sales, marketing and service solutions for Terex Trucks customers. ■

BBR secures site for new mixed-use project in Singapore

BBR Holdings has secured a winning bid for the acquisition of land parcel at Yishun Avenue 4 in Singapore through its joint tenderers, Northern Resi Pte Ltd and Northern Retail Pte Ltd.

The site, which was awarded by the Housing & Development Board (HDB) to Resi and Retail in January 2015 has an area of approximately 9,759.8 sq m and is proposed for a mixed-use development consisting of about 60 percent residential and 40 percent commercial. Resi will develop and sell approximately

200 units of residential dwelling units, and Retail will develop the commercial units and be the single strata owner upon completion.

As part of the government’s initiative to use labour-efficient construction methods and building design to improve construction productivity, prefabricated prefinished volumetric construction (PPVC) and prefabricated bathroom units (PBU) are required to be adopted for at least 65 percent of the constructed floor area and bathroom units, respectively, for the residential units of the development. ■



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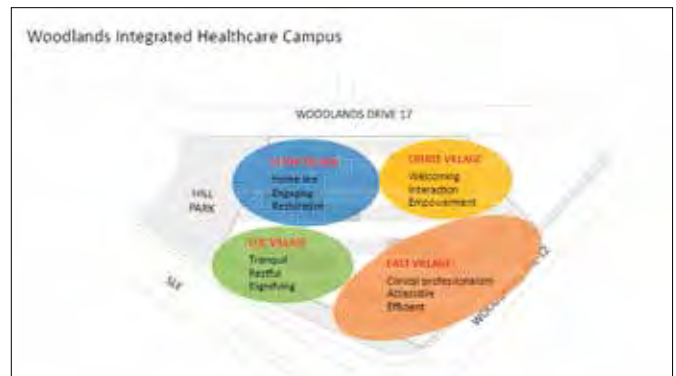
T.Y. Lin wins Woodlands Integrated Healthcare Campus contract

T.Y. Lin International Pte Ltd (TYLI) has been appointed by the Ministry of Health Holdings Singapore as the civil and structural engineer for the proposed Woodlands Integrated Healthcare Campus (WIHC). With up to 1,800 beds the WIHC will play a key role in caring for residents in northern Singapore through the provision of holistic healthcare services as the population grows and ages. It is planned to open in phases from 2022 onwards.

The development will include an acute care general hospital, a community hospital and a nursing home. Covering a site of 7.7 ha along Woodlands Avenue 12 the campus is easily accessible and well connected with easy access from the Seletar Expressway and is within walking distance of the Thomson East Coast Line Woodlands South MRT station.

The TYLI design team aims to support the sustainability target of BCA Green Mark Platinum and respond to current and future needs of the campus through flexibility and scalability in terms of building design. This will allow for advances in healthcare technology and equipment to be catered for in the future. In addition, the team is looking to optimise connectivity with Woodlands South MRT station through the provision of an underground link to the station.

Dr Tan Guan, director of building structures and TYLI's project



WIHC will play a key role in caring for residents in northern Singapore, occupying a site of 7.7 ha along Woodlands Avenue 12. It is planned to open in phases from 2022 onwards.

director for the project will lead the team in the delivery of the TYLI services, which includes the civil and structural design for the structures as well as construction support during the delivery phase 1. ■

Singapore's Lee Kong Chian Natural History Museum opens

Singapore's first natural history museum is now open to the public. Located at the National University of Singapore (NUS), the Lee Kong Chian Natural History Museum accommodates over 1 million Southeast Asian specimens as well as the complete fossils of three dinosaurs from the Jurassic period. T.Y. Lin International Pte Ltd (TYLI) was responsible for all the civil & structural (C&S) and mechanical & electrical (M&E) design of the new build for NUS, the project owner.

A seven storey building with a unique pre-historic, boulder like facade finish combined with tiered tropical vegetation, the museum accommodates Singapore's national and reference collection of preserved zoological specimens as well as the NUS herbarium. The wet and dry collections occupy three floors, a specially designed two storey central exhibition space caters for the three dinosaurs that have recently been acquired and are anticipated to be one of the most popular attractions.



The Lee Kong Chian Natural History Museum features a seven storey building with a unique pre-historic, boulder like facade finish combined with tiered tropical vegetation.

The TYLI structural design included a one-way post-tensioned slab and reinforced concrete beams to meet the stringent structural fire resistance requirements in the collection zone, as well as three slanted columns and a spiral staircase that preserves the interior gallery views. The team was also responsible for reviewing and assessing the casting of the off-form concrete wall and construction of the cantilevered exterior green wall. TYLI's M&E design was tailored to meet the differing requirements of the research and exhibition areas. The focus of the design in the research area was providing effective and efficient air conditioning and air exchange to ensure a safe working environment. In the exhibition area preservation and maintenance of the scientific collections 24 hours a day was a priority, the adoption of high frequency non-UV emitting lighting and efficient climate control systems were central to achieving this. ■

Huatong awarded S\$19.5 mil contract from HDB

Huatong Global Limited has won a new civil engineering contract from the Housing and Development Board (HDB) worth S\$19.5 million, through its wholly owned subsidiary Huatong Contractor Pte Ltd. The contract is for the proposed road widening and construction of road related facilities along Tampines Avenue 9, which is expected to be delivered by the second quarter of 2017.

"Huatong Global's contracts win momentum has been very encouraging in 2015, starting with the string of public sector projects totalling S\$28.5 million, which we announced in March 2015, and now this significant HDB project. Going forward, we continue to see buoyant activity in Singapore's public infrastructure works and will definitely continue to leverage on our strong track to secure larger value-added projects," said Patrick Ng, CEO of Huatong Global. ■



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Infrastructure projects 'main driver of growth' in Indonesia

Although the pace of expansion in Indonesia's economy, the largest in Southeast Asia, has slowed recently, the country's construction industry is set for continued rapid growth, with investment in infrastructure projects to be the main driver of growth, according to a new report by Timetric's Construction Intelligence Centre (CIC).

Indonesia's construction industry will expand at an annual rate of 7.9 percent in 2015-2019, an acceleration from 6.6 percent over the past five years. Measured in real terms and at constant exchange rates, the industry will stand at US\$287 billion in 2019, up from US\$196 billion in 2014. Infrastructure projects are expected to be the main driver of growth as a result of increased government investment in the face of a rising population, greater urbanisation and the participation of the private sector through PPPs, which will support infrastructure construction activity over the forecast period.

The government's focus on infrastructure is centred on the implementation of the multi-year Master Plan for the Acceleration and Expansion of Indonesia's Economic Development (MP3EI) 2011-2025, supported by the private sector through public-private partnerships (PPPs). Under the MP3EI, the government plans to invest US\$35.7 billion on road development projects, US\$34.3 billion on railways, US\$12.7 billion on ports, US\$3.4 billion on airports and US\$3.3 billion on other infrastructure construction projects by 2025.

To improve the country's dilapidated infrastructure, the government will also offer more infrastructure projects under the PPP model. According to Indonesia's National Development Planning Ministry, the government plans to offer 43 infrastructure construction



Indonesia's construction industry is forecast to expand at an annual rate of 7.9 percent in 2015-2019, with infrastructure projects expected to be the main driver of growth.

projects with a value of US\$52 billion to the private sector in 2015. Projects include the construction of monorail, ports, rail, airports, toll roads and water infrastructure.

"However, there are some risks to the positive outlook for the construction industry in Indonesia, namely rising costs associated with capacity constraints and shortages in supply of building materials," said Sina Zavertha, Economist at Timetric's CIC. ■

Black & Veatch to work on Vietnam power plant expansion project

Black & Veatch will play a major role in the delivery of a fast-track power plant expansion in Vietnam. The plant is needed to address the country's 10 percent annual electricity demand and to bring more reliable power to the region.

Working with Sumitomo Corporation, Black & Veatch will serve as the project technical lead on the expansion of the Duyen Hai 3 power plant in Vietnam's Tra Vinh Province. This role includes overall plant engineering liaison and commissioning. The company will also procure certain balance of plant equipment.

Sumitomo was selected in November 2014 by Power Generation Corporation 1, a subsidiary of state-utility Vietnam Electricity (EVN). Sumitomo will serve as the prime engineering, procurement and construction (EPC) contractor to build the 688 MW supercritical coal-fired plant expansion and other related infrastructure. The plant is scheduled for completion in 2018. The Duyen Hai 3 Expansion Power Station will be one of five EVN units at the 3,000-plus MW Duyen Hai Power Centre

"In addition to being timely, the project will help diversify the region's power generation portfolio. This will address the seasonal variations experienced with the use of hydropower and result in a more reliable system," said Mark Fournier, project director of Black & Veatch.

According to Vietnam's deputy prime minister, Hoang Trung Hai, the power plants being delivered in Duyen Hai are set to boost the Mekong Delta and surrounding regional economy. ■

SITECH Technology Dealer in Myanmar

A SITECH Technology Dealer has been established in Myanmar, which will serve heavy civil construction contractors in the country that are involved in a range of earthmoving applications such as the construction of roads, highways, railways and airports as well as site prep for large commercial, industrial and residential projects.

SITECH Myanmar joins the network of SITECH dealerships, a dedicated global distribution network offering comprehensive portfolio of construction technology systems available to the heavy and highway contractor.

SITECH Technology Dealers represent Trimble and Caterpillar machine control systems for the contractor's entire fleet of heavy equipment regardless of machine brand, along with Trimble's portfolio of Connected Site solutions - site positioning systems, construction asset management services, software and powerful wireless and Internet-based site communications infrastructure.

The experienced construction professionals at each SITECH Technology Dealership can advise contractors on the appropriate construction technology solutions to utilise, and can provide high-quality local customer service, personalised training and technical support. As authorised dealers for Trimble site-wide solutions and Caterpillar's machine control systems, the SITECH Technology Dealers understand how to apply innovative construction technology to help solve a variety of contractors' construction challenges. Leveraging technology, contractors can gain greater insight into their operations, enabling them to lower operating costs and improve accuracy, safety and productivity.

Trimble is establishing a SITECH Technology Dealer network in the Americas, Europe and Asia Pacific regions. ■

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Sansiri launches new residential development in Bangkok

Thailand's property developer Sansiri Public Company Limited has launched its new project in Bangkok, The LINE Jatujak-Mochit condominium. It is Sansiri's first joint venture business in partnership with Thailand's mass transit provider BTS Group Holdings Plc, under the name BTS Sansiri Holding One Limited. It is also Sansiri's largest project investment to date, valued at 5.6 billion Baht.

The BTS Group and Sansiri envision creating new condominium projects within a 500 m radius along existing and future mass transit lines, which will provide excellent connectivity and convenience for the residents. The LINE Jatujak-Mochit is within walking distance from BTS Mo Chit and MRT Chatuchak stations and is situated close to Don Muang International Airport.

The 43-storey condominium, consisting of 841 residential units that range from one to three bedrooms, sits on five rai (86,111 sq ft) of land. Also planned is a mini retail shopping strip in front of the project,



The LINE Jatujak-Mochit condominium project is scheduled for completion in November 2017.

which will connect directly to Mo Chit BTS Station for the convenience of residents. The project is scheduled for completion in November 2017 and will be managed by Sansiri Public Company Limited. ■

More Grove cranes set for Singapore and Thailand

Singapore-based crane rental company Asiagroup Leasing Pte Ltd has placed an order for five Grove all-terrain cranes and two Manitowoc crawler cranes. These include three Grove GMK6300Ls, a Grove GMK5220, a Grove GMK4100L, a Manitowoc 8500-1 and a Manitowoc 11000-1. The cranes are set for delivery this year.

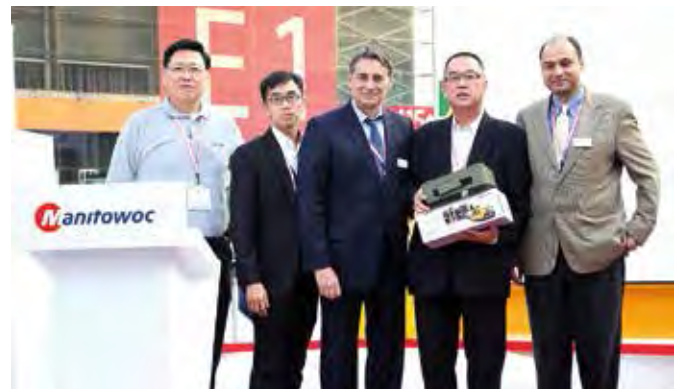
"The GMK6300L was of particular interest to us because of the space constraints in the city area in Singapore," said Jeffrey Poh, business development manager at Asiagroup Leasing. "The mobile crane enables our customers to complete a job without using a fixed jib or luffing jib, saving space. The long boom is perfect for tower crane erection at high-rise construction sites. It also provides additional load capacity at a higher reach than other models in its class."

The Grove GMK6300L has a 300 t capacity and one of the strongest load charts in its class. It also offers the longest boom in its class at 80 m, which gives users the ability to perform stronger lifts without the need to rig the jib. In Singapore, the GMK6300L is said to outlift its main competitor by nearly 30 percent when working at height with the full main boom extended or up to 46 percent when working at longer radii – and all while configured with 4 t less counterweight than the competitor. The crane also features the latest steer-by-wire technology and Megatrak suspension system for better manoeuvrability.

The seven cranes have been purchased by Asiagroup Leasing to replace older cranes in the company's fleet and to boost the company's overall fleet size as its business continues to grow. "We expect the market to pick up at the end of 2015 and these new additions to our fleet will ensure that we're ready for an increase in demand," said Steven Poh, Asiagroup's managing director. Besides the seven-crane deal, Asiagroup has subsequently ordered five additional Manitowoc crawler cranes.

In addition, Siam Cement Group (SCG), one of Asia's leading building materials suppliers based in Thailand, has purchased a 130 t Grove GMK5130-2 all-terrain crane to replace an older 80 t GMK4080. The higher-capacity GMK crane will be used across SCG's three biggest manufacturing sites in Saraburi province.

An evolution of the popular GMK5130-1, the second generation GMK5130-2 has an improved cab that hydraulically tilts to 20°. The aluminium cab features all-round vision and safety glass for optimal operator safety. The Twin-Lock boom extends from 12.9 to 60 m in six



Asiagroup Leasing Pte Ltd has placed an order for five Grove all-terrain cranes and two Manitowoc crawler cranes. Jeffrey Poh (second from left) and Steven Poh (second from right) from Asiagroup are seen here with Manitowoc executives.



Thailand's Siam Cement Group has purchased a 130 t Grove GMK5130-2 all-terrain crane.

sections with a maximum tip height of 63 m. At SCG's three cement plants, it lifts loads of up to 40 t which measure up to 6 m in length.

The crane's carrier is powered by an eight-cylinder, turbo-charged Mercedes-Benz OM502LA engine. It features the Megatrak independent, hydro-pneumatic suspension system, which is unique to Grove cranes. The system gives the crane excellent manoeuvrability and speed and also offers up to 600 mm of ground clearance.

SCG also owns three older models in its fleet, a Grove AT990E all-terrain crane, plus a Grove RT855B and a Grove RT530DXL – both rough-terrain cranes. ■



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New Genie parts distribution centre opens in Singapore

Terex Aerial Work Platforms (AWP) has opened a new parts distribution centre in Singapore to better serve its Genie customers in the Asia Pacific (APAC) region. This provides many benefits to the customers, including a shorter lead-time, high fill rates and long term savings through lower shipping costs.

Before opening the new centre, Terex AWP branch office in Singapore could store only a limited selection of parts locally, forcing customers to source Genie parts from multiple centres in Singapore, the US and Europe. "Today, they only need to come to one place in Singapore to get all their parts needs met. The new centre was set up to replicate the proven success of a centralised parts distribution model in Europe," said Daniel Ho, vice president for Terex AWP, Asia.

The new centre will have a broad selection of about 5,000 Genie parts, which will meet the majority of local needs. The set up in Singapore is considered an ideal location in the APAC region, due to its close proximity to both air and sea ports, with a high frequency of daily air and sea shipments. Parts can be shipped within the same day and customers will receive the parts in approximately two or three days, according to Terex AWP.

"The opening of this new centre is a significant investment in improving support for our APAC dealers and customers," said Mr Ho. "As our customers continue



From left: Jimmy Yap, parts and logistics supervisor; Jolynn Tan, parts and logistics assistant; Bryan Hew, service engineer; and Ivan Quek, field service manager.

to increase their Genie machine fleet and operations, the need to reduce downtime becomes increasingly important."

Go-live for parts ordering will be done in stages in different countries, starting with Singapore on 4 May 2015. The new centre joins the company's three parts warehouses in the US and Europe. ■

Leighton to play role in CityLink Tulla Widening project

Leighton Contractors, a CIMIC Group company, has been selected by Transurban to deliver a significant portion of CityLink Tulla Widening project in Melbourne, Australia. The design and construct contract is expected to generate revenue of approximately A\$570 million over the next two and a half years.

The CityLink Tulla Widening project extends from Melbourne Airport on the Tullamarine Freeway to Power Street on the Westgate Freeway. The project is being delivered in two sections, with Transurban responsible for the works from Bulla Road to Power Street and the Victorian government delivering the works from Melbourne Airport to Bulla Road.

Under the design and construct contract, Leighton Contractors will deliver the works between Bulla Road and Power Street. Construction is due to begin in October 2015 and this section is scheduled for completion by 2018. The CityLink Tulla corridor is one of the most heavily trafficked roads in Melbourne, carrying 210,000 vehicles per day in its busiest section. The project will add additional lanes, boosting capacity by up to 30 percent. ■

Clark Equipment NSW is now Gomaco distributor

Gomaco has appointed Clark Equipment NSW as its authorised distributor in Australia and New Zealand. The company will provide sales and service for Gomaco's full line of concrete construction products.

Clark Equipment is an Australian-owned company that has been associated with the construction market for more than 50 years. Its branch network consists of 20 facilities that serve both Australia and New Zealand.

In addition, Gomaco has appointed MRCM Co Ltd as its authorised distributor in Korea. The company is located in Seoul. ■

Another Maeda LC785 for Ryobi Tactics



Ryobi Tactics Pte Ltd has bought a second unit of Maeda LC785 mini crane from JP Nelson Equipment Pte Ltd. The first unit was bought six months earlier.

Ryobi Tactics is a specialist builder in civil engineering and structural steelwork construction, with a strong experience in the design and construction of underground strutting works. Prior to purchasing its first LC785, the company had been renting the machine from JP Nelson for use in many of its challenging projects.

The LC785 is designed to be versatile. It features a pick and carry function that enables the machine to transport materials up to 2 t. JP Nelson Equipment is the distributor of Maeda mini cranes in Singapore, Indonesia and Malaysia. ■

Ryobi Tactics recently bought a second unit of Maeda LC785 mini crane from JP Nelson.

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Comansa Jie renamed Comansa CM

Tower crane manufacturer Comansa Jie, based in Hangzhou, China, has changed its name to Comansa CM. This rebranding is due to the exit of one of its main shareholders, Jie Holding, which now leaves Linden Comansa as the sole owner of the company.

According to Comansa CM, whose corporate name is Comansa Construction Machinery (Hangzhou) Co Ltd, neither its sales and product strategy nor its staff and management team will be affected by the change in the shareholding. A clear example of this continuity is the new logo itself, which has undergone minimal changes in comparison to the previous logo.

Created in 2006 initially as a joint venture, Comansa CM currently offers a range of 11 tower cranes with flat top design, featuring maximum load capacities from 6 to 24 t. The products are sold mainly in China, India and the Southeast Asia. ■



Comansa Jie is now known as Comansa CM.

Successful IPO for Dingli



Dingli has successfully launched its IPO on the Shanghai Stock Exchange main board.

shares were priced at RMB 29.56 at launch, raising RMB 487.7 million and valuing the company at almost RMB 2 billion. The share offering was fully subscribed and has continued to climb within the limitations allowed by the Chinese government for new issues. ■

One of China's leading self-propelled aerial work platform manufacturers, Zhejiang Dingli Machinery, has successfully launched its initial public offering on the Shanghai Stock Exchange main board. Dingli was reportedly among 24 companies that were recently cleared for a stock market flotation, and one of 12 companies to be listed on the main board.

Dingli offered 16.5 million shares, representing 25 percent of its equity. The

Sanjeev Gandhi leads BASF in Asia Pacific



Sanjeev Gandhi (left), member of the board of executive directors, BASF SE, has taken over the responsibility for BASF's operations in the Asia Pacific region. He is based at the BASF Asia Pacific regional headquarters in Hong Kong.

Mr Gandhi began his career with BASF in a sales role in India in 1993. He subsequently held a number of management positions in marketing, product management and business management between 2000 and 2010. From 2010 to 2014, he was president of BASF's Intermediates division, based in Ludwigshafen, Germany. He joined the board of executive directors in December 2014. ■

Aurecon appoints China country manager



Global engineering and technical advisory company Aurecon has appointed Margaret Cao (left) as its country manager for China. She will be responsible for the company's Beijing and Shanghai offices, which focus on delivering technical services in the property, transport and infrastructure markets. Ms Cao was previously at Worley Parsons China as general manager of Infrastructure & Environment CSG.

With over 20 years of experience in engineering and construction in China, Ms Cao has worked for engineering consultancies and in resident engineering positions within various multinational companies. She also advised international investors entering the China market as well as Chinese companies venturing overseas on project delivery strategy, risk assessment, safety management system and methodology, project and value management practices. ■

Sheraton Zhanjiang Hotel opens



The Atkins-designed five-star Sheraton Zhanjiang Hotel (left) in Zhanjiang, China, has opened to the public. This sea view hotel is situated on the Leizhou Peninsula, close to the subtropical

shore of the South China Sea. Atkins was appointed by Guangdong Minda Investment Group to provide urban and architectural design for the project, which consist of two towers: Tower A houses a 440-room hotel containing a 2,800 sq m banquet area, while Tower B accommodates high-grade offices above a podium of entertainment spaces. Facing the shoreline, the twin towers stand in a V-shape formation, flanking a 50 m wide green belt, which will provide an outdoor green space for visitors. ■

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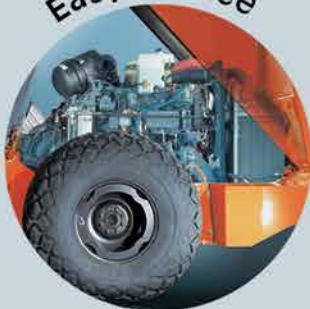
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BASF establishes largest India construction chemicals plant

BASF has inaugurated its largest construction chemicals plant in India, located at Nellore in Andhra Pradesh. This is the company's fifth construction chemicals plant in the country. The new plant will enable BASF to respond in a timely way to customers' needs in the southern part of India and to support them with high performance solutions in the highly competitive market.

At the new plant, BASF is now producing standard and custom-made performance based concrete admixtures – MasterGlenium, MasterPolyheed and MasterRheobuild range. In addition, construction systems such as MasterTile, MasterSeal, MasterTop and MasterEmaco series are being manufactured, with the potential to expand to higher versions of MasterTile and MasterProtect series of products. The site also houses a multiple tank storage facility and a well-equipped concrete lab that will deliver tailor made recipes through formulation excellence.

“With the new plant at Nellore, BASF offers a comprehensive range of solutions to help construct buildings that can be more energy efficient, durable and require fewer resources for maintenance,” said Ralf Spettmann, president of BASF's Construction Chemicals.

“India is a strategic market for BASF and it's important to be able to respond to the local market in a timely manner,” said Raman Ramachandran, chairman and managing director of BASF India Limited and head of BASF South Asia. “The Nellore site, an addition to our existing four construction chemicals plants in India, enables us to stay close to the customers and offer them customised solutions to meet the growing demands for multi-storey buildings, long-lasting infrastructure constructions and more energy efficient construction techniques.”

The production plant is strategically located in the Naidupet area of Nellore with access to the road network and the Krishnapatnam Port. Other construction chemicals production sites in India are located in Turbhe in Navi Mumbai, Nalagarh and Kolkata. ■



BASF has opened its largest construction chemicals plant in India, located at Nellore, Andhra Pradesh. This new plant will enable the company to respond in a timely way to customers' needs in the southern part of India and to support them with high performance solutions in the highly competitive market.

ADB provides US\$197 mil loan for Pakistan highway upgrade

The Asian Development Bank (ADB) and the Government of Pakistan have signed a US\$197 million loan to upgrade a national highway in Balochistan province. The project will rehabilitate 79 km of two-lane highway in Zhob-Mughalkot (N50) and another 128 km in Qila Saifullah Waghum (N70).

The highway development project is a continuation of ADB's support to the government of Pakistan in its efforts to upgrade important roads in Balochistan. The project, being executed by the National Highway Authority, is aimed to reduce transport costs, promote inter-provincial connectivity, strengthen road safety and open up new economic opportunities for local communities through easier access to markets and social services.

ADB said that Balochistan, located on the intersection of the Middle East, Central Asia and South Asia, has the potential to become an important regional trading hub. The province has the lowest density of roads among Pakistan's four provinces. Poor connectivity and access issues continue to be major challenges affecting the poor who live mostly in rural areas.

The improvement of road infrastructure is expected to help pull poor communities in remote parts of the country out of poverty, and unlock economic prosperity in the region. ■



ADB and the Government of Pakistan recently signed a US\$197 million loan to upgrade a national highway in Balochistan province.

JCB donates machines to Nepal

JCB has donated its backhoe loaders to support the relief effort in earthquake-hit Nepal. And in the coming weeks and months, these machines will also be used in reconstruction efforts. In addition, JCB has donated its electrical power generators.

“It is shocking to see the devastation caused by this earthquake and the resulting widespread damage and destruction. On behalf of JCB, I express my heartfelt condolences to everyone affected by this natural disaster. JCB will continue to help the Nepalese government in every possible way,” said Lord Bamford, chairman of JCB.

JCB supplied the backhoes through its dealer, MAW Enterprises Pvt Ltd, in Nepal. The electrical power generators were sent from JCB India's factory in Delhi to help stricken communities caught up in the quake. ■



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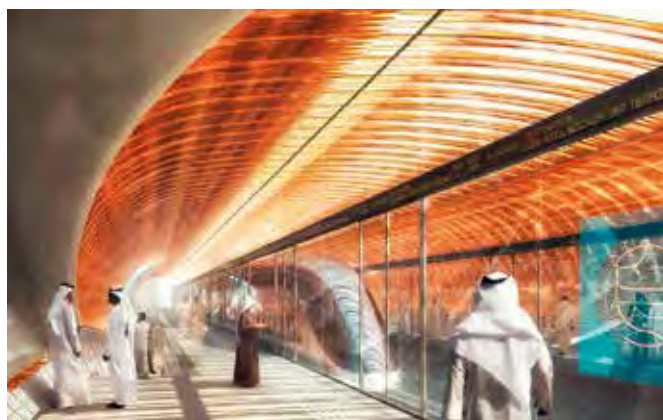
Foster + Partners wins major contracts in the Middle East

Saudi Arabia plans to build a new public transport system in Jeddah and has appointed Foster + Partners to develop the architectural vision for the project. The vision includes the design of metro, ferry, bus, cycle, public spaces and nodes of development. This comprehensive plan extends from the design of the stations to the trains and branding. In addition, the development of the metro system will create a new urban amenity for the city of Jeddah at key locations below the elevated track.

Designed in response to the local climate, the masterplan is citywide and draws on the high-density, compact urban model of the ancient quarter of Al Balad, with its mixture of uses and comfortable, walkable shaded streets. Currently only 12 percent of the population live within a 10 minute walk of Jeddah's transport nodes – the project aims to achieve 50 percent, through a process of densification and strategic planning.

Furthermore, Dubai Design District (d3) has appointed Foster + Partners to design phase 2 of its masterplan, which features a dedicated Creative Community occupying around 1,000,000 sq ft within d3. The project will sit alongside the newly developed 'core buildings' and act as a thriving cultural epicentre at d3. Phase 2 is expected to officially open its doors in 2017, providing an incubator for emerging local designers and artists, as well as bespoke environment for art galleries and studios wanting to showcase their pieces.

The design for the Creative Community includes flexible offices; coworking communal facilities; outdoor display venues; pedestrianised spaces; climate solutions; an emphasis on creating vibrant and attractive landscaping; and a contemporary approach to architecture. ■



Both images © Foster + Partners

The masterplan for Jeddah's new public transport system draws on the high-density, compact urban model of the ancient quarter of Al Balad, with its mixture of uses and comfortable, walkable shaded streets.



Phase 2 of the Dubai Design District features a dedicated Creative Community, which will occupy around 1,000,000 sq ft.

Vinci and Bouygues to work on Cairo's metro project

A joint venture comprising Vinci Construction Grands Projets, Bouygues Travaux Publics (a Bouygues Construction subsidiary) and their Egyptian partners, Orascom Construction and Arab Contractors, has been awarded a contract by the Egyptian authorities for the new phase of civil engineering for Line 3 of the Cairo metro between Haroun and El Nozha stations.

The new phase of works (Phase 4A) continues on from Phase 2, which was brought into service in May 2014. Phase 4A consists of 5.15 km of tunnel and five underground stations on Line 3, the east-west link across the Egyptian capital.

The joint venture has committed to a design-build delivery deadline of 34 months. The earth pressure balance tunnel boring machine Imhotep, used for the previous phase, will be modified to operate as a slurry pressure balance machine. This change is expected

to generate savings for the joint venture on both its execution time and budget. The project, worth €264 million, is planned to employ approximately 3,200 people, mostly Egyptians.

In another development, the Welsh government has awarded Costain/Vinci Joint Venture, represented by Taylor Woodrow and Vinci Construction Grands Projets, the first stage of an ECI (Early Contractor Involvement) contract for the M4 Corridor to the south of the city of Newport. This new 24 km long section of motorway includes a 2.5 km long cable-stayed viaduct above the river Usk, two key interchanges and 36 structures. The £750 million project will help to improve infrastructure in Wales by making it more efficient, safer and more sustainable. Development work is set to commence immediately, and construction is expected to start in the first quarter of 2018. ■

Bilfinger modernises Prora architectural monument in Germany

Bilfinger has won a €30 million contract to modernise a part of the Prora architectural monument on the Baltic Sea island of Rügen, Germany. The company will convert it into 280 premium holiday apartments.

Construction of the more than 4 km long holiday complex was begun in the 1930s. Later, the six-floor complex was used by the National People's Army and the German Armed Forces. Bilfinger will now fully modernise one of the nine structural blocks. Private condominiums and hotel apartments will be built over a total floor

space of 24,000 sq m. Work started in March 2015 and is expected to be completed in the third quarter of 2016.

In Hamburg, Bilfinger is also building a new residential and commercial development with an underground parking garage on a turnkey basis. On the ground floor, there will be approximately 4,000 sq m of retail and local supply space while the upper floors will have more than 100 new apartments. The building achieves a KfW70 energy standard, which means that it requires 30 percent less primary energy than a comparable new building. ■



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LiuGong opens Brazil factory

LiuGong has opened its first factory in Brazil, located in the city of Mogi Guaçu, about 180 km from São Paulo. This is the company's fourth factory outside China.

LiuGong said it will invest R\$120 million in Brazil and expects to produce 1,500 units per year at the new facility. The investment will last three years, reflecting the evolution of business expectations in the country. The factory will deliver machines targeted at the Brazilian market, including wheel loaders and excavators.

The machines will be distributed throughout Brazil and has a post-sale support system with local presence. The city of Mogi Guaçu offers easy access to some of the main parts' suppliers in the region and its strategic location is critical to the business plan, said LiuGong.

"LiuGong is reinforcing a long-term relationship with Brazil. We have a success story in the country with our machines. This investment is the natural consequence of our business's evolution and the belief that the infrastructure and construction markets have good potential for growth in the coming years," said Bruno Barsanti, vice president of LiuGong Latin America.

LiuGong plans to hire 80 percent of its employees locally and has a policy of offering opportunities for professional growth. "Our



LiuGong's first factory in Brazil is located in Mogi Guaçu.

company invests heavily in new products and technologies in China, and these advances are used worldwide in our operations in Poland, India, Argentina and now Brazil. We are committed to transferring our values to the communities selected to build our facilities, bringing social and economic growth and knowledge," said Mr Barsanti. ■

Gomaco appoints new director of international sales



Randy Bean (left) has been appointed as Gomaco's new director of international sales. He is replacing Bryan Schwartzkopf, who retired in May 2015. Mr Schwartzkopf had been with Gomaco for almost 42 years and became director of international sales in 1987.

Mr Bean started with Gomaco in 1987, working in the production control department. In 1993, he joined the international department when he was named international sales coordinator.

"Randy has been a part of our succession planning and has

played a major role in international sales for several years," said Kent Godbersen, Gomaco's VP of worldwide sales and marketing. "He is a part of the Gomaco culture and has the attention to detail and the work ethic that we are known for here in the heartland of the United States.

"Randy has coordinated a large number of projects with our worldwide distributor network and has provided guidance in specifying equipment for highways, canals, tunnels and other concrete applications. He will now have a leadership role in our directive to provide our customer base throughout the world with the leading sales and service support that our international team is recognised for in the concrete paving industry." ■

New president and CEO for Golder Associates



The global consulting and engineering firm Golder Associates has appointed Dr Hisham Mahmoud (left) as its president and CEO. He will be based in Atlanta, Georgia, USA.

Dr Mahmoud's career spans some 27 years, the majority of which has been in diversified global engineering and construction companies. He was most recently with SNC-Lavalin, serving as president of the infrastructure group. He was hired in 2013 as part of the company's new executive team.

Dr Mahmoud joined SNC-Lavalin from AMEC, where he last served as group president for growth regions, responsible for the company's mining, oil & gas, power, and environment & infrastructure business in the Middle East, Africa, CIS, Asia and Australia. He also served as president of AMEC's global environment & infrastructure business. Prior to AMEC, Dr Mahmoud worked for URS and its legacy companies Woodward-Clyde and Dames & Moore. ■

'The One'



'The One' will be a new mixed-use tower on a prominent downtown site at One Bloor West in Toronto, Canada. The 80-storey structure will rise to 318 m, set to be Toronto's second tallest building. It will combine a residential tower with a retail base, which is integrated with the city's underground pedestrian 'PATH' network. ■



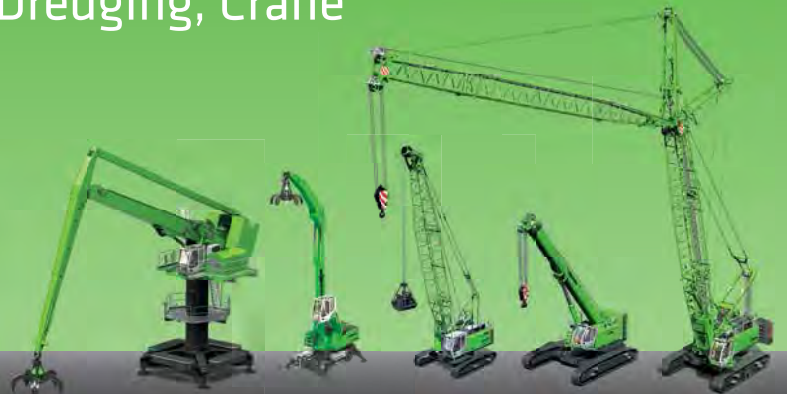
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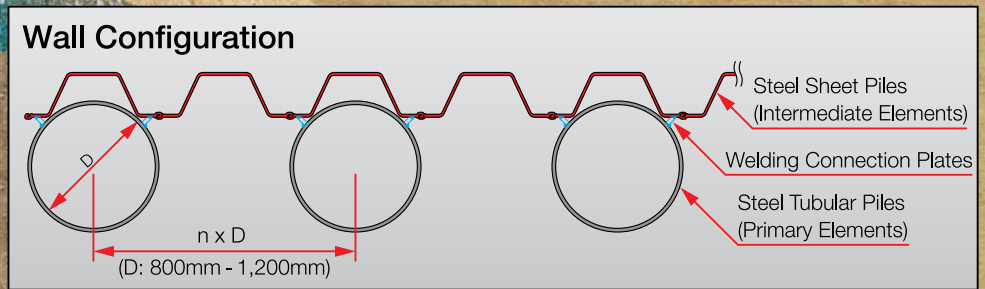
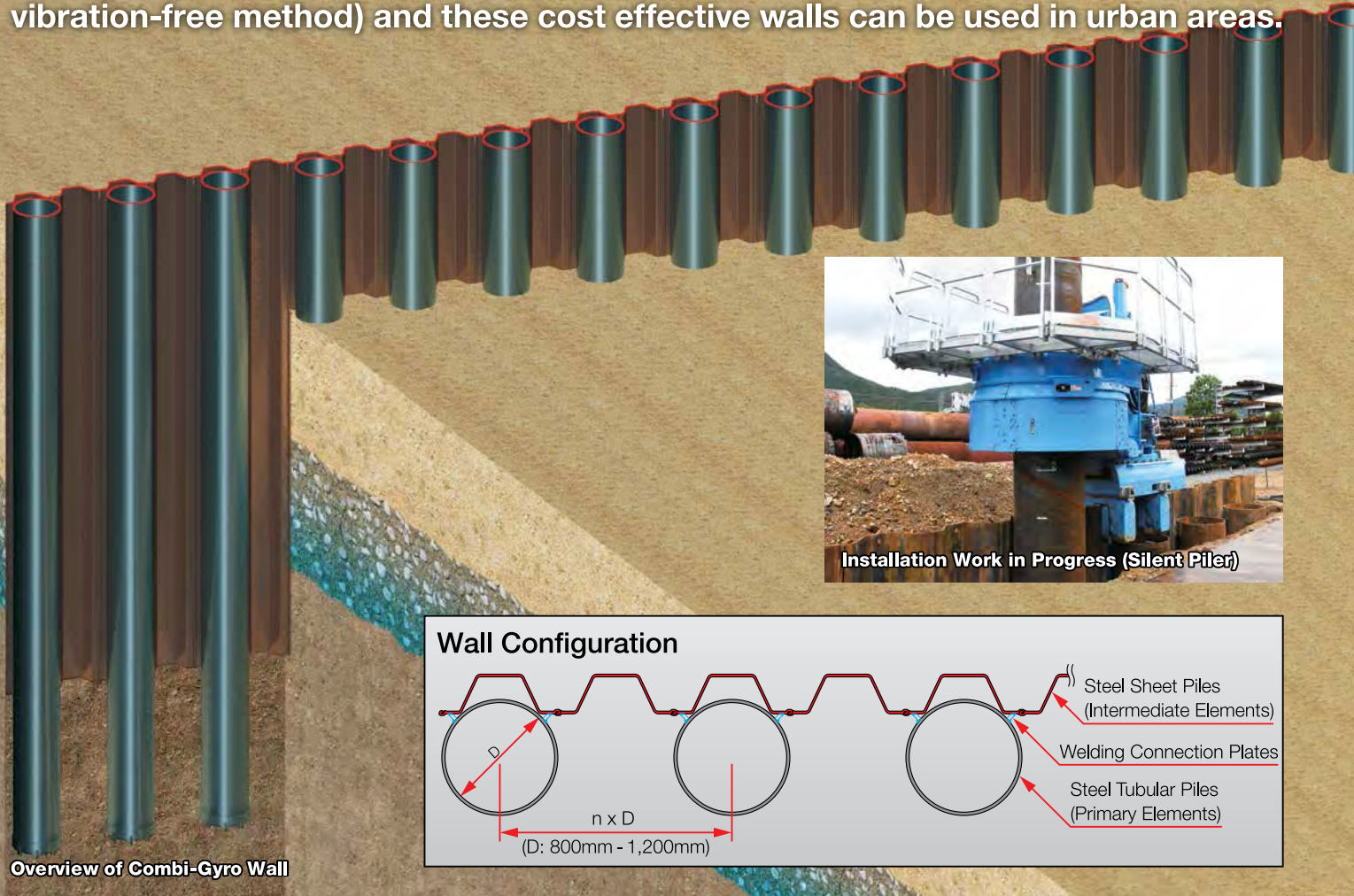


Date	Events in Asia	Organiser & Contact
9 to 12 Sept 2015	Construction Indonesia 2015 Jakarta International Expo Jakarta Indonesia	PT Pamerindo Indonesia/IEM/OES Tel: +65 6233 6777, Fax: +65 6233 6768 Email: violet@iemallworld.com Website: www.constructionindo.com
10 to 12 Sept 2015	Cambuild 2015 Diamond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

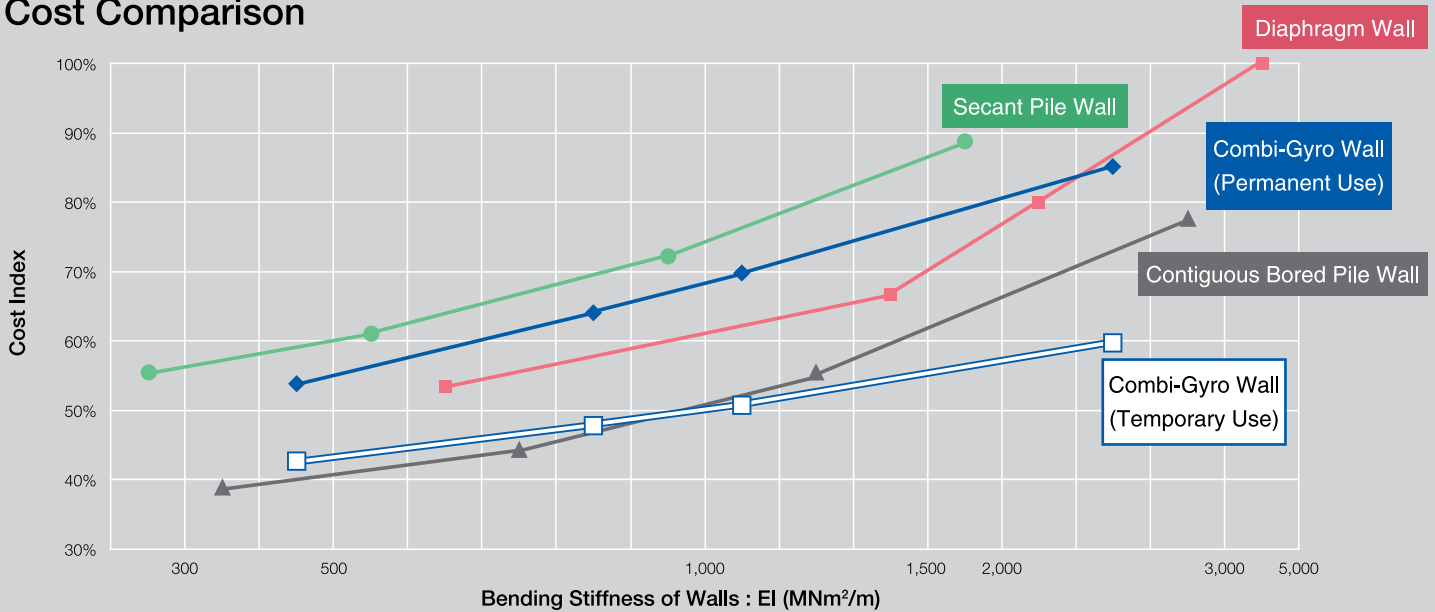
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Cost Comparison



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

Samoter prepares for 2017 show

The 30th edition of Samoter, the triennial international earthmoving and building machinery exhibition in Verona, Italy, will be held from 22 to 25 February 2017. The show will focus on environmental emergency and protection solutions, territory and hydro-geological risks, with special reference to intelligent machines, hybrid low-emission and high efficiency machines, technological platforms for human-to-machine (H2M) and machine-to-machine (M2M) interaction. The show will also highlight EU projects such as Europa 2020 planning for sustainable growth and the Horizon 2020 programme for research and innovation.

Samoter will feature a demo area, rental area, co-location with Asphaltica (machinery and systems for the road-building and bitumen sector promoted by Siteb) and Samoter International Award - an international technical innovation competition.

Despite the massive recession gripping the sector for many years, Samoter looks set to drive the recovery. The Italian industry data has reportedly been encouraging in this regard. As seen in the statistics from Cresme and Unacea, in 2014 the Italian construction equipment market improved by 11 percent with a positive trend confirmed by results in the first quarter of 2015 that closed at +19 percent. ■

Website: www.samoter.com



The next edition of Samoter will take place from 22 to 25 February 2017, focusing on environmental and hydro-geological protection solutions through intelligent machinery and technological platforms.

World Demolition Summit to return to Amsterdam

The next World Demolition Summit (WDS) will take place once again at the NH Grand Hotel Krasnapolsky in Amsterdam, The Netherlands, on 6 November 2015. The event will feature two main components, the 2015 World Demolition Conference and the 2015 World Demolition Awards.

The 2015 World Demolition Conference will build on the success of the six previous years' gatherings with a top level programme made up of a mix of reports detailing how some of the most challenging demolition projects from around the world were successfully carried out, along with papers covering more general topics of specific interest to the world's demolition industry.

The 2015 World Demolition Awards will celebrate the best that the demolition industry has provided its clients in the construction sector over the period from June 2014 to June 2015. These awards are open to any demolition contractor from anywhere in the world and there is no requirement for membership of any professional body, although the event itself is endorsed by many of the leading national and international demolition associations and federations. Companies have until 31 July 2015 to submit entries for the awards.

Dennis McGarel, vice president of sales at Brandenburg Industrial Service Co will use

the WDS conference to outline the company's work on the removal of the Prentice Woman's Hospital and Maternity Centre in downtown Chicago, USA. Brandenburg is considered one of the world's top five demolition contractors.

Mr McGarel will explain the challenges faced by the contractor in demolishing a cantilevered nine storey, four cylindrical tower structure sitting on top of a rectangular five storey lower structure. There were other challenges as well, with court action to prevent demolition leading to delays of more than a year on the project.

Brandenburg is the latest speaker to join a line-up that includes other high profile speakers, including Peter Craven (CDE Global) on waste recycling targets; Henrik Bonnesen (COWI) on a Danish investigation into PCB sources; Clinton Dick (Liberty International) on the decommissioning of a massive harbour crane in Sydney Harbour; keynote address by David Sinclair on a life in demolition; and William Sinclair (Safedem) on demolition and urban redevelopment.

The Summit is held in cooperation with the European Demolition Association (EDA) and is endorsed by the National Federation of Demolition Contractors (NFDC), the Institute of Demolition Engineers (IDE), the Concrete



Brandenburg will outline its work on the removal of the Prentice Woman's Hospital and Maternity Centre (above) in downtown Chicago, USA.

Sawing & Drilling Association (CSDA), and the National Demolition Association (NDA). ■

Website: www.khl.com/wds







A choice that speeds up the future

Kobelco cranes offer a new dimension in work efficiency.

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

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

Crawler Crane Series

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

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IPAF Asia Conference signals regional success

Close to 150 people attended the IPAF Asia Conference held at the end of May in Hong Kong, marking growing interest in the emerging use of powered access equipment and in safety concerns.

The conference offered a unique opportunity to hear and learn from speakers in the region, such as Alan Chan, vice chairman of the Hong Kong Occupational Safety & Health Council. Mr Chan noted that the number of construction workers in Hong Kong had risen by 50 percent to 80,000 in 2014. The industry is being pushed to introduce safe and productive means of working at height, and in 2013, the Council set up a sponsorship scheme to subsidise companies using mobile elevating work platforms (MEWPs). The scheme has so far received 17,000 applications, revealed Mr Chan.

OSH specialist Liew Wan Sein from the Singapore Ministry of Manpower examined the country's well-developed regulations that include heavy penalties for companies who fail in their safety responsibilities. She emphasised the need for good management of MEWPs. Bai Ri, IPAF's China representative, shared some key facts and figures about the MEWP market in China. There were around 80 manufacturers in China and 150 to 200 rental companies, he said. Total fleet was estimated at 10,000.

Keynote speaker Andy Studdert, IPAF president, used his current experience as CEO of NES Rentals and previous experience as COO of United Airlines to show how companies can be safe and successful. Rental companies must demonstrate commitment to their employees, he said, while having clear and strict safety procedures that everyone can adhere to. Also speaking was Brad Boehler, president of Skyjack, who presented key insights into the fleet mix of MEWPs in Asia compared to other regions. Scissor lifts and vertical masts had exceeded 2007 sales levels in Asia, while booms have a distinctly more gradual growth path, he revealed.

In addition, Mike Davis, vice president and managing director of Terex AWP Asia Pacific, examined the main safety features found on access lifts and noted that technology must be combined with mass production to ensure that these safety features are built into standard machines effectively.

The day before the conference, many delegates attended the site visit at Modern, the first IPAF-approved training centre in Hong Kong. IPAF's Hong Kong members held their first member meeting the day after the conference and agreed to work towards the creation



Nearly 150 people attended the IPAF Asia Conference held at the end of May in Hong Kong.



IPAF CEO Tim Whiteman (left) with Barry Wong Heung Ming, an IPAF certified instructor with Modern in Hong Kong.

of an IPAF Hong Kong Country Council in order to share information about good practice and safety. ■

Haulotte inaugurates first IPAF training centre in China

Haulotte has started the first IPAF-approved training centre in China, located in MinHang District, Shanghai. The centre was officially opened in early April by Tomie Chan, Asia general manager, Haulotte Trading (Shanghai), and Ms Li Han Bing, secretary-general of the China Construction Machinery Industry Rental Association (CCMRA).

More than 50 people attended the opening ceremony, which featured presentations by Bai Ri, IPAF's China representative; Raymond Wat, general regional manager, IPAF South East Asia; and demonstrations by IPAF certified instructors Allen Ouyang and William Fu. ■

MEWPs are believed to be the fastest growing segment of the machinery industry in China and predicted that the fleet would grow to one million units in 10 years' time.



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Auger Torque alignment monitor

Auger Torque has introduced its new alignment monitor for use with earth drills and augers. The device is specifically designed to further streamline drilling holes, and is also ideal for screw anchor and foundation drilling applications. It eliminates a spotter and allows the machine operator to monitor all angles simultaneously, ensuring accurate and efficient drilling.

According to Auger Torque, the new alignment monitor is suitable for all of the company's earth drills and can also be fitted to the existing setup. Installed in the machine cab, the monitor features an ultra-bright LED display. In addition, the monitor is IP rated to guarantee that it can operate in all weather conditions. ■

Website: www.augertorque.com.au



Left and above: Auger Torque's new alignment monitor is designed to further streamline drilling holes. It is installed in the machine cab and allows the operator to monitor all angles simultaneously.

New Sennebogen 653

The new Sennebogen 653 telescopic crawler crane is compact and easy to transport. It features a full-power boom, which can be continuously extended and retracted over a length of 30.4 m, and is always friction-locked. The fly boom extends the maximum reach height to 43.4 m.

The Sennebogen 653 has a maximum safe working load of 50 t. It comes with a 129 kW diesel engine and up to two hydraulically driven 50 kN winches, with winching speeds of up to 115 m/min. The crawler undercarriage can be used to work on both small and large construction sites.

The crane can be variably driven even at full load. It can also operate on inclines of up to 4° and manoeuvre easily in rough terrain. At just 3 m wide, the extendable crawler tracks save space during transport and can be extended out up to 4.5 m support width when in use. The 5.34 m long crawler tracks with optional track shoes up to 800 mm wide ensure low ground pressure and excellent stability.

The Maxcab comfort cab with automatic air conditioning and a spring-cushioned seat offers a comfortable working environment. The cab itself can be tilted up to 15°. An optional hydraulic cab elevator and standard camera system also improve the overview of the work area.

The Sencon control and diagnostics system displays all operating parameters and features an easy, intuitive user control, as well as the ability to process error messages quickly. It also monitors the load moment limitation system. The central maintenance and lubrication points are conveniently placed for easy access during maintenance and daily servicing. ■

Website: www.sennebogen.com



The new Sennebogen 653 telescopic crawler crane has a maximum safe working load of 50 t, and comes with a 30.4 m long boom and two undercarriage variants.

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Manitowoc introduces Grove GMK5250L all-terrain crane

The new 250 t capacity Grove GMK5250L all-terrain crane from Manitowoc has been developed for the global market. It offers excellent manoeuvrability and driver comfort, thanks to its inclusion of a VIAB turbo clutch and integrated retarder – it is believed to be the first mobile crane to feature this system.

The VIAB turbo clutch module eliminates both fluid overheating and clutch burning, while enabling wear-free starting and braking. It also contributes to fuel savings and on the GMK5250L fuel consumption is estimated at approximately 30 percent below that of its predecessor, the GMK5220.

The 'L' designation for the GMK5250L indicates it is a long boom all-terrain crane, and in this case the main boom is an impressive 70 m, which also includes Grove's Megaform shaping for better strength and stability. With its long boom length, the GMK5250L can offer more reach both vertically and horizontally than any crane in its class, allowing owners to take on a greater range of jobs with the crane.

Boosting overall reach is a 21 m hydraulic swing-away jib, which can be extended with either an 8 m boom extension, two 8 m jib inserts, or a combination of both for a total possible jib length of 37 m. For optimum usage, the full jib can also be operated while the crane is working with its full 70 m boom length extended. Another benefit of the jib is its ability to offer increased offset of up to 50° compared to a typical 40° on other Grove cranes in its class - plus there is an optional integrated heavy duty jib available.

The Grove GMK5250L is designed for efficiency, giving users a highly versatile crane, packed with the latest innovations. Operators will feel at home in the new Grove GMK5250L superstructure cab, with its 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 all-terrain crane models, as well as crawler cranes, rough-terrain cranes, truck cranes and tower cranes. The CCS components and operating software have been specifically designed, developed and tested by Manitowoc Engineering and Innovation teams worldwide to ensure the highest reliability standards. The cab also features a new ergonomic jog dial and new joysticks.

The highly intuitive Boom Configurator Mode makes it quick and easy to select the optimum boom position for a specific



The new Grove GMK5250L is believed to be the first mobile crane to feature a VIAB turbo clutch module.

lift. The operator inputs the lift parameters – radius, load and distance to be moved – and the system calculates the best boom configuration. Once the operator selects the preferred option, the boom automatically extends to the required length.

The GMK5250L is powered by a single engine - a concept pioneered by Grove on its highly successful Grove GMK6400. The GMK5250L is using a six cylinder, Mercedes-Benz diesel engine with a 390 kW rating and a maximum torque of 2,460 Nm. The engine drives the carrier and powers the superstructure, and on the GMK5250L this is managed by one simple and reliable angular gear box. A single engine means lower fuel consumption during operation, reduced overall weight and less maintenance, meaning the crane is far more economical.

With its 12 t per axle configuration, and dimensions suited to global roading requirements, the compact Grove GMK5250L offers excellent roadability. Compared to the GMK5220, the Gross Vehicle Weight has been reduced to give customers more transportation options including the ability to carry more equipment on the crane. Special attention has also been given to the appropriate axle group spacing and specifically the fact that this exceeds 2.4 m – a strict requirement for roading mobile cranes in North America. There are additional design features that make the crane far easier to move in countries with stricter axle loading requirements, such

as the US, Canada, Norway, Australia and Japan.

Meanwhile at the other end of the scale, in countries where the local requirement is for axle loadings of under 16.5 t (such as the UK), the crane is able to move on the highway with up to 21 t of counterweight. As most other cranes in this class are limited to 12 t counterweight on the road in the UK, the Grove GMK5250L offers outstanding load chart advantages of up to 50 percent.

Once on the job site, the crane can be moved with its full counterweight of 80 t saving valuable time that would otherwise be spent installing or removing counterweight sections. In addition, some of the counterweight slabs are interchangeable with those of the GMK6300L, optimising logistics and reducing transport costs for customers. An optional self-rigging auxiliary hoist is available too, which eliminates the need for an assist crane during on-site rigging.

On site movements are made easier with the inclusion of Grove's Megatrak independent suspension as well as the all-wheel steer system, which means no axles need to be lifted while moving - again enabling the optimum amount of counterweight to be carried. Another solution on the GMK5250L, which has already featured on the GMK6300L and GMK6400, is the MMI (Man Machine Interface). The MMI allows the suspension to be controlled even while in a locked position. ■

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S-CPTu

JCB expands telescopic handler range

JCB is extending its line of telescopic handlers, with the launch of a 20 m five-section boom model, a heavyweight 6 t lift machine and a 17 m Loadall specifically designed to work with an aerial work platform basket.

The JCB 540-200 is the company's first Loadall telescopic to boast a five-section boom, capable of lifting to a working height of 20 m, which is believed to be 3 m higher than its closest rival. By using lighter, high-grade materials the machine also delivers increased capacity at reach, improving productivity for the customer.

The five-section boom is used to maintain a compact overall machine length, for maximum manoeuvrability on site. This innovative design also delivers optimum visibility around the machine. The boom sections are driven by an internal ram and chain system, providing proportional extension of the multiple boom sections. This means that boom extension markers are only required on the first intermediate boom, making it easier to operate. The chain and roller system utilises a pre-lubricated chain, extending service intervals and reducing downtime. The system has also been designed to visibly show the operator and service engineer when chain adjustment is required.

The 540-200 is powered by 100 hp Tier 2 JCB Dieselmex engines. Featuring intelligent structural design delivering increased capacity at height and reach, with fast cycles times and a tight turning circle, the 20 m machine is more than a match for smaller rivals. According to JCB, it will also preview the machine with a range of access solutions, making it Europe's highest lift rigid frame telescopic handler available with a range of fixed, extending and slewing man baskets. With a capacity of up to 500 kg, the 4.4 m extending and rotating platform greatly increases versatility, making it ideal for larger construction and industrial site applications.

In addition, JCB has added a heavy-duty machine capable of lifting 6 t with a maximum working height of 8 m. As well as a lifting machine, the 560-80 has been designed with wheeled loader performance and its two-stage boom carries a heavy-duty carriage with a broad nose to withstand arduous industrial and waste handling applications. The boom is equipped with a Z-bar linkage, similar to a wheeled loader, providing the machine with robust digging ability and breakout forces as high as 6,800 kgf when used with a bucket. A full Wastemaster specification can be found on the 560-80 WM, including additional cab and underside protection, a reversible cooling fan and added guards for waste handling applications.

The 560-80 is powered by the Tier 3 JCB Dieselmex engine, producing 130 hp. JCB Attachments has developed a new 5 cu m bucket for the machine specifically for use in low density bulk handling duties such as waste and recycling. Options include JCB's Auto Smooth Ride system, designed to reduce boom bounce while travelling and improving material retention when used with a bucket.

Furthermore, JCB's Hi-Viz Loadalls deliver a 10 percent improvement in rear visibility compared to previous models, thanks to a 235 mm reduction in the boom pin pivot point. The 535-140 Hi-Viz also has a more compact rear chassis design, resulting in a 90 mm reduction in rear overhang, for improved manoeuvrability and less damage on confined sites.

The 535-140 Hi-Viz is powered by a 100 hp JCB Dieselmex engine. This high torque engine delivers rapid cycle times with low fuel consumption and reduced operating costs, boosting productivity for the customer. A transmission disconnect can be used to instantly divert power to the multiple hydraulic pumps for



Above and below: The JCB 540-200 telescopic handler has been designed to satisfy construction and industrial customer demand for increased lift heights and forward reach capabilities.



faster lift and reach, while parallel lift geometry improves load retention when travelling.

JCB has also added a work platform and single lever control option to its Loadall line up. Building on the 540-200 Man Platform solution, the company can now offer a platform derivative on 535-125, 535-140, 540-140 and 540-170 telescopic handlers, five machines in total. There are three platform models available, starting with a 1.1 m wide fixed basket with a capacity of 365 kg. There are also two extendible, 180 degree slewing baskets, with capacities of 500 kg and 1,000 kg. These have a length of 2.4 m extending to 4.4 m. This high capacity has been achieved by utilising a rear axle locking device to maximise stability.

The system has been developed to exceed the stringent requirements of EX280. When equipped with the work platform basket, the telescopic machines have both stabiliser and boom interlocks, with hose burst valves fitted to all hydraulic rams. Emergency stop and emergency lowering pumps ensure maximum safety for operators and for other personnel working on site.

JCB is also offering the option of a single lever control joystick, which is standard on the 540-200, on any of these man platform models. ■

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New 'intelligent' Sandvik DT922i tunnelling jumbo

The new DT922i from Sandvik Construction is a fully-automated electro-hydraulic two-boom tunnelling jumbo with a completely new articulated carrier. It has been developed for excavating cross sections up to 125 sq m, including face drilling, bolt hole drilling and long-hole drilling.

The DT922i comes with many new features that increase productivity simply through the machine's great adaptability to different working sites. The new articulated carrier enables the jumbo to operate in tight tunnels with narrow corners. The new optional cabin lifting system gives improved visibility, but at the same time allows to tram in low tunnels. The hydrostatic transmission system and joystick control enables very precise dynamic control of tramping speed and steering. The practical multi-voltage concept for different electric voltages allows easy and fast shift to different working sites. Combined with the efficient RD525 rock drill, intelligent drilling and boom control systems, as well as the iSURE tunnel management system, the DT922i offers an excellent combination for any tunnel excavation.

Optimised performance with amplified drilling automation, corner stones for the design of the new tunnelling jumbo, has resulted from the use of Sandvik Intelligent Control System Architecture (SICA). This is an intelligent drilling control system with nine different hole type settings, and three alternative control methods: manual drilling control, feed percussion follow-up and intelligent torque control. The DT922i also possesses a new easy-to-use boom control system with three different modes for manual boom control. With this new technology the accuracy of drilling is brought to a completely new level, which facilitates enhanced and maximised performance.

The Sandvik RD525 rock drill provides 17 percent higher penetration rates as well as 40 percent longer tool life for the shank and 17 percent for the bits (when compared to its predecessors). The jumbo's two SB100i booms are equipped with stiff square shape profile giving maximised support to the rock drills and further add to the precision in drilling.

The DT922i's brand new cabin comes with improved ergonomics and maximised safety. The new design delivers 25 percent greater visibility sector, reduced dust levels and provides more operator space. With noise levels under 69 dB at all times, it thus supplies a comfortable and safe working environment for the operator. In addition, the new state-of-the-art user interface, with touchscreen, is easy to work displaying comprehensive diagnostics with all drilling and carrier parameters split into logical subsystems and shown on one display.

Environmental, health and safety (EHS) features are also part of the new DT922i. All lights of the new jumbo are based on LED-technology, which when compared to the more commonly used high intensity discharge (HID) lights, have up to 500 percent increased lifetime, and consume 50 percent less energy. In addition, the laser scanner access detection system optimises personnel safety.

The DT922i is available with the fuel efficient and emissions friendly Tier 3 diesel engine (119 kW) as standard, or the optional Tier 4 Final (122 kW), which provides even greater levels of reduced emissions, with the powerpack consisting of two 75 kW IE3 compliant electric motors. These being just examples of the new jumbo's EHS-features, which enable the DT922i to be a trailblazer in modern underground drilling, not just from a productivity perspective but also an EHS one.



Featuring a completely new articulated carrier, the latest Sandvik DT922i tunnelling jumbo has been developed for excavating cross sections up to 125 sq m, including face drilling, bolt hole drilling and long-hole drilling.

Two automation levels are also offered: gold and platinum. The standard gold package facilitates drilling according to predefined drill plans. This automation level includes features such as drilling to predefined depth, drill plan visualisation, rig navigation and an option for automatic long hole drilling. It also integrates the iSURE tunnel management tool for creating accurate plans for drilling, charging and blasting, as well as data collection and analysis tool for improving work cycle and process. The enhanced platinum package includes all features from the gold package, but enables full automatic face drilling with 'iDATA'.

According to Sandvik, the new DT922i tunnelling jumbo is planned to be introduced during the second and third quarters of 2015 at several local customer focused events around the world. ■

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Mikasa reversible plate compactors with built-in sensor

The Mikasa MVH-308DSYV and MVH-408DSYV reversible plate compactors are aimed at the Singapore market. They are powered by Yanmar L70V (4.8 kW) and L100V (6.8 kW) engines, respectively. Both models conform to the NEA emission standards in Singapore.

The most notable feature of the compactors is the built-in Compas II sensor, which can check the rigidity of the soil quantitatively, helping to improve work efficiency. According to JPN Trading, the exclusive Mikasa dealer in Singapore, this sensor is an innovative system which is not available on most compactors sold in the Singapore market. The company believes it will help improve the quality of road works here.

The compactors' front cover features monocoque frame with steel plate to better protect the engine against gravel and other objects, preventing damage. This front cover can also be opened for ease of maintenance. To improve machine weight balance and increase rigidity, ductile cast iron is applied as the engine base material.

In addition, vibration transmission efficiency is enhanced by using a base plate with gravity centre at lower position and by a new vibrator structure, which also improves the machine's travelling performance.



Mikasa's MVH-308DSYV (left) and MVH-408DSYV reversible plate compactors feature the built-in Compas II sensor (top) to improve work efficiency. These compactors are specifically targeted at the Singapore market.

Other key features of the compactors include a cyclone pre-cleaner, which is placed inside the rear cover to further simplify machine maintenance, and the tacho-hour meter for diesel engine that has a built-in battery checker function.

The MVH-308DSYV and MVH-408DSYV are designed with a vibrating

frequency of 73 Hz, a maximum travelling speed of 27 m/min and a maximum limited gradeability of 35 percent. The MVH-308DSYV has a 45 kN centrifugal force, and the MVH-408DSYV 55 kN. The compactors are available in Singapore from JPN Trading. ■

Website: www.jpn.sg

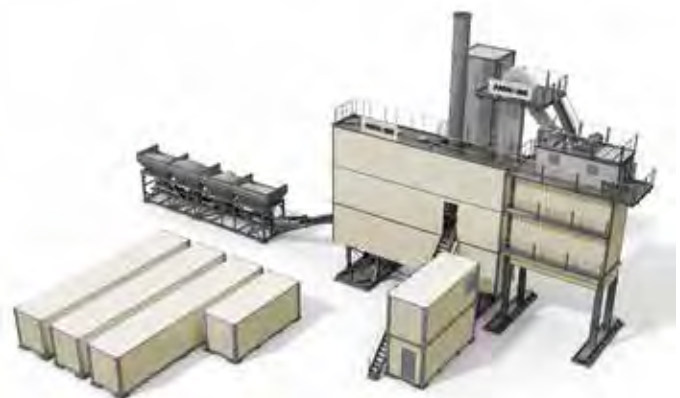
Ammann's QuickBatch asphalt mixing plant for easy operation

Ammann's new QuickBatch asphalt mixing plant is designed for easy, cost-effective transportation and installation while still offering benefits typically associated with stationary facilities. It is available in two output classes, 140 t/hr and 180 t/hr.

The plant is ideal for international operations involving frequent moves for deployment at different locations. It is built around the 'container principle' logistics concept. Key core components, including dryer/filter units and mixing tower modules, utilise housings that also serve as transport containers. The components are built as 20 ft or 40 ft units, which are considered the most common container sizes. When it's time to move, the components are simply loaded onto the transport vehicle. No packing or unpacking is required.

All extras and add-on components, such as the cold feed and control cab, are also built with 20 ft or 40 ft housings that double as transport containers. Smaller individual plant components are placed in containers module by module in an organised manner. The entire plant can be transported in 10 units.

As for set-up, all electrical and mechanical interfaces are highly functional and intuitive, thus reducing installation time and costs. The plant can be assembled without foundations. All Ammann plant core components are manufactured in-house in Switzerland, and QuickBatch is no exception. Ammann said the company strictly adheres to this practice because of the complex process engineering



Ammann's new QuickBatch asphalt mixing plant is ideal for international operations involving frequent moves for deployment at different locations.

and interaction between drums, burners, filters, screens, consoles and mixers. Other features of the plant include a hot aggregate silo with 5 - 6 chambers of 18 cu m, mixer options consisting of QuickBatch 140 1.7 t and QuickBatch 180 2.2 t, and Ammann as1 control system. ■

Website: www.ammann-group.com

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Carmix 5.5 XL designed to produce high quality concrete

The Carmix 5.5 XL from Metalgalante is capable of producing a large quantity of concrete directly on the building site. The cement-mixer unit has a capacity of 7,600 l with an output of 5.5 cu m per batch. In addition, a system with double mixing screws and a drum with hydraulic motor rotation and planetary gearbox allow a uniform and compact mix. This result is also due to the automatic loading system, which thanks to the front cabin, alongside the loader, enables maximum visibility of operations.

The Carmix 5.5 XL is fitted with Joymix, a power-assisted joystick that controls the hydraulic functions of the loader and makes it possible to discharge the concrete up to 2 m high. There is also an optional load cells weighing system, which features load cells under the cement-mixer unit, to obtain high-quality concrete. Moreover, the 112 kW six-cylinder, water-cooled Perkins engine and four-wheel drive ensure the necessary power to tackle difficult building sites, with slopes up to 30 percent. ■

Website: www.carmix.com

The Carmix 5.5 XL mobile concrete mixer offers high productivity on site.



Faster construction process with Doka Concremote

Doka Concremote is designed to determine fresh concrete-strength development on the structural element. By incorporating sensor placement into the casting process, Concremote measures concrete strength by way of heat development. There is no need for a person to be present on the site for reading and securing the measured data.

Sensors measure temperature development of the fresh concrete at regular intervals and transmit these data to the Concremote computing centre. Here, the weighted maturity method is used as the basis for calculating and providing reliable information on the strength development of the concrete in real time.

Concremote uses two types of sensors: slab sensors, which are inserted in the fresh concrete after it has been screeded, and cable sensors that are incorporated directly into the formly of the wall formwork and repositioned together with the formwork.

Wireless transmission of the non-destructively measured values starts automatically. The system's long-life batteries, sturdy sensors and wireless data transmission make it highly user-friendly. Measuring results can be accessed at any time on a secure web portal. Users can also be alerted by e-mail or text-message as soon as the specified early strength has been reached.

Concremote offers wide-ranging possibilities for optimising the construction



Left: Doka Concremote can optimise the construction process on the basis of measured concrete-strength values.

Right: Once the concrete has been screeded, slab sensors are inserted and start measuring automatically.



process. If a customer has entered a specific target value for a site, the strength values enable him or her to make precise recommendations on many things e.g. the earliest times for stripping the formwork,

climbing and pre-stressing, and for the end of curing. The real-time measured data can also be taken into consideration for optimising the concrete formulation. ■

Website: www.doka.com

844



844 Concrete Block Machine (Board-free)

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Genie articulating boom lift and telehandler

The new Genie Z-33/18 articulating boom lift is designed for both indoor and outdoor applications. It is well suited for tasks on sensitive surfaces where space or floor load is restricted. The boom lift weighs only 8,080 lbs and offers a ground clearance of 5.9 in. Its key features include solid non-marking tyres, long working cycles due to low-consumption AC drive transmission, a tight turning radius for excellent manoeuvrability, the ability to drive at full height, plus the benefits of the Genie FastMast boom system that shortens ground-to-top lifting time.

Featuring a compact 6 ft 3 in wheelbase providing a gradeability of up to 30 percent, the Genie Z-33/18 has a working height of 38 ft 10 in, a horizontal reach of 18 ft 3 in and an up-and-over clearance of 14 ft 1 in. The 3 ft 10 in wide by 2 ft 6 in long platform supports weights of up to 440 lbs.

To make transport easier, this compact unit's boom stows down to only 4 ft 11 in wide and 13 ft 8 in long. Drive speed is an efficient 3.7 mph, which when combined with a 48 V DC 315 Ah boom power source leads to long lasting performance. Furthermore, the mechanical switches are conveniently protected within the boom to avoid damage. The new Genie Z-33/18 articulating boom lift is expected to be available globally in July 2015.

In addition, Genie's new GTH-636 telehandler delivers the performance of a full-sized machine in a compact size. Rather than detuning its 8,000 lbs telehandler by downsizing the cylinders, Genie optimised the structure in the boom and the chassis, dropping the weight of the machine to under 20,000 lbs. By staying under 20,000 lbs, the new telehandler delivers full-sized performance, full-sized tyres and full-sized capacity while delivering the right-sized price.

With a maximum lifting height of 36 ft and a forward reach of 21 ft 11 in, the GTH-636 offers a maximum lifting capacity of 6,000 lbs. It has an operating weight of 17,600 lbs and an outside turning radius of 13 ft 4 in. The telehandler is very versatile with a rugged chassis and boom, standard QA and auxiliary hydraulics, a right-side mount engine and a new boom support for enhanced visibility.

While the GTH-636 looks similar to the GTH-844 with the side engine mount, high pivot boom and high visibility cab, there are several differences. Unlike the GTH-844, the GTH-636 is powered by a 74 hp, 2.9 l Tier 4 final compliant Deutz turbo-charged diesel engine. By keeping the horsepower under 75, the engine is Tier 4 final compliant, only using a diesel oxidation catalyst. This catalytic converter requires no scheduled servicing, meaning no Regen and no Diesel Particulate Filter (DPF).

The GTH-636 provides excellent visibility. Operators have a clear view to all four tyres as well as great visibility to the rear of the machine. This visibility provides the operator with a great tool for congested jobsites. Cab options include fully enclosed, and fully enclosed with air conditioning. The highly adjustable suspension seat and adjustable tilt steering wheel are standard. These ergonomic adjustments allow a wide range of operator sizes so the user is comfortable throughout the day.

All Genie telehandlers come standard with the Quick-Attach system. This gives the operator the flexibility to use the forks and carriage that come with the machine, or quickly attach to a new carriage. A new feature on the Quick-Attach system is the new lifting shackle. This new lifting point can support a full-rated suspended load of 6,000 lbs without the need of an additional attachment.

The telehandler's boom may be serviced by removing one cover,



The Genie Z-33/18 articulating boom lift is suitable for use on sensitive surfaces where space or floor load is restricted.



The Genie GTH-636 telehandler has a maximum lifting height of 36 ft and a forward reach of 21 ft 11 in.

a common feature with all Genie telehandlers. This lets the service technician remove all the boom cylinders and chains without having to take the boom apart, saving time and money over the life of the telehandler. ■

Website: www.genielift.com



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Zero Clearance Method helps to save land space on jobsites

Giken's Zero Clearance Method employs a specially designed press-in machine (zero piler) and zero sheet piles (NS-SP-J) to press-in piles with zero 'dead space' between the piles and the adjacent structure. The method is ideal for the development of underground spaces and anti-seismic reinforcement work, according to Giken.

The Zero Clearance Method features several benefits. Firstly, it is respectful of the surrounding area. The press-in technique uses static load, and the zero sheet piles (NS-SP-J) all face the same way, therefore it can minimise the effects on the ground behind the piles when using driving assistance.

Secondly, the method is considered very safe. This is because the press-in machine grips onto the completed piles, so there is no risk of overturning.

Thirdly, the method is cost effective. The zero sheet piles (NS-SP-J) have their interlock joint situated on the outside, allowing for an economical design solution without the need to reduce cross-sectional performance due to interlock efficiency. The individual piles are also robust and resistant to deformation, making them excellent to work with, said Giken.

Lastly, the method allows for a faster project completion. The zero sheet piles (NS-SP-J) have an effective width of 600 mm, compared to the 400 mm-width sheet piles, which means that fewer piles need to be installed and thus resulting in shorter construction time.

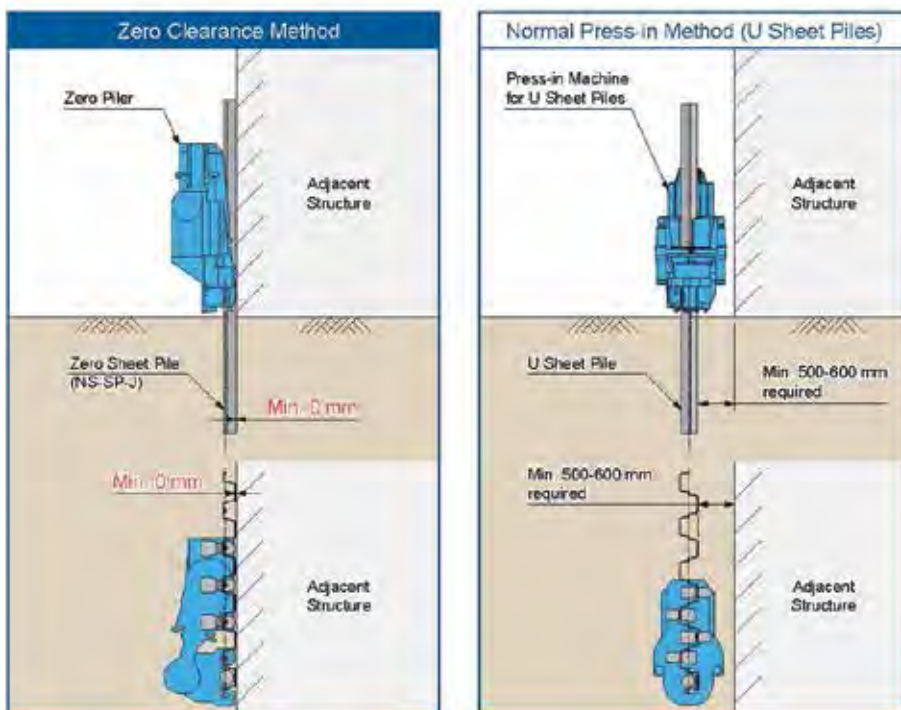
The Zero Clearance Method has been used in various projects in Singapore. Giken also plans to introduce this method across Southeast Asia. ■

Website: www.giken.com



The Zero Clearance Method employs a specially designed press-in machine (zero piler) and zero sheet piles (NS-SP-J) to press-in piles with zero 'dead space' between the piles and the adjacent structure.

Below: In comparison to the normal press-in method, the Zero Clearance Method features many benefits that makes it ideal for use on jobsites with limited spaces.



The press-in machine grips securely onto the completed piles, so there is no risk of overturning.



Reaching Greater Heights.



The new JCB 540-200 represents a new high for our Loadalls. Its 5-piece boom – with range-topping 20m reach – means you get the manoeuvrability of a telescopic handler, combined with crane-like lifting performance, potentially saving you from hiring additional machinery. This telehandler is also blessed with innovative hydraulics to boost efficiency, as well as three steer modes. Of course, productivity is nothing without durability, which is why the 540-200 uses our renowned DIESELMAX engine with a perfectly matched JCB transmission. This Loadall also boasts a stable work platform, great comfort, excellent safety, and easy serviceability. It is no wonder why we are the world's number one producer for telescopic handler.



Visit our website today for more information about the JCB 540-200 Loadall.

www.jcb.com

Enerpac Pow'R-LOCK portable lifting system

A new portable self-contained Enerpac Pow'R-LOCK hydraulic jacking system rated for heavy lifts up to 181 t features full-time automatic load holding protection for optimum safety in operation. It is designed to provide safe and secure lifting for heavy off-highway machinery including trucks, tractors, civil engineering machinery and implements.

The PL-series Pow'R-LOCK accomplishes its load-holding protection by utilising a control system that maintains the position of a rotating locking collar near the cylinder base, providing a mechanical lock regardless of cylinder movement and control cycle. The heavy-duty lifting system integrates into a rugged mobile cart with a high capacity and compact 10,000 psi hydraulic cylinder and an air-driven hydraulic pump unit with complete valving and control systems. The units, the two versions of which feature strokes of 356 mm and 622 mm, are ideal for companies where time and safety are paramount, such as mining and energy, oil and gas, heavy infrastructure construction and heavy transport.

Pow'R-LOCK can be used in even the tightest locations and over rough terrain where recommended safety procedures are followed.

The system is unique in that it provides autonomous locking of the load through all stages of lifting and lowering. No operator intervention is required to activate or energise the locking system – they just lift or lower the load. If anything hazardous occurs, the Pow'R-LOCK system is there to hold the load.

Other key features of Pow'R-LOCK include redundant lowering valves, PO (pilot operated) check and counter-balance, to add safety to the retract operation; pneumatic operation for use in potentially hazardous environments (in consultation with Enerpac); nitro-carburisation that provides additional corrosion protection on the cylinder; integrated tilt saddle to reduce side loading and extend the life of the jack in extreme situations; a large base plate, which increases contact with the ground, distributes load, resists tipping and achieves a stability factor that allows Pow'R-LOCK to be classified as a vehicle support stand; and an ergonomic six-position handle, which maximises leverage and hand clearance under vehicles when positioning to a lift point. ■

Website: www.enerpac.com



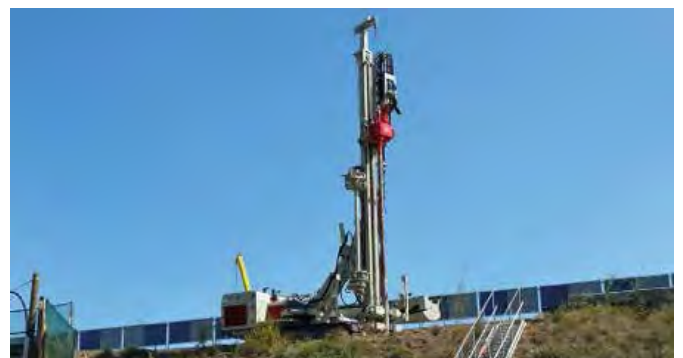
Left and above: Enerpac Pow'R-LOCK system is designed to provide safe and secure lifting for heavy off-highway machinery such as trucks, tractors and other civil engineering machinery.

Comacchio MC15 drilling rig with rod carousel

The Comacchio MC15 is a high-performance compact drilling rig designed for civil engineering works for micropile, jet grouting, anchoring and consolidations in general. The rig can be fitted with rod carousel, which is mounted onto the side of the mast, thus reducing manpower on site when changing rods. It also prevents accidents that could occur when changing rods/replacement of rods. The Comacchio MC15 rig with rod carousel is available from Foundation Associates Engineering, a Comacchio distributor in Singapore. ■

Website: www.fnapl.com

The MC15 drilling rig can be fitted with rod carousel to offer greater productivity on site.



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Nitti safety shoes ideal for demanding jobsites

Nitti manufactures high quality safety shoes and boots serving a wide range of customers in the construction, manufacturing, mining, marine, oil and gas and petrochemical industries. Nitti's minimum safety standards are based on European CE EN ISO 20345. Moreover, Nitti also conforms to Singapore's SS 513, China's GB 21148, Malaysia's MS ISO 20345, Indonesia's SNI 7079 and Australia/ New Zealand's AS/NZ 2210.3 standards.

The shoe range includes Low-Cut series, Mid-Cut series and High-Cut series. Nitti uses pre-moulded removable insoles with ventilation holes to provide optimum comfort and impact absorption. The breathability and water resistance of the leather, combined with genuine Cambrelle lining, helps keep the worker's feet cool, comfortable and healthy. The flexibility of the lightweight polyurethane outsole provides excellent slip resistance while reducing worker fatigue.

The Low-Cut series is suitable for most dry working environments. It provides great comfort while exceeding basic safety standards. The Mid-Cut series is intended for working environments that require more protection around the ankle area. It

helps keep the ankle more firm, secure and better protected against injury. The High-Cut series features superior comfort, sturdy 10-in construction available with easy pull-on straps or side zippers for worker ease. ■

Website: www.nittifootwear.com



Nitti safety shoes and boots are suitable for demanding jobsites. They provide many benefits to help keep the worker's feet cool, comfortable and healthy.

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Eurotec plant hard at work on Kenya's port development project

A unit of Eurotec MZ concrete batching plant has been working on the Mombasa Port Development Project in Kenya, Africa, since the second quarter of 2014. Built in a 4+3 bin aggregates storage format, the plant features an output capacity of up to 120 cu m/hr. The plant's control system has been customised and the mixer tower is covered to reduce pollution.

Toyo Construction Co Ltd is the main contractor for the project. The company has been tasked to carry out both civil engineering and building works, including quay wall, sea wall, revetment, trunk and access roads, as well as parking areas, container terminal and utilities. ■

Website: www.eurotec.com.sg



Eurotec's concrete batching plant at the Mombasa Port Development Project site.

Haulotte scissor lifts chosen for Bedok Integrated Complex

Kim Seng Heng Engineering Construction Pte Ltd is currently working on the Bedok Integrated Complex project in Singapore, which is built as part of an initiative to revitalise Bedok Town Centre. To carry out the concrete formwork on this new seven-storey complex, the contractor has rented 12 Haulotte Optimum 8 scissor lifts from Aly Energy, a local Haulotte distributor.

The Haulotte Optimum 8 scissor lift features 1.88 m long, 0.76 m wide and 2 m high, with a working height of 7.8 m and a lifting capacity of 230 kg. Designed to be robust, reliable and easy to maintain, the machine offers a lifting speed of 22 seconds.

In addition, the Optimum 8 scissor lift has a platform size of 1.68 m by 0.68 m and it can be extended for up to 2.59 m lengthwise. The machine also comes with pothole protection that ensures maximum safety and high operating autonomy.

Based in Singapore, Aly Energy has been a Haulotte distributor in Southeast Asia since 2008, serving customers in the construction, marine, offshore and recycling industries. Apart from the Bedok Integrated Complex, the company's recent projects in Singapore also include the construction of Changi Airport Terminal 4 as well as the Ng Teng Fong General Hospital and Jurong Community Hospital. With a mixed fleet



Haulotte Optimum 8 scissor lifts being used at the Bedok Integrated Complex in Singapore, which is built as part of an initiative to revitalise Bedok Town Centre. Designed to be robust, reliable and easy to maintain, the scissor lifts have a working height of 7.8 m and a lifting capacity of 230 kg.

size of 200 Haulotte aerial work platforms (AWPs), consisting of boom and scissor lifts with working heights of 8 to 25 m, Aly Energy has added 50 new Haulotte Optimum 8 electric scissor lifts which extends the

company's low range of AWP rental fleet in 2014. Among the mixed fleet, the models also include the Haulotte H 21 TX and HT 23 RTJ telescopic boom lifts. ■

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Sennebogen excels in Izmit Bay Bridge project

The Izmit Bay Bridge is being built approximately 50 km southeast of Istanbul in Turkey. The project is slated for completion in 2017, upon which it will complete the highway from Istanbul to Izmir. It is believed to be the fourth longest suspension bridge in the world at a total length of about 2,700 m. A Sennebogen 5500 crawler crane is currently working on the project, used by Aydin Vinc AS for numerous lifting and logistics tasks.

Aydin Vinc AS is one of the largest logistics service providers in Turkey. The company specialises in heavy transport and port logistics in addition to crane rental. The 5500 crawler crane provided for this job by Sennebogen's sales and service partner Forsen AŞ at the end of 2014 is equipped with a 35.5 m long main boom and can lift the massive bridge members into position with ease. The 180 t crane is powered by a 261 kW diesel engine.

The flexible crawler crane is particularly suited for the job thanks to its stable wide-gauge undercarriage and 160 kN winch. Even when under load, the heavy steel and precast concrete members can be transported and placed with precision. The Maxcab comfort cab, which can be inclined up to 20°, offers the operator an ideal overview of the work area. ■

Website: www.sennebogen.com



Above and below: A Sennebogen 5500 crawler crane performs lifting tasks at the Izmit Bay Bridge.



Sunward rig to play role in Singapore metro project

Singapore-based company JP Nelson, which represents Sunward foundation equipment, has recently delivered a Sunward jet grouting rig with high pressure pump, mixer and silo system to Shanghai Tunnel Engineering Co Ltd (STEC) for the Thomson Line T225 project. The equipment will be used for fissure grouting to stabilise loose soil around the area.

According to JP Nelson, STEC will require the equipment to perform round the clock at a depth of above 40 m and therefore needs a very reliable high pressure pump. The Sunward jet grouting rig will work together with a Metax MP7 high pressure pump, JM40PV batching plant and SLH44 silo fitted with high pressure air compressor. ■

Website: www.jpnelson.com.sg



JP Nelson has recently delivered a Sunward jet grouting rig with high pressure pump, mixer and silo system to Shanghai Tunnel Engineering Co Ltd for use in the Thomson Line T225 project.

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Wirtgen slipform paver modernises Brazil motorway

Galvão Engenharia SA has been commissioned to modernise the Anel Viário de Fortaleza (the Fortaleza ring motorway) in Brazil, which links Fortaleza in the federal state of Ceará with the port of Pecém. Federal authorities are said to have invested more than R\$200 million in the project.

The motorway ring is to be modernised over a total length of 32.1 km by June 2015. At present, the road is 11 m wide. When the work is completed, each roadway will be 16.5 m wide. Measuring 33 m across its entire width, the road will thus be three times as wide as before the work started.

Due to the high degree of stress from heavy goods vehicles, the mechanical stability required for the new pavement was a major criterion prompting Galvão Engenharia to opt for concrete surfacing. An asphalt wearing course will then be laid over the concrete. To meet the project requirements, the company selected a Wirtgen SP 850 slipform paver.

The slipform paver is ideal for the production of all manner of high quality concrete pavements. The hydraulically telescoping machine frame can be extended by 1.25 m to the left and to the right, permitting the use of paving moulds ranging from 2.5 to 5 m in width. Working widths of up to 10 m can be achieved by mounting additional extension elements. All components can be adjusted to the specified paving width.

Four separately hydraulically driven, steerable track units ensure excellent manoeuvrability and traction. The range of equipment includes spreading auger or spreading plough, dowel bar inserter, central tie bar inserter, side bar tie inserter, finishing beam, super smoother and 3D interface.

The entire paving process is automated from the even distribution of the concrete to its final smoothing. First, concrete is distributed by either a spreading auger or spreading plough. The heavy-duty paving mould then forms the concrete slab as the machine moves forward. Up to 24 curved high-frequency electric vibrators simultaneously ensure the optimum compaction of the concrete. Dowel bars, central tie bars and side tie bars can be inserted into the freshly placed concrete. A hydraulically driven hoisting crane for dowel or tie bar packages makes the process easier. Finally, the finishing beam and super smoother ensure an excellent finish. ■

Website: www.wirtgen.com.sg



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REVERSE CIRCULATION



Gomaco works smarter on New York's bridge

D.A. Collins Construction has completed work on a two-year, 32,515 sq m bridge overlay project in New York, USA. The concrete overlay took place on bridges and interchange ramps along Interstate 787 between Exits 3B and 4 in the heart of Albany. Traffic had to be maintained at all times for the 122,000 commuters who travel I-787 each day, and construction was carried out in tight-clearance conditions and under a tight completion deadline.

D.A. Collins added a new Gomaco C-450 cylinder finisher to its inventory at the start of the project. After that, to help further accommodate the aggressive two-year completion schedule, the company purchased another new C-450 for the I-787 project.

The main bridge decks on the project average five to six lanes wide with a 3 m shoulder. The on and off ramps to the bridge are roughly 7.6 m wide. The C-450 can easily be converted to the different widths each bridge requires. Framework sections can be added or removed to reach the required width. Also, the C-450s are equipped with self-widening capability allowing up to 3 m of on-the-go adjustment.

With the C-450s raised higher than normal, they were equipped with a 914 mm lowering kit so the undercarriage reached the concrete. The carriages were equipped with dual augers to strike-off the concrete, 1.5 m long externally-vibrating double cylinders to compact and level the concrete, and double float pans with a double burlap drag to provide the final finish and texturing on the concrete.

During one phase of the project, D.A. Collins had just 76 days to remove and replace 8,361 sq m of bridge deck. The clock started ticking as soon as the first barriers were placed on the roadway separating out the construction zone from the live traffic travelling by at speeds up to 113 km/hr.

The new C-450 at work on a 670.6 m long bridge was set up to finish three lanes of deck, 11.6 m wide in each finishing pass. A concrete pump truck worked from down below, at street level, placing concrete in front of the C-450. The concrete was a NYSDOT (New York State Department of Transportation) required Class DP mix design created for overlays and high-performance decks.

According to D.A. Collins, the Class DP mix uses smaller stones for the thinner overlays; it has a lot of microsilica and



Above: The Gomaco C-450 cylinder finisher's undercarriage was equipped with a 914 mm lowering kit, dual augers, 1.5 m long externally-vibrating double cylinders and double float pans with a double burlap drag. It also had a fogger system to keep the microsilica concrete from sticking to the finishing cylinders.

Left: A concrete pump truck worked below the bridge on Interstate 787, right next to the Hudson River, pumping the concrete with microsilica up to the Gomaco C-450 finisher.

cement in it so it is very sticky concrete to work with. As such, D.A. Collins outfitted the C-450s with an optional fogger system. A set of misters mounted to both sides of the undercarriage, ahead of the finishing cylinders, kept the concrete from sticking to the cylinders and helped create a smooth, sealed finish.

About 3 m behind the C-450, workers

used a Gomaco Spanit Work Bridge to place wet burlap and soaker hoses for a seven day wet cure. After curing was completed, saws were brought in for a longitudinal grooving. Once it was grooved, the whole deck was washed, cleaned, dried off and a waterproof seal was applied before the newly overlaid lanes were opened to traffic again. ■

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WHEN TRENCHLESS MATTERS...

Trenchless installation methods such as horizontal directional drilling (HDD) are increasingly popular worldwide due to their ecological and economical advantages. Southeast Asia Construction met up with Strega, a well known HDD contractor in Asia, to discuss the challenges of trenchless technology in the region and its importance for the future.

1. Strega has completed many varied HDD projects in Asia since 1999, and is regarded as a pioneer in the field. How has growth been for you?

John Barton (JB): Overall, our business has been growing positively. In the early days, we would carry out a wide range of projects; but after four or five years, we decided to focus on our strength, which is onshore gas pipeline installation. This way we could become an expert in this area and offer our customers a one stop solution - from planning to commissioning.

The size of our team has also expanded significantly. We started as a private company with only nine people and now we have over 230 employees (including permanent, temporary and contract staff) and are listed on the MAI sector of the Stock Exchange of Thailand.



2. Can you share the key factors that contribute to your success?

JB: First, we have acquired deep knowledge and experience in the field. HDD operations are technically challenging and require very specific skills, and without these you wouldn't be able to carry out your job competently.

Second, we have implemented standard procedures that our staff must follow. These include conducting a thorough assessment of the project, what is the ground condition, how to access the site's location, who manages the logistics, etc. You've got to do what it takes to get the job done, you cannot exclude the necessary steps to reduce the costs.

Third, we don't compromise when it comes to quality. HDD operations involve not only a great deal of time and effort, but also reliable equipment. We need to spend money to make money.

Trin Pimhataivoot (TP): Being mediocre is not okay with us. We position ourselves as an industry leader, especially in the way that we deliver health, safety, security, environmental and quality (HSSEQ) performance. Strega is certified to ISO 9001 and undergoes a yearly evaluation for this. I think we are currently the only HDD



Top: Urbanisation is one of the main reasons that trenchless technology is becoming more popular in Asia.

Middle: Trin Pimhataivoot (on the left), Strega's chief executive officer and John Barton, Strega's chief operation officer.



Bottom: Strega team members at the company's headquarters in Thailand.

contractor in Thailand - and Asia - that has received such certification.

And as John said, detailed and careful planning is important, which sometimes could take us up to three months - but we know it is necessary if we wish to complete the project successfully. We wouldn't want to start a project only to pull out halfway through because we make mistakes. That said, we are always honest with our clients as to whether the projects are feasible - we won't agree on a project that we know we can't do.

3. What would you say the biggest challenges the trenchless industry is facing in Asia?

JB: Well, technical problems could still be a major challenge for inexperienced contractors. Due to the complexity of trenchless installation, it requires competence as well as good support from both the equipment manufacturer and dealer. If you don't have any of them, you'll be likely to run into trouble.

Our main challenge in the early days was that there weren't many local representatives for trenchless equipment



manufacturers that we could rely on. The trenchless industry in Asia and Thailand in particular, where our headquarters is, was almost non-existent. Vermeer was probably the only manufacturer that had a proper dealer in Thailand - and that's why we chose to collaborate with them.

Above: Strega has an extensive fleet of HDD and support equipment, including its own fabrication facility.

Continued overleaf...

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Today, our main challenge is more on the social issue - how to communicate efficiently with the local community about our project. For instance, in Thailand, if you look back a few years ago the country was very poor and the majority of its people did not have much authority; but now if you want to go ahead with any project, you have to ask permission from the local residents, and the process can get quite difficult and lengthy.

4. Do you also find it difficult to attract local talent in this industry?

TP: Yes, certainly! Although trenchless technology is becoming more popular in Asia, it is still uncommon and therefore it's not easy to find the relevant skills, such as machine operators, drillers, surveyors and so on. We have to hire staff from overseas, especially Australia, Europe and the US, where the technology is already developed. We hope that our local staff can learn the skills from them.

The best way is to invest in your own people and retain their loyalty – some of our workers have been with us for as long as 15 years, since we started. We also have two Thai drillers with 10 years of experience.

5. So, what does the future hold for trenchless technology in Asia?

JB: The increased urbanisations and greater environmental awareness in Asia will provide many opportunities for trenchless technology to be used in the region. Sometimes it is the only viable construction option, notably in the crowded urban centres with heavy vehicle and pedestrian traffic and numerous underground utility networks.

“THE INCREASED URBANISATIONS AND GREATER ENVIRONMENTAL AWARENESS IN ASIA WILL PROVIDE MANY OPPORTUNITIES FOR TRENCHLESS TECHNOLOGY TO BE USED IN THE REGION.”



Top: Many onshore gas pipeline projects in Thailand are now being carried out using the HDD method.

Left: Lack of local talents still poses a major problem for the trenchless industry in Asia.

Trenchless technology has a vast array of advantages over the traditional open-cut method. For one, it minimises disturbance to the surrounding area - local business, roadways, trains, walkways and others can remain open in operation while work is being carried out. Also, it is more environment-friendly - because there isn't a large scale excavation site, it takes much less time for the restoration work to be done after the project is completed. And as a result, it could reduce costs dramatically.

We've seen many trenchless projects carried out in Hong Kong, Thailand and Malaysia, and I am confident that other

countries like Indonesia, Cambodia and Laos will soon follow suit.

6. With the benefits that trenchless technology can offer, do you think it will replace the conventional open-cut method one day?

JB: No, it won't. You still need to perform open-cut operations in some projects. However, I believe trenchless technology will continue to grow in popularity for years to come. Things are definitely looking good in the trenchless world! ■

Website: www.strega-hdd.com

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A FORCE MORE POWERFUL

Liebherr recently held its customer days in Nenzing, Austria, unveiling the latest machines for special deep foundation tasks. Southeast Asia Construction joined the event to take a close look at these innovations.



Above: Liebherr welcomes international customers at its Nenzing facility.

Left and right: The new LRB 355 piling and drilling rig.



LRB 355 rig

Liebherr's new LRB 355 piling and drilling rig is fitted with a robust undercarriage, ensuring a high level of stability. Thanks to the parallel kinematics, the rig has a large operating area. All winches are directly mounted onto the leader, allowing for a better view from the operator's cab to the main winch as well as ensuring that the ropes do not move during leader adjustment. The optional elevating working platform provides safe and easy access to the attachments and to the rotary.

The LRB 355 is available in two different configurations with a maximum height of 33.5 m and a maximum weight of approximately 100 t without attachments. The rig is driven by a V12 diesel engine offering 600 kW, which can be upgraded to 750 kW. The engine runs at a reduced operating speed of 1,700 rpm.

The LRB 355 can be equipped with an automatic engine stop control. This function enables the rig to switch off automatically during longer breaks, making it both fuel saving and environment-friendly. With the eco silent mode, the engine speed can be set to a predefined, required level, allowing a significant reduction in diesel consumption without any impact on the operational output.

The LRB 355 has been specially designed for drilling with full displacement tool. However, it can be used for different applications such as drilling with Kelly equipment, double rotary head and continuous flight auger, soil mixing as well as piling jobs with vibrator and hydraulic hammer.

A new attachment is the BAT rotary drive, which offers a torque of 450 kNm and can be individually set up depending



Liebherr simulators help trainees to improve their skills in a virtual but realistic environment. This enables safe and productive operation in the real world.



Above and left: About 900 customers attended the Liebherr event.

on the application. Its main benefits include automated torque adjustment, continuous speed optimisation and four electronically adjustable speed ranges. The rotary drive also excels with its simple structure, low maintenance requirements and high efficiency.

The LRB 355 is fitted with the Litronic control system and thus offers a multitude of programme options for various drilling methods. The rig can be transported with the leader, multi sledge and rope still attached to the machine. The leader can be folded to minimise the transportation length.

Liebherr has also developed its first hydraulic vibrator, the LV20. It features an eccentric moment of 0 to 20 kgm, a maximum centrifugal force of 1,160 kN and a maximum frequency of 2,500 rpm. The total weight including clamp is 4,400 kg.

In addition, Liebherr offers a number of services ranging from application consulting on the jobsite to simulator training

Continued overleaf...



The LRB 355 rig fitted with vibrator.

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Right: The HS 8130 HD duty cycle crawler crane has an operating weight of approximately 115 t.

Left: The HS 8130 HD fitted with casing oscillator.

Below: Liebherr has also developed its first hydraulic vibrator, the LV20.



and recording, reporting and transferring of machine relevant data. Features such as Liebherr simulators (LiSIM), process data recording and reporting (PDE/PDR) and data transfer system (LiDAT) are intended to increase efficiency on the jobsite.

HS 8130 HD crane

Replacing the HS 885 HD, the new HS 8130 HD duty cycle crawler crane features an operating weight of approximately 115 t. The crane is fitted with two hydraulic free-fall winches offering 35 t of line pull each, which is increased by approximately 17 percent in comparison to its predecessor.

The HS 8130 HD is powered by a Liebherr V8 diesel engine. Due to optimised hydraulics, the crane offers the same and partially even higher material handling capacity than its predecessor despite lower engine power. Like the LRB 355 rig, the HS 8130 HD also has the eco silent mode and can be equipped with an automatic engine stop control.

For fast mobilisation, the HS 8130 HD can be transported with the railings, walkways and pedestals fully assembled on the uppercarriage. Other features that facilitate the mobilisation include the self-assembly system for crawlers and

counterweight as well as the telescopic jack-up system. Transportation is also made easy with the machine's low transport weight of only 50 t and the maximum transport width of the basic machine at 3.5 m.

The HS 8130 HD is suitable for a wide range of special deep foundation applications as well as typical material handling tasks of a duty-cycle crawler crane. These include working with slurry wall grab up to 35 t and casing oscillator up to 3 m, material loading with grab or drag bucket, dynamic soil compaction as well as various dredging applications. ■

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THE CRESCENT PROJECT



The new landmark in Baku will include Crescent Place with a tapered residential tower at the centre, and Crescent City office tower in the shape of a torch. Construction of Crescent Hotel is expected to begin soon.



Crescent Place will feature an eight-storey shopping centre with a 170 m high residential tower. Next to it, the 203 m high Crescent City office tower will overlook the entire area.

With an area of 450,000 sq m assigned to residential, office and shop space, the Crescent City and Crescent Place developments will become a new landmark in Azerbaijan's capital, Baku. At 203 m high, the 43-storey Crescent City office tower in the shape of a torch will overlook the entire area. Crescent Place, an eight-storey shopping centre with a 170 m high residential tower accommodating 168 apartments on 32 storeys, is under construction right next to it.

Gilan Holding is the builder of the complex, with the building design provided by Heerim Architects & Planners from South Korea. The building contractor is Ilk Insaat MMC.

High wind speeds experienced on many days in Baku represent a great challenge during construction of the project. Use of cranes is severely limited for the periods of high winds. Other challenges include the complex engineering tasks and tight construction schedule.



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Formwork system

For the project, Doka proposed an automatically controlled formwork system. The Doka SKE50 and SKE100 automatic climbing formwork systems are suitable for both high-rise building lots, as they ensure unrestricted construction progress in any wind and weather condition.

These automatic climbing systems also meet strict safety requirements. They include the Xclimb 60 protection screen



Minerals

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Continued overleaf...



The Doka SKE50 and SKE100 automatic climbing formworks ensure unrestricted construction progress at both high-rise buildings during any wind and weather condition.

serving as an enclosure and protecting workers from weather and falls. The increased sense of safety for the construction crew can improve personal performance and as a result total productivity, explained Doka. This in turn not only reduces costly crane use, but also saves on manpower and therefore calculable fixed costs.

The Doka Top 50 large-area formwork is used to erect the massive core walls. This system is pre-assembled, allowing for adjustments as necessitated by the architectural requirements in relation to form, size and form-tie pattern.

For construction of the floors, the d2 load-bearing tower is used at the Crescent Place. The TLS table lifting system attached to the automatic climbing formwork also allows for rapid and crane-independent repositioning of the floor formwork. Furthermore, the TLS optimises site logistics and increases efficiency. Here, the construction crew is continuously kept safe by the protection barriers covering the entire circumference of the construction site.

In the planning stage, Doka instructors trained the construction crew on-site and



The TLS table lifting system is a safe method for repositioning floor formwork without a crane and an ideal add-on to the Xclimb 60 protection screen.

explained the safe handling of the formwork systems. During the initial pouring intervals, the formwork instructors took on the role of supervisor. Doka specialists have been on-

site in Baku since March 2013. Completion of the forming jobs is scheduled for May 2015. ■

Website: www.doka.com

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SELF-ANCHORED SUSPENSION SPAN OF SAN FRANCISCO-OAKLAND BAY BRIDGE NEW EAST SPAN

The San Francisco-Oakland Bay Bridge New East Span (East Span) in the US opened to traffic in September 2013, and is a regional lifeline structure located near two faults capable of producing destructive earthquakes. In order to meet the complex challenges of seismicity, the San Francisco Bay's unique geological features, and community demand for a signature structure, the project design team, T.Y. Lin International/Moffatt & Nichol, Joint Venture, was willing to advance existing engineering principles so as to provide the highest levels of seismic safety. In this article, Marwan Nader, senior vice president and technical director at T.Y. Lin International, explains the challenges in detail.

Self-anchored suspension span

From east to west, the 3.5-km-long East Span comprises four distinct but interrelated elements: a 1,289-m-long, low rise post-tensioned concrete box girder near the Oakland shore; the dual 1,931-m-long segmental concrete box girders of the Skyway connecting the bridge to the Oakland shoreline; the iconic, 624-m-long, single-tower self-anchored suspension span (SAS) over the primary marine navigation channel; and the 470-m-long Yerba Buena Island Transition Structure (YBITS), a post-tensioned concrete box girder linking the parallel roadways of the SAS to the existing over-under geometry of the Yerba Buena Island tunnel. Seismic performance criteria include the East Span's ability to open to emergency traffic shortly after the occurrence of up to a 1,500-year return period design earthquake, designated as a safety evaluation earthquake (SEE) by the California Department of Transportation.

The SAS consists of dual box girders suspended from a single, 1,387-m-long looped cable, which is supported on the 160-m-high single tower. As the architectural centre of the bridge, the SAS spans 565 m between piers E2 and W2, with a 385-m-long main span and

A view of the San Francisco-Oakland Bay Bridge New East Span.



a 180-m-long back span.

The bridge's longitudinal asymmetry subjects pier W2 to a vertical uplift, while the bridge is lightly supported on pier E2. As a result, the tower carries most of the bridge dead load. The uplift at pier W2 is fully counterbalanced by the pre-stressed concrete cap beam at pier W2, ensuring that the bridge is always balanced without relying on the pier to carry any tension. In order to balance moments in the box girder caused by the 49-m cantilever at the east anchorage, suspenders do not support a 35-m segment of the eastern end of the main span.

Continued overleaf...

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The SAS is the world's first suspension bridge with no connection between the deck and tower. Instead, the box girders 'float' at the tower, with the suspenders providing the only connection between the box girders and tower. Piers E2 and W2 are designed to provide the bridge's main lateral seismic support.

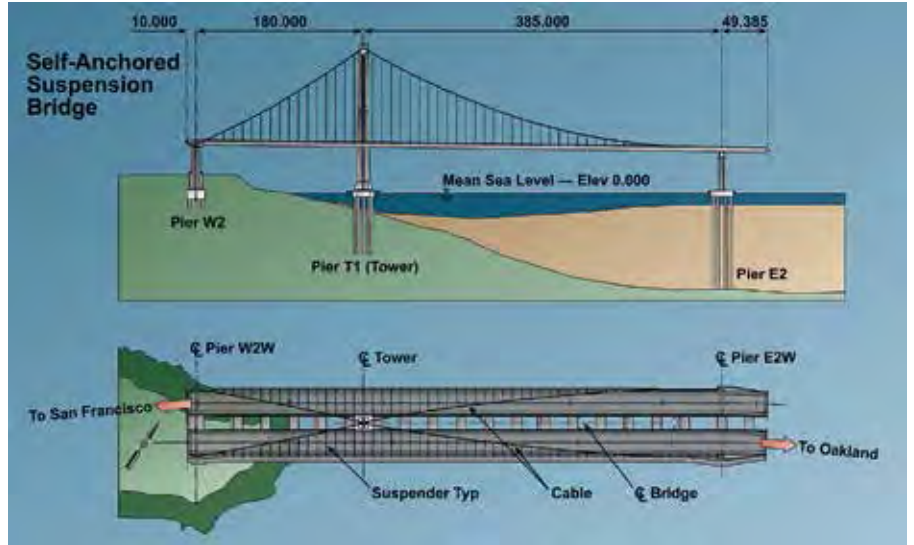
The tower seismic response is mainly governed by its own mass and stiffness, behaving as a propped cantilever with a spring resistance at the tower saddle. At 408 mt, the cable saddle at the top of the tower is the world's largest for a suspension bridge. The gap between the tower and the deck is designed to be large enough to avoid impact during the SEE.

The 0.79-m diameter cable is anchored to the east anchorage and loops around the west bent through deviation saddles. The suspenders are splayed to the exterior sides of the box girders and spaced at 10 m. Designed to minimise the weight of the anchorage, the loop at the west bent is the first application of its kind in the world.

The dual orthotropic steel box girders of the SAS are in longitudinal compression (reacting against the cable tension force) and part of the gravity load system. Transverse diaphragms, spaced at 5 m, support the orthotropic deck and distribute the suspender loads to the entire box. The box girders are connected by 10-m-wide by 5.5-m-deep cross beams spaced at 30 m on centre. The cross beams carry the transverse loads between the suspenders, with the 72-m span constituting the world's longest transverse distance between suspension suspenders. The cross beams also ensure that the dual boxes act composite during wind and seismic loads (Verendeel truss action).

Pier W2 and E2

At the west end, the steel box girders frame into the W2 prestressed cap beam, the



As the architectural centre of the bridge, the SAS spans 565 m between piers E2 and W2, with a 385-m-long main span and a 180-m-long back span.



The SAS is believed to be the world's first suspension bridge with no connection between the deck and tower. Instead, the box girders 'float' at the tower, with the suspenders providing the only connection between the box girders and tower.



Designed to minimise the weight of the anchorage, the loop at the west bent is the first application of its kind in the world.



The cross beams also ensure that the dual box girders act composite during wind and seismic loads (Verendeel truss action).

connection of which is subjected to reaction forces between the cable system and the W2 pier. Additional pre-stress is added through post-tensioned strands connected at each steel orthotropic rib. The west piers are reinforced concrete columns that are monolithically connected to the pre-stressed cap beam forming the west bent. The west bent is supported on gravity footings, which are cast into rock with 10-m-long corner piles. Designed to keep west piers in compression during the SEE, a tie-down system links the west bent cap beam to the gravity footings.

The east bent comprises two reinforced concrete piers and a pre-stressed concrete cap beam. The cap beam protects the bearings and shear keys that connect the box girders to the east bent. The bearings carry the vertical loads, with the capacity to carry lateral loads, while the shear keys are designed to carry all the lateral loads. The bearings are made of a spherical bushing assembly capable of large rotations about the transverse axis of the bridge, providing an almost true pin connection. The east bent is supported by 16 2.5-m diameter cast-in-steel-shell concrete piles support. These vertical piles are approximately 100 m long, among the longest piles ever used for a suspension bridge, and are founded on bedrock.

Steel structural hinges between the SAS and the Skyway, and the SAS and the YBITS, are designed to allow the structures to move relative to each other in the longitudinal direction. The 18-m-long hinge pipe beams are capable of elastically transferring dead loads and live loads, and structurally yielding under design-level seismic loadings in order to protect major structural elements.



The east bent is supported by 16 2.5-m diameter cast-in-steel-shell concrete piles support. These vertical piles are about 100 m long, among the longest piles ever used for a suspension bridge, and are founded on bedrock.

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SAS Tower 1

The tower, which is composed of four shafts interconnected with shear link beams along its height, is the first single tower to utilise fusible shear links to protect tower shafts during an earthquake. The tower shafts are stiffened pentagonal steel box sections that taper along the height, and are provided with diaphragms spaced at 4 m. The shafts are rigidly connected at the top and bottom by tower saddle grillage and tower base grillage, respectively. The four-legged, pentagonal-shaped tower of the SAS is an industry first for self-anchored suspension bridges.

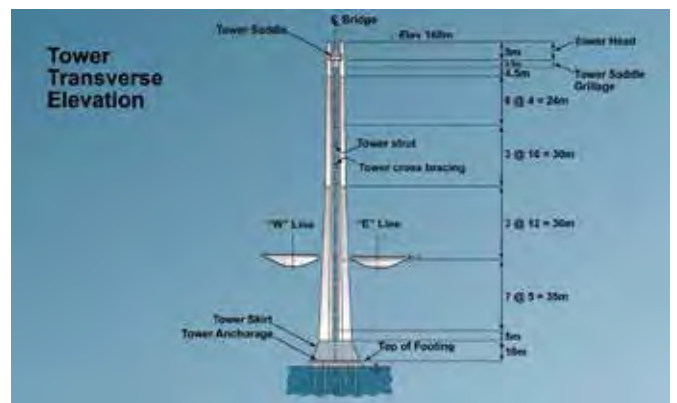
The tower is fixed to a 6.5-m-deep pile cap with anchor rods and dowels. The pile cap consists of a steel moment-resisting frame encased in concrete and supported on 13 cast-in-steel-shell piles, which measure 60 m long and 2.5 m in diameter, and are extended and embedded into rock.

The shear link beams are designed to resist seismic loads; supply the tower with the required stiffness for service load conditions; remain almost elastic during a 450-year return period design earthquake (functional evaluation earthquake, or FEE); plastify during the SEE, dissipating energy and limiting damage to tower shafts; and be replaceable after an earthquake, if necessary.

To satisfy these requirements, various tower configurations were evaluated, including strength and stiffness of the shear links and their optimum location along the height of the tower. These static pushover studies determined tower response during service loads, wind loads, and FEE and SEE seismic loads. Tower shafts were also designed as stiffened box sections per California's Applied Technology Council ATC-32 to ensure that the shafts could undergo large inelastic compressive strains without buckling locally.



The 18-m-long hinge pipe beams are capable of elastically transferring dead loads, live loads and design seismic loads. These hinge pipes are designed with a fuse to structurally yield in case of seismic overload in order to protect major structural elements.



The tower shafts are rigidly connected at the top and bottom by tower saddle grillage and tower base grillage, respectively, and are interconnected with shear links along the height.

Seismic analysis

Seismic analysis was performed using the ADINA general-purpose finite element programme and included time history analysis (global model), pushover analysis and local detailed analysis. Time history analysis was the primary means of analysis because the foundations are subjected to different excitations. The tower and west pier are founded on rock, while the east pier is supported in deep soil. Ground motions at these supports differ in character and intensity, and were analysed by applying different time histories of ground displacement at the supports. Pushover analysis evaluated ductility of critical elements and established failure mode sequence. Local detailed analysis was used to establish local strain/stress demands and to evaluate the modelling used for the global model.

The bridge design was based on a limited ductility design, where plastic deformations are clearly defined and predetermined. The bridge has been designed to remain largely elastic, with the exception of the east and west piers, which are designed to form plastic hinges. The shear link beams between the tower shafts are also designed to yield in shear during the SEE event. The maximum rotation demand on these links is 0.04 radians compared with an ultimate rotation of 0.09 radians. The piles were designed to sustain minimal damage (<0.01 for concrete and <0.02 for steel) when subjected to SEE displacement demands. The tie down at the west pier was designed with a 2.0 factor of safety. ■



Seismic analysis was performed using the ADINA general-purpose finite element programme.



The San Francisco-Oakland Bay Bridge New East Span opened to traffic in September 2013.

Marwan Nader, PhD, PE, is the lead design engineer for the self-anchored suspension span of San Francisco-Oakland Bay Bridge New East Span. He is currently senior vice president and technical director for the bridge line of business at T.Y. Lin International in the US.

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LEE KUAN YEW: THE CHANCE OF A LIFETIME

Policy makers from around the world are often intrigued by Singapore's transformation over the last half-century, much of this under the helm of the citystate's first prime minister, Mr Lee Kuan Yew. Chairman of the Centre for Liveable Cities, Dr Liu Thai Ker, spoke with Mr Lee on 31 August 2012. Looking back, Mr Lee called the opportunity to redevelop the entire city the "chance of a lifetime." A Cambridge-trained lawyer, Mr Lee became prime minister in 1959 at the age of 36. He stepped down in 1990, but remained in cabinet until 2011 as senior minister and minister mentor. Mr Lee continued to be a member of parliament, in his original electoral ward of Tanjong Pagar, until his passing on 23 March 2015.

You are certainly the key architect for the way Singapore is today. A lot of developing cities want to know how we got started. How did we get ourselves on the right footing?

I learnt from negative examples. Hong Kong has crowded, tall buildings, you seldom get sunshine in the streets, no greenery. So that's something we must avoid. I also watched how the French cities did their underground roads... and we had teams going out along the Equator to collect various plants that will thrive in Singapore so we would have variety... We are not the only city. There are thousands of other cities and we can see the mistakes they have made. We can also see what they have done right.

What do you think were the critical success factors for Singapore?

First, you must have an efficient administration... It cannot be one-off. It has to be regularly done and there must be an organisation or several organisations that sees to this. We started rebuilding Singapore, and the two big organisations were the Housing & Development Board (HDB), and later on the Urban Redevelopment Authority (URA)... (In contrast, China faces problems with resettlement) because there is no special agency that will build the new houses and coordinate it with the road builders and the tree planters. I think URA and HDB, plus the Garden City Action Committee, played crucial roles.



The Singapore Flyer (left) and Marina Bay Sands Integrated Resort are two of the iconic landmarks in Singapore.

Second, it must be a level playing field for all... You must have a society that people believe is fair. We have a heterogeneous population – Chinese, Indians, Malays and others – so policy is colour-blind... A crucial thing is not to allow clever developers to corner large pieces of land at critical areas, waiting for the development. We forestalled them to prevent exploitation of fellow men.¹

Third, it must be corruption-free... The basis for that was a non-corrupt bureaucracy, especially the police, heavy penalties for corruption, rigorous enforcement of the law.

“WE ARE NOT THE ONLY CITY. THERE ARE THOUSANDS OF OTHER CITIES AND WE CAN SEE THE MISTAKES THEY HAVE MADE. WE CAN ALSO SEE WHAT THEY HAVE DONE RIGHT.”

Today, people accept it as a fact – you’ve just got to obey the law... There are no haphazard buildings, like in Bangkok, Jakarta or even Kuala Lumpur, where you’ve got two tall towers and then squatters all around. There’s a definite plan, and we stuck with the plan. There is no corruption and nobody can deviate from the plans. A building that is not in accordance with the plan cannot be allowed. Those were the basics, and that’s how we started.

Were there special opportunities that helped Singapore to be developed?

We became a hub because of the convenience. For shipping, you have to pass Singapore, it’s the southernmost point (of continental Asia)... We were poor and we were underdeveloped, so we had to work hard... The chance (to industrialise) came with the British military withdrawal in 1971. They surrendered to us the land they were holding. So we had the Bases Conversion Unit, with (former finance minister) Hon Sui Sen as the head. He knew all about land and we entrusted to him the work of planning, where to build what on these vacant spaces.

What were the key obstacles that you faced at different stages?

The key obstacles were a lack of land, and the high cost of compensation for coastal land. So we passed a law that said that when government acquires coastal land, we compensate without taking into account that it’s by the seaside.²

The market was at an all-time low at that time and so we acquired large tracts of land. They were lying fallow – investors were waiting



Mr Lee Kuan Yew passed away on 23 March 2015 at the age of 91. He was regarded as the key architect of modern Singapore. Here is one of the community tribute centres that were set up around the country during the mourning week.

Continued overleaf...

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“SINGAPORE MUST RETAIN THE SENSE OF SPACE. WE’RE GOING TO BUILD TALLER BUILDINGS, BUT WE CAN’T BUILD THEM CLOSELY TOGETHER.”

for the climate to change so they could manipulate and sell it at a big price. We just acquired as many large pieces of land as possible and claimed the right to reclaim coastal areas... Jurong was a swamp, which we reclaimed. I think there’s a picture of me and Hon Sui Sen in Jurong and I was pointing towards it...

So the coastline changed and that accounts for Paya Lebar. We abandoned Paya Lebar as the main airport in favour of Changi, and with the East Coast Parkway you can get from the airport to the city in 20 minutes. These are basic infrastructures. Unless they are in place, it’s very difficult to overcome the obstacles, so they must be in place early. You must have the infrastructure right and that was made possible because we reclaimed coastal land without paying high compensation and so we had a brand-new airport, and a brand-new East Coast Parkway.

I feel that land acquisition is an example of our very creative, farsighted, unconventional legal system, which is one of the key factors to our success story.³ What would you say about that?

I anticipated these problems. At the low point (in the property market), people gave up on Singapore and said, “this place is going down the drain” and property prices went down. So I pushed this legislation through. It’s probably because of my legal background that I wanted to get the legality of what we were doing properly entrenched, so that it cannot be varied and changed for fickle reasons.

You’ve got to look ahead and forestall or preempt the problems. I mean, if we did not introduce the Certificate of Entitlement (a vehicle quota system, begun in 1990) at a time when the public could not afford cars as much, you could not do it now without a big row – because you can’t get people to give up their cars. But we did it when the cars were few. Today, it’s accepted as a fact.



Above and left: Spaciousness is an important element in Singapore’s urban landscape. As Mr Lee said, there must be a sense of playing fields, recreational areas for children and old people – a sense that this is a full country with all the facilities which you expect of a large country but in a confined space.

If you want the roads to be free, you’ve got to pay for the right to use the road.

What are your current concerns about the urban development of Singapore?

I think the large influx of immigrants has disturbed the population. But if you don’t bring in these people, at the rate we’re reproducing ourselves, we will cease to exist in two generations. So you’ve got to balance this rate of inflow and the discomfort of seeing unfamiliar faces in crowded trains and buses. So we must have the immigrants to keep the place young, make the economy grow and look after the old. They are willing to sacrifice and work hard, they want to succeed. So they set the pace and the competition.

In terms of urban development, what are you most pleased with?

I’m pleased that we redeveloped the city when there was a chance to do it. We knocked down Outram Prison in the west, we started from Changi in the east and worked towards the

centre and rebuilt the whole city. And the big heritage sites in the city, like Fullerton Building, we left those alone. That was a chance of a lifetime.

Lee Kuan Yew on the ingredients of a good city:

Safety:

Create a sense of safety, a sense of feeling comfortable in this place. It is no use having good surroundings, if you are afraid all the time. I went to New York’s Central Park, and you felt unsafe... The police force must be effective, not visible. We have Neighbourhood Police Posts – police who know the people in that neighbourhood, so they know when strangers come in. It is easier to prevent people from going to another place where they are not recognised and committing crimes, because if you are not from the neighbourhood

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Continued from page 86...

“THERE MUST BE A SENSE OF EQUITY, THAT EVERYBODY OWNS A PART OF THE CITY.”

and you come in, you are noticed... Today, a woman can go jogging at three o'clock in the morning, and she would not be raped. It is an essential part of a liveable city.

Cleanliness:

I used to see bushes covered with soot. So I said follow European emission standards. Lorries from Malaysia cannot come in unless they comply with our pollution standards... And consideration for neighbours – (avoid creating) noise, burning joss papers and having ash floating all over the place, upsetting people. Do not do to your neighbours what you don't want others to do to you... I went to Osaka and I could smell chemical factories. I said no, we mustn't allow that. We are a small island; unless we protect ourselves by placing the right industries in the right places – taking into consideration the prevailing winds – we will despoil the city. This could easily have become an unliveable city.

Mobility:

The city must move – transportation... I could see traffic jamming up and making travel impossible. Bangkok was an example where you had to have pot full of pee because you may be stuck in the traffic for one or more hours. The way to stop it is to limit the number of cars, so that they can flow at least at 25 miles per hour, and to improve public transport.

We debated between buses and rail. I was in favour of buses because it is cheaper. But we were convinced in the end that although the cost would be high, (rail) will remove the traffic from the roads and keep buses flowing.

Spaciousness:

Hong Kong has crowded, tall buildings, you seldom get sunshine in the streets, no greenery... So I said alright, from west to east and east to west, we'll knock down the whole city and rebuild it.

Unlike Hong Kong, we spread out throughout the island, so it's not crowded and we've got the space for greenery... For instance, while building the East Coast Parkway, they were giving enough space for planting trees along the side... Singapore must retain the sense of space. We're going to build taller buildings, but we can't build them closely together. There must be a sense of playing fields, recreational areas for children and old people – a sense that this is a full country with all the facilities which you expect of a large country but in a confined space... That is a problem which the present government must tackle – (deciding) how much population we can bear.

Connectivity:

We became a hub because of the convenience... For aircrafts, it's the efficiency of the airport and the interconnectivity. If air passengers have to stopover, they prefer Singapore. We have coaches to take them to see the city free of charge and they can stay one or two days in convenient hotels near the city. We made it comfortable and easy for the traveller and you can have a shower at the airport... Most important is connectivity.

Many airlines fly to Singapore direct from other cities – that gives us an enormous advantage. If they move to Kuala Lumpur or Jakarta,

then the headquarters of these companies will move... We must make it attractive for corporations that want to base here.

Equity:

There must be a sense of equity, that everybody owns a part of the city... I could see that wage-earners in Taipei and South Korea did not own their homes, they had to pay heavy rents. I aimed for a home for every family, so a large portion of their salaries need not go into paying for rents. They own it, an asset which will increase in value as the city grows... A homeowner keeps the public space around his home clean. The person who rents doesn't care, he just looks after the inside. So I said, let everybody own a home, their value goes up if the place is clean and beautiful on the outside and inside. We were asking people to get their sons to do National Service, to learn to fight for the country. Unless you give them a home, why should they be fighting? ■



Above: Mr Lee aimed for a home for every family. Today, the majority of Singaporeans own their HDB flat (public housing).

Below: The Mass Rapid Transit (MRT) is a main railway system in Singapore, which spans the entire country.



Notes:

1. State land was sold with a condition that it be developed in a specified period, to discourage speculation.
2. The Foreshores Act was amended in 1964 to end compensation to landowners for their loss of sea frontage.
3. The 1966 Land Acquisition Act lets government pay compensation for land it acquires based on current value and zoning. Landowners may question the compensation value, but not the acquisition itself.

Article source: Urban Solutions' No. 2, Centre for Liveable Cities
www.clc.gov.sg/documents/UrbanSolutionsIssue2.pdf



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SAFETY AT HEART

Singapore's first training centre dedicated to work-at-height safety was officially opened in May 2015. Southeast Asia Construction had a chance to visit the facility and find out how it can play a pivotal role in driving safety excellence within the local industry.

Galmon Academy offers a suite of accredited courses designed to raise the work-at-height safety awareness for both workers on the ground and site supervisors. The new two-storey, 6,700 sq m facility comprises outdoor and indoor training grounds, 11 classrooms for theory lessons and a 300-seat auditorium for holding safety talks and forums.

The training centre partners with international industry bodies to offer globally recognised certifications for erecting scaffold towers and supervisory-level courses in managing operations that involve mobile elevating work platforms (MEWPs). These industry bodies include the Prefabricated Access Suppliers' and Manufacturers' Association (PASMA) and the International Powered Access Federation (IPAF).

Located in Tuas, Galmon Academy was established by Singapore-based Galmon (S) Pte Ltd, one of Asia's largest distributors of MEWPs. Initially, training sessions were conducted in a section of Galmon's equipment maintenance workshops. The company later made plans to repurpose one of its workshops into a dedicated training centre for work-at-height safety.

"Safety has always been at the heart of what Galmon does. In addition to providing safe machines, we are also actively trying to lower the number of fall-from-heights incidents in Singapore," said Desmond Ong, CEO of Galmon (S) Pte Ltd.



Above: Guests at the opening ceremony had an opportunity to ride on the world's tallest self-propelled boom lift, JLG 1850SJ.



Left: The academy's outdoor training ground.



Located in Tuas, the two-storey, 6,700 sq m Galmon Academy includes outdoor and indoor training grounds, classrooms and an auditorium.

Falls from height remain a major cause for workplace fatalities in Singapore. In a 2014 report by the Workplace Safety and Health (WSH) Institute, it accounted for 17 percent of workplace fatalities and 13 percent of major workplace accidents in the country.

"I don't see this problem diminishing unless efforts are made to change operators' attitude," said Desmond. "Many have become complacent about safety. They think it's okay to miss one or two procedures, in order to finish the job faster. But they don't realise that by doing so, they will compromise not just their own safety, but of those around them as well."

Galmon started its business in 1982 and is a pioneer in the use of MEWPs in Singapore. Today, the company has grown to some 200 staff who oversee more than 3,000 machines including self-propelled booms, scissor lifts, truck-mounted work platforms, telehandlers, mobile aluminium scaffold towers and other custom-built lifts.

“It is heartening that Galmon, a home-grown company, is taking the initiative to enhance the safe use of mobile elevating work platforms in the industry,” said Senior Parliamentary Secretary for the Singapore Ministry of Manpower (MOM) and Ministry of Education, Hawazi Daipi, who officiated the opening of Galmon Academy.

According to Mr Daipi, earlier this year, MOM initiated an enforcement operation targeting specifically at work-at-height and lifting operations at construction sites. Of the 214 worksites inspected, 191 were found to have violated WSH rules. “We issued Stop-Work Orders, Notices of Non-Compliance and meted out fines. This shows that more can be done to increase the WSH standards at workplaces,” he said.

“Enforcement alone cannot be the solution. Employers and employees can and must do their parts to bring about safer and healthier workplaces. It begins with the belief that the prevention of workplace accidents and ill health is key, and we must do all we can to prevent them. Hence, this year’s National WSH Campaign message is ‘I can prevent all injuries and be healthy at work’. This is what Vision Zero is about - a mindset that all injuries and ill health at work are preventable, and a conviction that zero harm is possible. This will drive a focus on finding solutions to prevent injuries and ill health.

“If we have this mindset that injuries at work are preventable, then the use of MEWPs, instead of ladders and scaffolds to undertake work at height is an obvious choice. First, MEWPs enhance productivity and are quicker to deploy. Second, and more importantly, MEWPs are safer to use as they remove the risks of climbing especially during the erection and dismantling of scaffolds. In other words, MEWPs offer workers an easier, safer and smarter way to access to workplaces at height.”



Left: Desmond Ong, CEO of Galmon (S) Pte Ltd.



Right: Hawazi Daipi, Senior Parliamentary Secretary for the Singapore Ministry of Manpower and Ministry of Education, was the guest of honour at the opening ceremony.

“MANY HAVE BECOME COMPLACENT ABOUT SAFETY. THEY THINK IT’S OKAY TO MISS ONE OR TWO PROCEDURES, IN ORDER TO FINISH THE JOB FASTER. BUT THEY DON’T REALISE THAT BY DOING SO, THEY WILL COMPROMISE NOT JUST THEIR OWN SAFETY, BUT OF THOSE AROUND THEM AS WELL.”

Mr Daipi further highlighted that government schemes such as the Building and Construction Authority’s Mechanisation Credit and the Inland Revenue Authority of Singapore’s Productivity and Innovation Credit Scheme are available to help defray costs of rental or purchase of equipment, and training.

e-Learning for MEWPs

Galmon Academy plans to work with JLG University to bring e-Learning to Singapore, customising it to how the local workers use these machines here, according to Desmond. JLG is a global manufacturer of MEWPs based in the US. Galmon has represented JLG in this region for more than 20 years.

“e-Learning will not only benefit new operators. It is also the first step towards developing a structured framework to train technicians on how to service these machines and assess their competency levels,” said Desmond.

Simulation is another virtual technology that Galmon Academy plans to introduce



Left: Guests were also invited to explore the academy’s premises.



Right: Shawn Ong, principal of Galmon Academy and COO of Galmon (S) Pte Ltd, explains to Mr Daipi the safety procedures that take place before machine operation begins.

in Singapore. “I visited the new JLG University in Pennsylvania recently and I was very impressed by how JLG is using virtual technology to complement its training syllabus,” said Desmond.

“We may think that hands-on training is the best way to train operators to use these machines. However, I witnessed how JLG’s simulators allow trainees to familiarise themselves with the control panel and even test drive the machines.

“That way, trainees will not be overwhelmed by the buttons and knobs when they first start practising with an actual MEWP and can concentrate on the safety precautions to look out for.”

‘World-class academy’

Shawn Ong, principal of Galmon Academy and chief operating officer of Galmon (S) Pte Ltd, said that the academy will also organise safety seminars, talks and forums aimed at government agencies and industry players. “The intention is to expand and improve their knowledge on MEWPs. At the same time, we can help train their authorised examiners and professional engineers so that they get more hands-on experience with the machines.

“In general, our goal is to become the first academy in Asia with a proper, structured curriculum-based training for operation, maintenance and repair of MEWPs. In the near future, our theory lessons will be conducted through a series of class lectures and e-Learning. Graduates of Galmon Academy will be certified by both Galmon and JLG as competent technicians. We are also working towards getting these courses recognised by the Singapore Government,” explained Shawn.

However, the main challenge faced by the industry seems to remain for now: there is a lack of local interest. “It is unfortunate that the younger generations in Singapore are not keen on joining the industry,” said Shawn. “The fact is, they have a misconception about it, and that’s what we try to change.

“By creating a world-class academy, we expect to attract local students. Here, they’ll find out that there is a career path in the industry beyond being technicians. Graduates will be able to obtain a certificate that allows them to work for global manufacturers, end users and governments. They have valuable skills to offer, which are very specialised and highly sought after.”

Shawn also underlined the strength of Galmon Academy. “We will follow the principle of Galmon – a company which values safety and quality. Galmon works closely with the government on safety issues,



Shawn receives tokens of appreciation from IPAF (left) and PASMA. Galmon Academy currently partners with these international bodies to offer globally recognised certifications for erecting scaffold towers and supervisory-level courses in managing operations that involve MEWPs.



Practical lessons for scissor lifts (left) and scaffold towers can be held at the academy’s indoor training ground.



The academy’s classrooms (left) will conduct theory lessons, and the auditorium will be used for safety talks, seminars and forums.

and doesn’t deal with partners that don’t have a safety culture.”

In 2011, Galmon received the bizSAFE Star Award for its occupational safety and health risk management capabilities and implementation systems. It is the highest level of bizSAFE Award from the Singapore WSH Council. In 2013, Galmon was honoured with a bizSAFE Partner Award for its commitment to motivate vendors and contractors to improve their WSH performance by embarking on the bizSAFE

programme. Earlier this year, Galmon bagged the bizSAFE Enterprise Exemplary Award which recognises companies with exemplary WSH performance and robust risk management plans.

“Galmon Academy will be more than just a place where we train our students on how to operate MEWPs safely. We also want to enhance the students’ attitude towards safety, with the hope that it is instilled in their daily life.” ■

Website: www.galmon.com/services/training

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Models shown may include optional equipment. Available models may vary by region or country. Materials and specifications are subject to change without notice.

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*1 Based on our survey at customers' worksites. The value can change depending on the type of work.
*2 Based on the assumption of 15,000 hours of use a year.



JKG TOWER

The JKG Tower high-rise building complex in Kuala Lumpur, Malaysia, consists of a 32-storey office tower along with a 13-storey parking facility. The tough schedule and tight budget allowance proved to be major challenges for the building contractor, IJM. For this reason, the company decided to collaborate with Peri on the project.

Formwork solution

For the completion of the building's shell, the construction crew needed only 26 months, according to Peri. To construct the core walls, the Vario GT 24 girder wall formwork on CB 240 climbing brackets provides a cost-effective solution. The climbing system guaranteed safe working conditions at all heights. In addition, the well thought-out design combines easy handling with trouble-free adaptation to suit different building geometries. The wall formwork and climbing formwork system are thereby connected to form large-area units that can be quickly moved to the next level with only one crane lift. This

has provided excellent support for the short construction period of only one month for realising three floors respectively.

In the floors, a wide range of rectangular columns with large cross-sections had to be constructed. The Vario GT 24 column formwork has been easily and quickly adapted to match the different dimensions of up to 1.50 m x 2 m. Furthermore, the system with Vario standard components has safely transferred the high fresh concrete pressure.

For the economical construction of the storey slabs with thicknesses of up to 1 m, Peri PD 8 slab tables are being used. With only a minimum of system components, the building crew has found it easy to adapt to the varying 4.30 m to 6 m floor heights. In many areas, large-sized beams have been simultaneously concreted along with the slabs. Load-bearing GT 24 formwork girders form the underside of the formwork whilst RCS steel walers transfer the loads onto the PD 8 shoring.

The Peri RCS P climbing protection panel serves as a gap-free enclosure for the storeys in the shell construction. As a result,



Facing page: The JKG Tower complex in Kuala Lumpur consists of a 32-storey office tower along with a 13-storey parking facility.

Above, left: The perforated steel sheeting used as enclosure of the Peri RCS P climbing protection panel is particularly suitable for use in warmer regions. It is air-permeable and prevents heat accumulation inside the building.

Above, right: Columns with diameters of up to 1.50 m x 2 m are formed using the Vario GT 24 column formwork. The high fresh concrete pressures can also be safely transferred with this variable system.



the construction team can work at great heights without any risk of falling as well as with more productivity. With the system, the protective wall is always guided upwards by using a rail connected to the building, ensuring safe and fast climbing procedures in all weathers. Mobile self-climbing devices raise the protective wall in 50 cm increments on the following floors, which reduces crane requirements on the jobsite.

For the JKG Tower, a perforated, air-permeable sheet steel is being used as a housing. This enclosure variant is an advantage, particularly in warmer climates because it prevents any heat accumulation inside the shell thus significantly improving the working conditions. The perforated sheet is also being used as highly visible, prominent advertising space.

A Peri RCS landing platform serves as a temporary storage area and for moving loads into the following storeys. The landing platform is assembled using standard components and can be flexibly positioned at any point on the building.

Safety has also been taken into consideration for all access possibilities: four-legged stair towers on the basis of the flexible Peri Up Rosett Flex modular scaffolding ensure workers safely reach all levels in the structure. The system with its 75 cm wide flights of stairs made of aluminium is extremely quick to install – among other things, due to the low number of required anchors as well as ledgers. ■

Website: www.peri.com

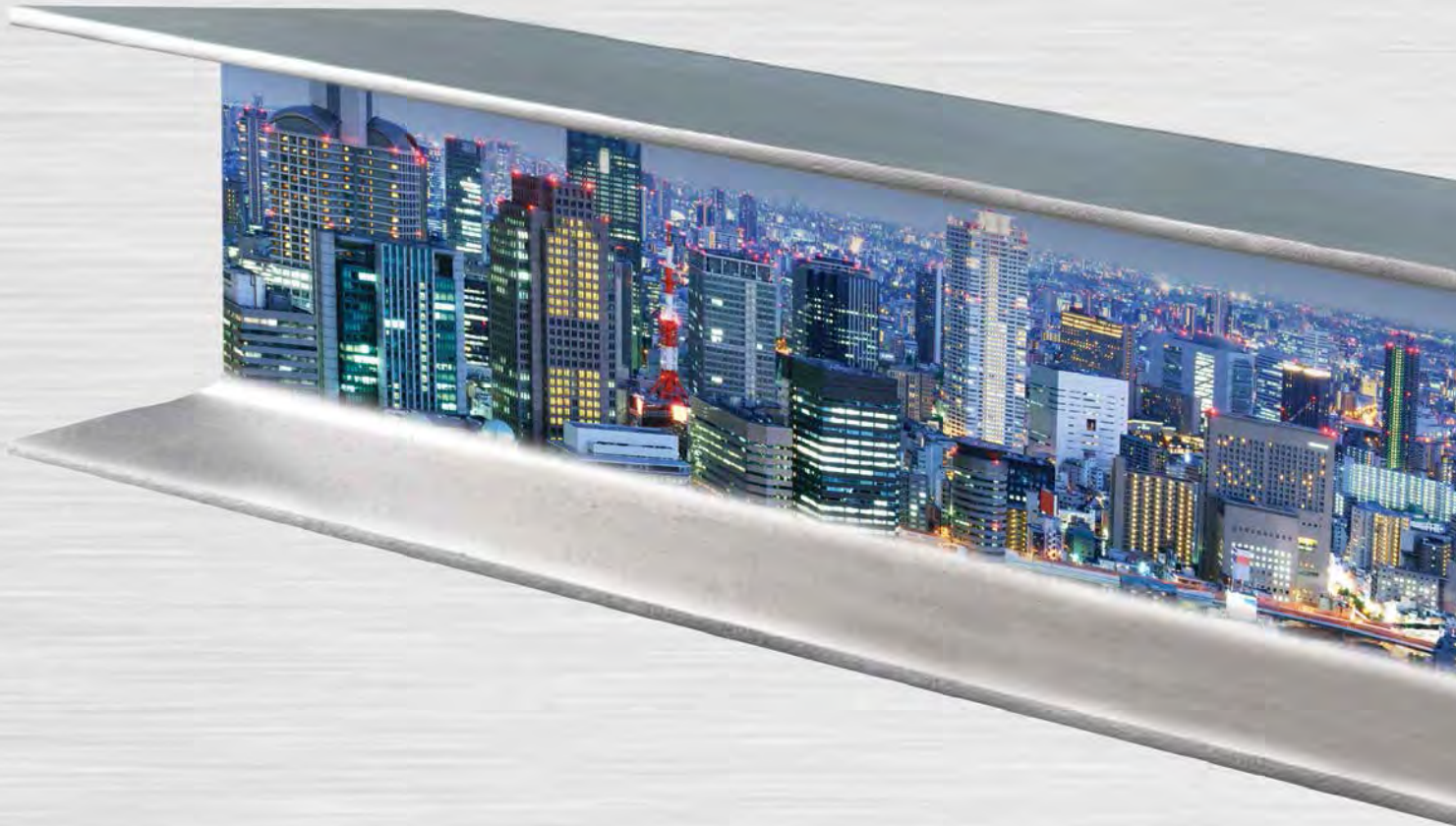
Top: For the top three floors in each case, the RCS P climbing protection panel offers all-round anti-fall protection. It is also used as advertising space.

Left: Peri Up Rosett staircases are a safe option for reaching the higher storeys.

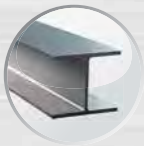
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The Mandaue-Mactan Bridge is an essential link in the Philippines.

© Rabosajir

MANDAUE-MACTAN BRIDGE

The construction of Mandaue-Mactan Bridge in the Philippines was completed in 1972. Apart from being a national pride, the bridge also led to commercial growth and to this day remains an essential connector. It spans along the entire length of the Mactan Channel and links the islands of Cebu and Mactan. It is also the link between Cebu and Mactan-Cebu International Airport, the second busiest airport in the Philippines. The bridge is a key gateway for travellers accessing the air hub.

Bridge repair

Over the years, the bridge surface has been patched and repaired, and some sections have been replaced. Still, most of the asphalt has been more than 30 years old. The Philippine government, through the Department of Public Works and Highways, realised the need for comprehensive repair, which included a fresh coat of asphalt across the surface of the entire length of the bridge.

PLD Construction was the contractor tasked with the enormous job of repairing the Mandaue-Mactan Bridge asphalt pavement. The contractor partnered with Asphalt Pavement Solution Inc (APSI) to undertake the removal of the existing dilapidated asphalt pavement at a depth between 50 mm and 100 mm and pave the new asphalt overlay. Given the heavy daily traffic volume of 10,000 vehicles at the bridge, the contractor faced a difficult task. Specifications for the project also required the utilisation of a cold planer.

To solve such problems, both PLD Construction and APSI came up with a solution that resulted in the purchase of a Cat PM102 cold planer. Trainers from Caterpillar arrived and started a programme to ensure the operators could leverage the machine's technological advantages. The trainers provided lessons in a classroom setting to introduce the operators to its basics. Next, the team went to work in



A Cat PM102 cold planer was used to help repair the Mandaue-Mactan Bridge asphalt pavement.

a controlled environment away from the jobsite. Finally, the trainers remained on hand at the jobsite to ensure smooth operations as the job began and progressed.

Operators were able to set the PM102 to the specified grade and simply move forward. The automatic height adjustment removed the exact amount of material detailed in the specifications, helped maintain a steady pace even when the bridge had a sloping design at both sides, and eliminated production-robbing manual adjustments. Because of this technology, PLD Construction and APSI were able to complete the milling of the entire span of the Mandaue-Mactan Bridge in a record time of 15 days, 33 days ahead of its schedule.

The contractor said the productivity helped make the job profitable, as did the fuel efficiency of the Cat C7 engine. Another key feature that ultimately provided efficiency and productivity was its sensors, which made the machine easy to keep and in line. ■

Website: www.cat.com/paving

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CHU LAI AIRPORT

Vietnam's Chu Lai International Airport was once a military airport operated by the US Marine Corps between 1965 and 1970. Abandoned after the end of Vietnam War, it has been reopened commercially since April 2005 with flights operating to Tan Son Nhat International Airport in Ho Chi Minh City and Noi Bai International Airport in Hanoi. Featuring a total area of 2,300 ha, the Chu Lai International Airport links the two main industrial zones in central Vietnam, the Chu Lai and Dung Quat industrial zones.

According to the Civil Aviation Administration of Vietnam (CAAV), the Chu Lai International Airport is one of the four airports approved to be upgraded with a total investment of up to VND170 trillion. The other three airports are Long Thanh, Cam Ranh and Quang Ninh International Airports.



Above and below: In the first phase of concrete repair work, the surface of the damaged existing concrete slabs was removed up to 5 cm in depth, before applying a mixture of gravels and Mapefill SP high-flow shrinkage-compensated cementitious grout.



To protect fresh concrete slabs from rapid water evaporation caused by wind or sunlight and reduce surface cracking, Mapecure E anti-evaporation agent in water emulsion was sprayed on the concrete surfaces.





A view of Chu Lai International Airport at dawn.

The Chu Lai International Airport is currently undergoing upgrades with an investment of VND11.5 trillion. It will have two parallel runways, a passenger terminal capable of handling 2.3 million passengers per year and a cargo terminal with a capacity of 1.5 mil t/yr. The Airports Corporation of Vietnam has selected Nam Viet Construction and Investment Development Company as the contractor for the project. Work started in 2013 and is expected to be completed in 2025.

Concrete repair

Concrete repair work at the airport’s parking area no.1 and existing runways were carried out using Mapei innovative systems. In the first phase, the surface of the damaged existing concrete slabs was removed up to 5 cm in depth, before applying a mixture of gravels and Mapefill SP high-flow shrinkage-compensated cementitious grout. To protect



Mapefill SP at the worksite.



Flexible joints among new concrete slabs were sealed with Mapeflex PU50 SL paintable, castable polyurethane sealant.



To regulate the depth of Mapeflex PU50 SL, Mapefoam closed-cell expanded polyurethane flexible cord was inserted beforehand in the joints.

fresh concrete slabs from rapid water evaporation caused by wind or sunlight and reduce surface cracking, Mapecure E anti-evaporation agent in water emulsion was sprayed on the concrete surfaces. Flexible joints among new concrete slabs were sealed with Mapeflex PU50 SL paintable, castable polyurethane sealant. To regulate the depth of Mapeflex PU50 SL, Mapefoam closed-cell expanded polyurethane flexible cord was inserted beforehand in the joints.

In the second phase, Mapegrout SV quick-setting and hardening, compensated-shrinkage hi-flow mortar was used for cracks and damages along the flexible joints and on the existing concrete slabs. The damaged flexible joints were treated mechanically and then sealed with Mapeflex PU50 SL combined with Mapefoam. Mapeflex PU50 SL was also used to seal cracks on the surfaces. ■

Website: www.mapei.com.sg



Above and below: In the second phase of concrete repair work, Mapegrout SV quick-setting and hardening, compensated-shrinkage hi-flow mortar was used for cracks and damages along the flexible joints (above) and on the existing concrete slabs.



Mapeflex PU50 SL was also used to seal cracks on the surfaces.



The finished runway.

The article courtesy of Realta Mapei International no. 51

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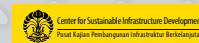
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HONGSA POWER PLANT



Launched in 2009, the Hongsa Power Plant is being built to provide electricity across Laos and Thailand. Located in Hongsa district, in the province of Sainyabuli, Laos, the project is a joint venture between Banpu Power Limited (BPP) – the Lao Holding State Enterprise (LHSE) – and the Ratchaburi Electricity Generating Holding Public Company Limited (RATCH), called Hongsa Power Company Limited (HPC). When completed in 2016, the plant's steam powered generator will be fuelled by lignite and have the capacity to generate over 1,878 MW a day – this is believed to be higher than any existing power plants in Laos.

Extraction and loading operations

Italian Thai Hongsa has been contracted for 15 years to carry out the extraction and loading operations of the lignite to fuel the generator. The company is using 18 Volvo machines – ranging from the Volvo 70 t excavator to be delivered in Laos, to a range of wheel loaders, motor graders and soil compactors. The machines are being used to extract lignite and load it onto trucks, ready to be transported to the power plant, as well as maintaining the roads around the large site.



Top: The Hongsa Power Plant in Laos.

Above: The Volvo machines work together on site.

When Italian Thai Hongsa took delivery of the Volvo EC700C excavator – said to be the largest Volvo CE unit ever sold in Laos – the company's project manager,

Sutee Boonsayamtham, noticed the impact straight away. "We previously used the smaller, Volvo EC380DL and because of its low fuel consumption and good performance,

we decided to purchase more Volvo excavators. The EC700C was worth the investment – it also demonstrates good fuel efficiency and a powerful engine, while the larger bucket size has boosted productivity tremendously.”

The powerful EC700C features a 336.5 kW Volvo V-ACT engine that delivers high torque in low revs for an excellent performance and fuel efficiency. Its advanced hydraulic system is well matched to offer the operator smooth and responsive digging and lifting, as well as high breakout force. The Volvo cab is spacious and designed for safe operation with enhanced visibility. The machine’s robust undercarriage and reinforced superstructure, boom and arm are all built to last against the daily stresses in tough applications.

In addition to the 70 t excavator, there are three Volvo CE EC210 Prime, three EC380DLs, one EC140BLC and one ECR88 Plus excavators being used in digging and loading applications. Also in operation at the site are a Volvo CE L150G and L70F wheel loaders, which are used to support the excavators in loading and dumping applications. Volvo CE wheel loaders are recognised for their durable and fuel efficient Volvo engine, the comfortable operator environment, including the cab design and ergonomic control layout. Volvo’s torque-parallel linkage delivers parallel lift with a high breakout force, while the transmission features Automatic Power Shift for easy operation.

The mountainous, rural province where the plant is located can be difficult to navigate with limited roads and infrastructure, so delivering machine support can be difficult. That’s why Volvo dealer, Italthai Industrial (ITI) has deployed a team of service technicians who are based on-site to keep the machines up and running.



The EC700C excavator is said to be the largest Volvo CE unit ever sold in Laos.

ITI has 13 branches across Thailand, as well as a sales, service and spare parts dealership in Vientiane, Laos’ capital. “Our aim is to deliver our services to customers as closely as we can maximise uptime for our customers,” said Khun Yuthachai Charanachitta, president and CEO of Italthai Group (the parent company of ITI). “That’s why we have an on-site service, so that machines can be maintained around the clock.” ■

Website: www.volvoce.com



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BOTANIKA NATURE RESIDENCES

Work on the Botanika Nature Residences is currently underway—a premium, low-density condominium featuring luxury apartments located at one of Metro Manila’s premier business districts, Alabang in Muntinlupa City, in the Philippines. The site spans 1.55 ha, 70 percent of which will be dedicated to open spaces including gardens, swimming pools, tennis courts and other facilities.

The iconic structure will be made up of three oval-shaped towers, designed for optimal privacy by ensuring that windows do not peer into neighbouring apartments. Each tower will feature a large glass-roofed atrium, to flood the entrance hall with light, and a roof garden. The high-end units will range from 123 to 343 sq m, with the largest costing in excess of US\$1 million. The first tower, scheduled for completion in 2017, will stand 13 stories high and contain 101 apartments.

Botanika Nature Residences is being managed by Filinvest Group, one of the biggest residential developers in the country, and it is said to be the first in the Filinvest Exclusive Collection, a range of premium housing developments.

Lifting solution

Construction giant Datem Inc is acting as main contractor of the project, and purchased the Potain MCT 205 topless tower crane to manage much of the material handling duty. Datem Inc’s president, Levy V. Espiritu, said the investment in the new tower crane fitted with the business philosophy at the company. The crane, launched in 2014, is manufactured at Manitowoc’s factory in Zhangjiagang, China.

“All of our projects to-date have made use of specialised construction practices and technologies, such as the Potain MCT 205,” he said. “These investments allow the safest possible working environments, greater efficiency in completing projects and directly benefit the overall standards of infrastructure delivered by the construction industry.”

On the Botanika Nature Residences project, the crane is lifting formwork, rebar and precast concrete sections, weighing up to 5 t and placing them at heights of up to 59 m. The crane is also being used to pour concrete. Maximum capacity for the Potain MCT 205



Construction of the Botanika Nature Residences is in full swing. The premium, low-density condominium featuring luxury apartments is located at one of Metro Manila’s premier business districts, Alabang in Muntinlupa City, the Philippines. When completed, it will have three oval-shaped towers, with the first tower scheduled for completion in 2017.

is 10 t while at its 65 m jib end it can still handle an impressive 1.75 t. The crane's modern design makes it quick to erect, with the heaviest group of components weighing just 7.9 t, while the full 65 m jib can be placed in a single lift.

“With development of residential property on the rise in the Philippines, we need equipment that is quick to erect, as well as strong and reliable,” explained Arnold De Asis, vice president of operations at Datem Inc. “We decided to purchase the Potain MCT 205 because it offers the latest technology and its topless design makes it suitable for many job sites.”

As one of the largest and fastest-growing construction companies in the country, Datem Inc has been responsible for some of the most iconic structures in the Philippines and is working alongside US-based architectural firm, Architecture International, and global construction services provider, AECOM on the Botanika Nature Residences job. The former farming area has been transformed into one of the country's premier business districts and is home to many large corporations in the information technology sector. ■

Website: www.manitowoccranes.com

A Potain MCT 205 tower crane is helping to manage much of the material handling duty on the project. The crane's modern design makes it quick to erect, with the heaviest group of components weighing just 7.9 t, while the full 65 m jib can be placed in a single lift.



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PAHANG SELANGOR RAW WATER TUNNEL



Top: The first of three Robbins TBMs excavated 11.2 km, and broke through in March 2013.

Above: Remote adit sites, located in the mountains surrounding Kuala Lumpur required supplies such as invert segments to be cast onsite.

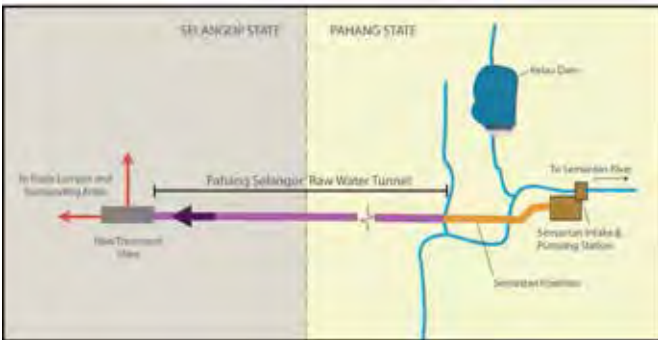
The Malaysian capital Kuala Lumpur is now the country's most populous city. The water supply sourced from local rivers is projected to run short in the near future and to address forecasted needs, the Malaysian Ministry of Energy, Green Technology, and Water (KeTTHA) has commissioned the Pahang-Selangor Raw Water Tunnel. The conduit will transfer water from the Semantan River in Pahang State to the Selangor/Kuala Lumpur region, traveling as deep as 1,200 m beneath the Titiwangsa mountain range.

Up to 27.6 cu m of raw water per second will flow through the completed tunnel, which is believed to be the longest in Southeast Asia. An 858 m long inlet conduit structure and pumping station, located in the Pahang River Basin, will draw water from the river to the tunnel, while outlet structures in Selangor will transfer the water to the site of a new treatment plant.

In order to excavate swiftly in difficult high cover rock conditions, KeTTHA developed a programme combining multiple TBM drives with NATM methods at the inlet and outlet portals. SNUI JV was selected



Three 5.23 m diameter Robbins Main Beam TBMs excavated up to 657 m per month in Malaysia.



At 44.6 km long, the Pahang Selangor Raw Water Tunnel is believed to be Southeast Asia's longest tunnel.

in 2009 as the contractor for the project - a consortium of Shimizu Corporation and Nishimatsu Construction of Japan, along with local companies IJM Corp and UEM Builders Bhd. The JV operated three Robbins Main Beam TBMs, each excavating tunnel sections ranging from 11.3 to 11.8 km in length, in mountainous areas outside the city.

Tunnelling methods

While vertical tunnel walls were specified in short sections of NATM excavation (ranging from 1.9 to 2.6 km each), the tunnel length and geology, consisting of granites with approximately 50 to 200 MPa UCS, prevented using drill and blast for the main drive. "In this type of hard rock, we prefer to use Robbins TBMs. The total contract construction time is five years and the tunnel was quite long, so drill and blast could not have done this in the time specified," said Mr Ohashi, mechanical engineer for SNUJ JV.

To tackle the high cover, hard rock conditions, the three machines were designed with unique design aspects - from custom cutterheads to streamlined operator's cabs. The TBMs were engineered with the smallest diameter back-loading cutterheads ever to

be mounted with 19-in disc cutters. The back-loading design increases safety and efficiency during cutter changes, as workers are not exposed to the tunnel face. The larger cutter diameter also aids in increased cutter life and higher advance rates in hard rock, compared to 17-in diameter cutters.

Operator's cabs on each of the three machines included industrial computer systems and wireless routers. The routers allow for laptop access to control systems from any location on the TBM, and allow for remote access of the programmable logic controller (PLC). Integrated touch screens are another feature of the cab designs. Dual central processing units (CPUs) provide both an operating and standby system for machine control, while closed-circuit television (CCTV), data logging and laser guidance systems are all accessible and adjustable via the screens.

Due to the system integration and ethernet connection, all data could be transmitted to the surface via fibre optic cables for viewing. "We kept all real-time

Continued overleaf...



From 1 to 7,5 ton - up to 28 mt

data on our servers. These were in our site offices, and there was one in Tokyo, which then routed the data on the internet. Because of this our actual progress data was available anywhere in the world from our password-protected website,” said Mr Nakano, deputy project manager for SNUI JV.

While the ground support programme varied from steel straps to rock bolts based on the rock classification, the majority of primary support was done using a novel type of shotcrete. The shotcrete was applied manually and consisted of a continuous mixing and charging pump system, customised dry mortar mix with polypropylene fibres, and a fast-acting accelerator. The shotcrete, developed by MCM Co Ltd and Denka of Japan, has been used on numerous TBM and NATM projects in Japan, though this is believed to be the first time the system has been used internationally.

MCM and Denka worked with Robbins to create a near-zero rebound L1 shotcrete system to be used as the primary means of ground support. The shotcrete was applied following each TBM stroke in a 2 cm layer directly behind the cutterhead support, and was accompanied by ring beams depending on the ground conditions. Compressive strength of up to 15 MPa was achieved within 24 hours of application. “The shotcrete was very quick setting with no rebound, and the mortar did not require high pressure application,” said Mr Nakano.

Three Robbins fabric belt continuous conveyors operated simultaneously behind the TBMs. “We considered muck cars and rubber-tyred trucks early on, but the tunnel diameter is too small for trucks, and muck cars would take too much time out of the schedule. This is because the diameter is so small; we couldn’t make a double track. Conveyor was our only choice. The extension time for the conveyor is very short, so this is a big advantage for us,” explained Mr Nakano. The belt was added every eight to 10 days, a process that took 10 to 12 hours and was paired with TBM maintenance and cutter inspections.

Wide ranging jobsites

The three TBMs were assembled in the Robbins Shanghai, China manufacturing facilities and shipped to Port Klang, where they were then trucked to each portal location. The most remote of these locations is high up in the densely forested hills near the town of



Andy Birch, Robbins Adit 4 site manager, surveys the excavated tunnel.



A novel type of polypropylene fibre shotcrete was applied as the primary means of ground support - a mixture that dramatically reduces rebound.



Three Robbins continuous conveyor systems operated simultaneously behind each TBM, averaging 92 percent availability.

Karak, about 45 km from downtown Kuala Lumpur. Supplies including precast invert segments were trucked to the site each day. “Everything was shipped in from the other jobsites or suppliers in the city. We had nothing stored onsite except fresh water for the tunnel,” said Glen Maynard, Robbins site manager at Karak.

Geology at the Adit 2 site consisted of weathered granite with warm water inflows up to 13,000 l/min from hot springs. The contractor used spiling methods combined with grouting to reduce over-break and lessen the water inflows. “We also managed these inflows by upgrading our pumping capacity from 20,000 to 30,000 l,” said Mr Nakano.

To mitigate further risks, SNUI JV adopted a programme of continuous probe drilling, along with a contractor-developed add-on known as the DRIS system, installed on all three TBMs. The DRIS calculates the

rate of advance using drill feed pressure, rotation, and other variables, and also infers the rock quality based on the rate of penetration.

Adits 3 and 4 were located southeast of downtown Kuala Lumpur, in the Hulu Langat district. TBM tunnelling at Adit 3 began in good ground conditions, but quickly entered a section of heavily faulted, relatively soft in which a void of more than 50 m high was encountered. The near-zero rebound shotcrete was used successfully to overcome this section. The TBM also met with rock above 200 MPa UCS, and with at least 30 percent quartz content.

To cope with the abrasive rock conditions, crews performed daily cutter inspections. "We measured each cutter using a cutter gage every morning to determine wear and decide which cutters to change. We felt comfortable doing this inside the back-loading cutterhead, which was much safer than front-loading and makes cutter installation easier," said Andy Birch, Robbins site manager at the Adit 4 site.

Also located in the Hulu Langat area, Adit 4 saw the fastest advance rates, up to 657 m per month. Though the rock strength is softer in this section, it had the tendency to become blocky and a stretch of completely weathered rock with soil-like ground was encountered during tunnelling. Shotcrete was again successful in consolidating this section.

The machines maintained excellent advance rates throughout the project despite many challenges including fault zones, variable rock conditions, high rock temperatures and frequent electrical storms that required machine stoppage. Due to the hot springs, water ingress at temperatures up to 56 degrees Celsius was recorded. Maximum rates of 49 m in one day, 198 m in one week and 657 m in one month were nonetheless achieved - good rates that were at least partially attributed to the early installation of fibre mortar shotcrete as primary ground support. The near-zero rebound system, with its quick set time of 30 minutes, saved a significant amount of time compared to conventional ground support methods.

The first TBM excavated 11.2 km, and broke through in March 2013. The other two machines excavated 11.3 km and 12 km and met in the tunnel in mid-February 2014. ■

Website: www.the Robbinscompany.com



Above: The near-zero rebound system, with its quick set time of 30 minutes, saved a significant amount of time compared to conventional ground support methods.

Bottom: Wireless operator's cabs and touch screens in each TBM enabled user-friendly tracking of all the machine's functions.



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ORCHARD MRT STATION

The 30-km long Thomson Line will connect the northern and central parts of Singapore to the city and the rest of the MRT network, provide additional capacity along the north-south corridors, and strengthen the overall resilience of the rail network. The line is scheduled to open in phases between 2019 and 2021. A joint venture between Penta-Ocean Construction Co Ltd and Bachy Soletanche Singapore Pte Ltd is currently building the Orchard Station under Contract T219 for the sum of S\$498 million, with a construction period of 78 months, from July 2014 to December 2020.

The Orchard Station will provide an interchange with the North-South Line. Set on hilly terrain and occupying the former site of the Overseas Family School, the station is located at the junction of Orchard Boulevard and Paterson Road. Contract T219 is for the construction of Orchard Station, cripple sidings and twin-bored tunnels towards Orchard Boulevard, with a slurry TBM being used for the dual drives.

Foundation work

The Orchard Station will be constructed with a combination of top-down method and together with the cripple siding has a combined diaphragm wall perimeter of approximately



Top and above: A joint venture between Penta-Ocean Construction Co Ltd and Bachy Soletanche Singapore Pte Ltd is currently building the Orchard Station as part of Singapore's Thomson Line project.

1,300 m and 61,000 sq m. Within the station box and cripple siding barrettes with plunge in columns will be constructed to facilitate the top-down method. The depth of the diaphragm wall and barrettes are up to 75 m, passing through marine alluvial soil to clay

and finally granite. Various widths are used across the site 0.8, 1.0, 1.2 and 1.5 m with the length of panels up to 7.5 m.

Three Liebherr duty cycle crawler cranes, including a newly delivered HS 885 HD, which joins a second HS 885 HD and

an HS 855 HD, are being used by Bachy Soletanche to construct the diaphragm wall, barrettes and cross walls of the Orchard Station together with the cripple siding. The new HS 885 HD was delivered by Liebherr Singapore and arrived on site earlier this year.

Both Liebherr 120 t capacity HS 885 HD cranes are equipped with Bachy Soletanche's Evolution 3 hydrofraise trench cutting machines. The HS 885 HD is powered by a MAN D2842 LE diesel engine rated at 898 hp at 1,900 rpm ensuring plenty of lift capacity to manoeuvre the 40 t hydrofraise.

The hydrofraise has a heavy metal frame that serves as a guide, and two cutter drums equipped with tungsten carbide-tipped cutters that rotate in opposite directions to break up the soil. A pump placed immediately above the drums evacuates the loosened soil, which is then carried to the surface by the drilling mud. The mud is filtered to remove suspended cuttings and then poured back into the trench, where it helps to stabilise the excavation as well as to loosen the soil. The HS 855 HD, which has a lift capacity of 90 t, has been equipped with a hydraulic diaphragm wall grab powered by the crane engine.

According Carsten Fricke, general manager of Liebherr Cranes & Foundation Equipment at Liebherr Singapore Pte Ltd, Liebherr cranes feature more than 80 percent of Liebherr manufactured components, resulting in all components being perfectly compatible with each other. "This also applies to the electronic components and control unit, which is based on a Canbus system; it was implemented about 20 years ago and we have been working on its performance and reliability ever since. ■

Website: www.liebherr.com



The Liebherr HS 855 HD duty cycle crawler crane being used on the project has a lift capacity of 90 t and is equipped with a hydraulic diaphragm wall grab powered by the crane engine.



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DONGDAEMUN DESIGN PLAZA



DDP is believed to be the largest irregular shaped structure in the world.



Covered in a shell of uniquely shaped aluminium panels, DDP appears more like a massive spaceship than a building.

South Korea's new landmark, Dongdaemun Design Plaza (DDP), appears more like a massive spaceship than a building. Located in the heart of Seoul, the development consists of five main facilities including a multipurpose hall, an exhibition hall, a shopping centre, an experiential centre, and a history and culture park. It occupies 86,574 sq m of floor space divided between three underground floors and four aboveground floors.

Covered in a shell of uniquely shaped aluminium panels, DDP is said to be three times the size of a regular football pitch and the largest irregular shaped structure in the world. Construction of the project started in 2009 and lasted for five years until its grand opening in March 2014.

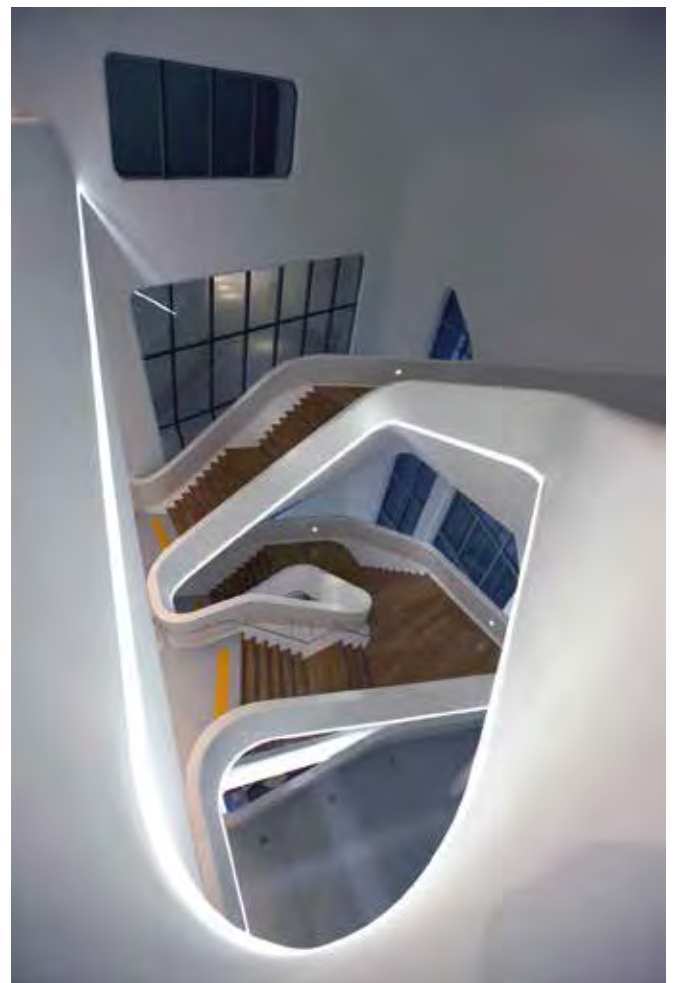
DDP was designed by the world-renowned architect Zaha Hadid, who applied the idea of organic architecture. Not a single straight line can be found either inside or outside the building. All the spaces inside the building are connected, making it difficult to even guess how many floors the building is made up of. There are virtually no columns inside the building, and the cavernous interior reaches 15 m at its highest point. The 533 m walking path surrounding the exhibition hall and the curved staircase twisting its way up from B2 to F4 both add to the building's organic and irregular design theme.

Turning the architect's vision into reality was not an easy task. Such unique design presented technical challenges to the contractor, Samsung C&T.

Irregular exterior panels

According to Samsung C&T, DDP is the first construction project in the world to employ BIM technology (Building Information Modelling) during all of its stages, from foundation work to building construction, interior construction, MEP and landscaping.

To achieve the wavy curves on the building's exterior while keeping the interior free of unsightly columns, the design incorporated the use of a space frame and mega trusses. The space frame made it possible to form the long span and curved sections of the building;



The curved staircase twisting its way up adds to the building's organic and irregular design theme.

the trusses, which are normally used in much heavier structures like bridges, were used to support the frame itself from the ground up. Steel-pipe trusses were then added in triangular configurations to give the frame greater tensile strength while meeting both safety and artistic objectives of the design.

The most noticeable feature of DDP is its curved exterior, the implementation of which was one of the biggest challenges faced by Samsung C&T. The exterior is made up of more than 45,000 panels, and no two panels are the same in shape. Using the conventional approach would have meant fabricating individual moulds for each of the 45,000+ panels - but that was not going to be possible given the project's schedule.

“We were referred to panel manufacturers in the UK and Germany, but found out they were both using conventional pressing equipment and shaping the individual panels by hand. It would've taken 20 years to fabricate all the panels that way, so we were forced to come up with a new method,” said assistant manager Baek In-Beom, who was part of the engineering team on the DDP project.



Above and below: The building's exterior is made up of more than 45,000 panels, with no two panels having the same shape.

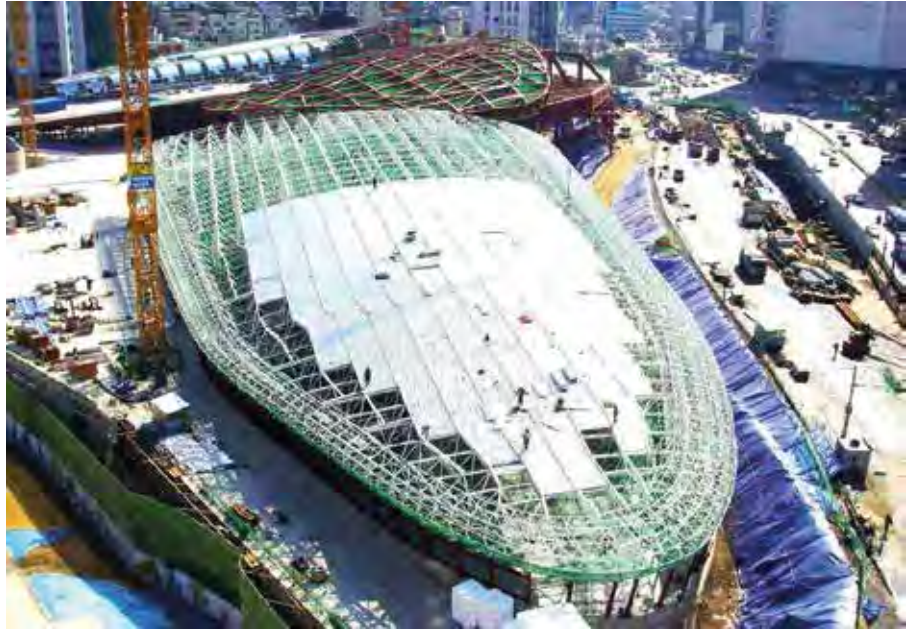


The manufacturers in the UK and Germany could not solve the riddle of DDP's exterior panels and no case study was available anywhere for Samsung C&T to benchmark. So the contractor looked to shipbuilding, aerospace, automotive and other industries that are familiar with irregular shaped curved panels.

Samsung C&T then came across a project to develop an advanced pressing machine for fabricating curved panels for bows of naval ships. The contractor visited the development team at a university in China and completed the development of the multi-perforation shape-forming press after six months of negotiations.

Samsung C&T now had a way to form tens of thousands of uniquely shaped panels with efficiency, but still lacked a way to punch and cut the panels into individual pieces. So the contractor shifted its attention to the automotive industry and the articulated robots used in the industry was the key to its awaited answer.

It took Samsung C&T 18 months, from September 2009 to April 2011, to fabricate all the exterior aluminium panels. The



DDP is said to be the first construction project in the world to employ BIM technology during all of its stages, from foundation work to building construction, interior construction, MEP and landscaping.

Continued overleaf...

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completed panel was given a serial number indicating where the panel goes, its degree of curvature and its colour, to facilitate correct installation and easy replacement of the panels. Installation work began in December 2012 and lasted for 19 months. Each panels weighs 30 kg.

“There was much doubt and concern all around us when we started working on the exterior panels of DDP. When Zaha Hadid, who has a reputation for being a perfectionist, saw the finished product and said it was ‘fantastic’, however, all of us at the site felt an incredible sense of pride knowing we had pulled off something special against all odds,” said DDP’s site supervisor Kim Hyeon-Ho.

Exposed concrete

DDP also features irregular and exposed concrete sections of all shapes and forms both outside and inside the structure. Building the forms to shape concrete in this way also posed a major technical challenge, and to solve this Samsung C&T used wood, plywood and steel bars to build complex-shaped concrete forms, naming them ‘rib forms’ in reference to their organic, skeletal configurations.

The contractor explained that the typical method of building forms for exposed concrete sections involved using EPS blocks, which are essentially chunks of Styrofoam, and shaping them using CNC machines. Testing this approach, however, revealed that it was easy for bits of Styrofoam to end up embedded on the surface of the concrete while detaching the form from cured concrete. Hence the use of harder and more stable materials such as wood, plywood and steel bars.



Top and above: Samsung C&T had to search far and wide in seemingly unrelated industries to come up with a simple and elegant solution to a complex problem. The contractor also managed to manufacture and install the panels in a fraction of the time it would have taken using the conventional approach.

Natural gypsum boards and reinforced natural gypsum boards (GRG: glassfibre-reinforced gypsumboard) have also been used on the interior of DDP. The former was used on low-curvature sections and the latter on high-curvature sections - such as where the wall joins the ceiling - to achieve a smooth, clay-like finish. ■



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HUANGDU #3

Construction of 11 high-rise buildings is currently underway in the Huangdu residential area, in Shanghai, China. As a major residential project, Huangdu #3 will involve the construction of 1,906 apartments spread over four 18-storey, two 25-storey and five 26-storey residential buildings. The Shanghai No.5 Construction Company, a subsidiary of the Shanghai Construction Group, is responsible for construction of the project, which will include more than 188,576 sq m of floor space.

Three Alimak SC 65/32 DOL and two Alimak SC 45 FC dual-car passenger and material hoists were used on the project. With payload capacities of 2,000 kg per car, and lifting heights of up to 100 m, the hoists provided fast and efficient vertical access during concrete construction of the towers.

Huangdu #3 is one of the first projects in the world to utilise the newly launched Alimak SC 65/32 construction hoist. The SC 65/32 is specially designed to meet the needs of construction and rental companies working in new and emerging markets such as China, offering efficiency, safety, reduced energy consumption, higher speeds and greater lifting heights, all with a low total cost of ownership.

Alimak construction hoists are suitable for a wide range of applications, from industrial and mining complexes, chimneys and bridges, through to new building construction and refurbishment on some of the world's tallest structures. ■

Website: www.alimakhek.com



All images: Alimak material hoists were used during the construction of 11 high-rise buildings in the Huangdu residential area. The hoists provided fast and efficient vertical access during concrete construction of the towers.

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SHANDONG BRIDGE

A new cable-stayed prestressed concrete bridge in Shandong province, China, was recently opened to traffic. Construction of this massive twin-tower bridge spanning the Yi River was said to be a huge challenge requiring the latest technologies and complex methods.

To cope with the challenge, the construction team employed an XCMG QAY500 all-terrain crane with a maximum lifting capacity of 500 t. The crane was used to help erect the 100 m high twin towers. Powered by a Benz electronic fuel injection engine, the QAY500 boasts seven boom sections of 84 m, a fixed jib of 56 m, a luffing jib of 91 m and a Y-shaped superlift structure, with a torque of up to 2,800 Nm. The crane is also equipped with an advanced lifting system as well as an intelligent operation system. Its chassis belongs to all-bridge swerving, with a minimum turning radius of 15 m, so the crane could turn around easily in a confined construction site under the bridge. ■

Website: www.xcmg.com



Above and left: A new cable-stayed prestressed concrete bridge in Shandong province, China, was recently opened to traffic. Construction of this massive bridge spanning the Yi River was said to be a huge challenge.



Above, left and right: To cope with the challenge, the construction team employed an XCMG QAY500 all-terrain crane with a maximum lifting capacity of 500 t.



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WYNN PALACE



Work on the new Wynn Palace luxury resort at Cotai Strip in Macau started in 2013. This massive casino and hotel complex is scheduled to open in 2016. It is reported that the resort will have an aerial transport system with gondolas shaped like smoke-breathing dragons, hot-air balloons, pedestal gardens, a 30,000sqm performance lake and a hotel accommodating 1,700 rooms. Leighton Contractors (Asia) Limited is the project's main contractor.

Hong Kong-based Proficiency Equipment has been awarded a contract to supply 11 Comansa CM flat-top tower cranes, including 10 units of model 21CJ290 and the remaining is a 21CJ400. The

cranes have a maximum load capacity of 18 t and are manufactured at Comansa CM's headquarters in Hangzhou, China. The company is a subsidiary of Spanish manufacturer Linden Comansa.

The project is quite a challenge for Proficiency Equipment as some of the tower cranes had to be relocated during the construction and seven of them have to be climbed periodically: two with a hydraulic climbing cage, and five with an internal climbing system. As of May 2015, all of the cranes have reached their maximum height and the tallest are already working at a height under hook of 133.9 m. ■



All images: The upcoming Wynn Palace luxury resort in Macau is expected to open in 2016. A total of 11 Comansa CM tower cranes are helping to complete the project.

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KOREA HIGH SPEED RAILWAY



A new high speed railway is being constructed in South Korea to link Wonju and Gangneung, as part of an extensive infrastructure programme for the 2018 Pyeongchang Winter Olympics. The line is planned to have been completed by 2017. One of the contractors involved in this Samsung C&T run project is Gusan Construction, which is working on section 10 of the route. The roadbed the company is working on is expected to be complete by November 2016.

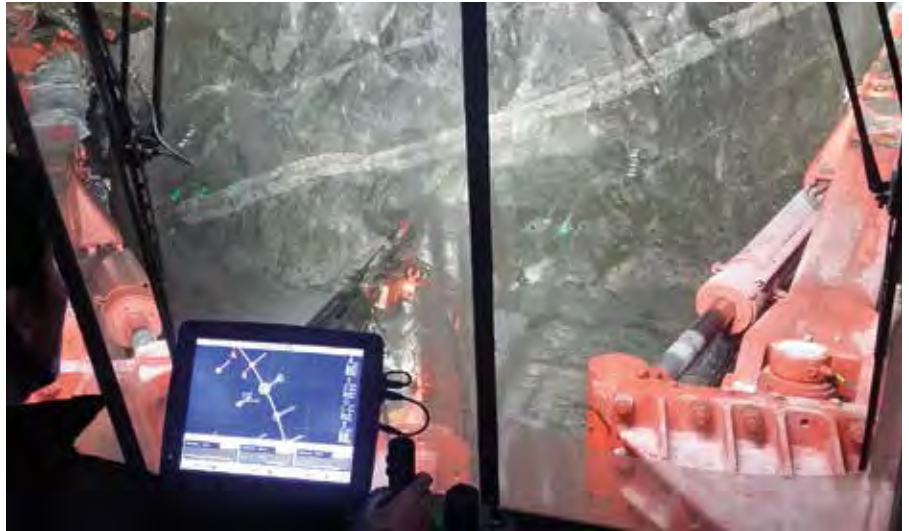
Efficient drilling

When Gusan began work on the project, its drilling jumbos were not deemed to be satisfactory - although they were performing at reasonable levels. The company wanted to achieve an improvement in drilling speed, rates of advance and drilling accuracy. After discussions with Sandvik Construction in Korea, Gusan decided to replace the existing jumbo drill rigs with the DT1131i using RD525 rock drills and Alpha 330 rock tools. It was found that the

new Sandvik drilling equipment was able to achieve in one and a half hours what the previous equipment took two and a half hours. Further efficiencies and benefits were also achieved through the enhanced, and pro-active, after market back-up from Sandvik.

The Sandvik DT1131i jumbo drill rig has been in operation on the project since December 2014, helping Gusan to improve its drilling efficiency, increasing the number of meters drilled per hour. The DT1131i is a computer-controlled three-boom electro-hydraulic drilling jumbo for tunnelling and cavern excavation of 20-183 sq m cross sections, including face drilling, bolt hole drilling and mechanised long-hole drilling. As with all Sandvik DTi jumbos, it has been designed with successful operations in mind as it is fast, accurate and user-friendly.

Together with the iSURE tunnel management programme, the DT1131i's intelligent iDATA control system, and recently launched high frequency RD525 rock drills, robust booms and advanced drill string guides, the rig delivers excavation results of high quality, with low operating



All images: The new high speed railway in South Korea is being built with the help of a Sandvik DT1131i jumbo drill rig.

costs. Further improving the excavation process remote access via WLAN can be used. This allows web-based data transfer as well as online MWD. In addition, ease of service has been in-built into

the construction of the equipment. All components are damage-protected, and all daily service points are accessible from the ground level. ■

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REUNION IN PARIS



All images: Scenes from Intermat 2015.

The 10th Intermat show ended on 25 April 2015, attracting approximately 183,000 visitors (including 131,624 identified visitors) during its six days. According to the organiser, these numbers are slightly down (-8.5 percent) compared to those of 2012, a record-breaking year; however, the result is still satisfying given the complex and uncertain economic climate. The show also attracted 1,410 exhibitors (+5 percent).

In addition, Intermat has cemented its international focus with 35 percent of visitors coming from 168 countries including the Middle East, North Africa and Turkey. This year's show had a strong international appeal, particularly in EMEA (Europe, Middle East and Africa) countries, and was able to attract high quality visitors with investment projects, many of which were decided at the show, said the organiser.

“Intermat 2015 was a stepping stone in the chronicle of the internationally-



announced recovery,” said Maryvonne Lanoë, the show director. “The general consensus is that high-ranking visitors and project initiators made this a dynamic show that gave a confidence boost to everyone working in the sector.”

The first World of Concrete Europe organised by Intermat 2015 offered a brand new platform to showcase the concrete industry. It featured 200 upstream and downstream exhibitors and was a highly anticipated event for the concrete industry as it offered new visitor profiles.

Intermat 2015 was officially opened by Pierre Gattaz, president of MEDEF, and Bruno Cavagné, president of FNTP. During the week packed with networking opportunities, Intermat organised three special days to officially welcome ambassadors from Turkey and the United Arab Emirates and receive official delegations from those countries as well as from Algeria.

Intermat 2015 offered a great platform from which to launch a number of innovative solutions. More than 100 new products and innovations were presented during the show, the best of which were recognised by the Innovation Awards, awarded at the Pre-Intermat event taking place earlier this year in Paris.

Intermat 2015 also played a key role in conveying information and leading discussion through its workshops, networking meetings and topical lectures (concrete, leasing, demolition, counterfeiting and EMEA zone distributors). ■

Website: www.intermatconstruction.com



SHANTUI

Shantui's SD10YE and SD13YS bulldozers boast a high working efficiency and low fuel consumption. Featuring a fully hydraulic drive from Rexroth, the machines utilise a low-emission and fuel-efficient Cummins engine, 103 hp for the SD10YE and 132 hp for the SD13YS.

The SD10YE meets Euro Stage 3B and US Tier 4I standards, while the SD13YS meets Euro Stage 3A and US Tier 3 standards. Both machines are equipped with a PAT blade to provide excellent functionality and versatility. The operator cabins have been fully redesigned and now feature improved noise reduction, an ergonomically designed seat and operator interface, an air filter and AC unit and a digital instrument display, all to increase the operator's comfort and efficiency.

Shantui has also upgraded its most popular bulldozer model, the 160 hp SD16. The new SD16CE features a redesigned operator cabin and incorporates a Tier 3/Stage 3 Cummins engine. In addition, the desert-modified SD32D is a variant of the 320 hp SD32 bulldozer. The new SD32D has been retooled for hot, dry and harsh environments such as the Middle East and Africa. It features heat-resistant hydraulics, a robust cooling system, air intake filters, a sealed undercarriage, and a sealed and air-conditioned operator cabin. ■



Shantui SD13YS (above) and SD32D bulldozers.



SENNEBOGEN

Sennebogen's 640 HD duty cycle crawler crane features a safe working load of up to 40 t. Powered by a 186 kW Cat diesel engine, the crane can be used in a broad range of applications.

With a maximum boom length of 41.1 m and an optional auxiliary jib and fly boom, the Sennebogen 640 HD is ideally equipped for use as a crane. Fitted with a rope grapple or dragline bucket, it is suitable for hydraulic engineering and mining applications. Here, two 12 t freefall winches ensure optimal pulling force. These winches are also available in a heavy duty 16 t version.

The Sennebogen 640 HD is stable and secure on its 700 mm three-grouser base plates. The compact dimension and simple ballast mounting system save time and money when transporting between construction sites. With the crawler undercarriage telescoped in, the crane has a width of just 3 m. With an uppercarriage length of 6.62 m, it can be transported easily and cost-effectively using a flatbed trailer. The total weight with the lower boom section is just 38.7 t, which can be further reduced to 30.5 t.

The Maxcab comfort cab offers an ergonomic work environment for the operator. Numerous headlights and supplemental surrounding cameras ensure a convenient all-around view and high level of safety. The Sencon diagnostic and control system supports the operator in daily operation. As an option, the cab can be designed for 15 degree inclination or 2.70 m elevation to enable a better view of attachment and work environment. ■



Sennebogen 640 HD duty cycle crawler crane.

VOLVO

The new L28F compact wheel loader from Volvo Construction Equipment (Volvo CE) features a bucket capacity of 1 cu m and can carry a fork payload of up to 2,200 kg, making it suitable for a wide range of applications. All components have been rigorously selected to work in harmony, and the heavy-duty powertrain, Z-bar linkage and robust hydraulics enable the use of a variety of attachments, from forks and buckets to material handling arms, for maximum versatility.

With a maximum height of 2.5 m (with standard tyres), the L28F provides easy access to confined working spaces, and the compact design and short turning radius allow for excellent manoeuvrability. For outstanding traction, the wheel loader features large tyres, 100 percent differential locks on the front and rear axles and an articulating oscillating joint which maintains 100 percent ground contact. This ensures stability in rough terrain, while maintaining superior operator comfort when operating on uneven ground.

The L28F offers ergonomic controls and a dashboard that is easy to read for quick familiarisation with the machine. The large glazed surface area on all four sides of the cab and an optional in-cab rear-view mirror allow for a comprehensive view of the jobsite. An optional driveline shut-off feature has been incorporated for enhanced operator safety – if the belt isn't plugged in or if the parking brake is engaged then the powertrain won't start.



Volvo L28F compact wheel loader.

In addition, the L28F ensures 500 hour intervals between engine oil changes, and 1,500 hours between hydraulic oil changes, both easily accomplished through the built-in drain valves and hose extension. The large engine bay provides excellent ground-level access to the air filter, hydraulic filter, engine oil filter, fuel filter and a transparent water separator, enabling early detection of fuel contamination to reduce potential downtime. ■

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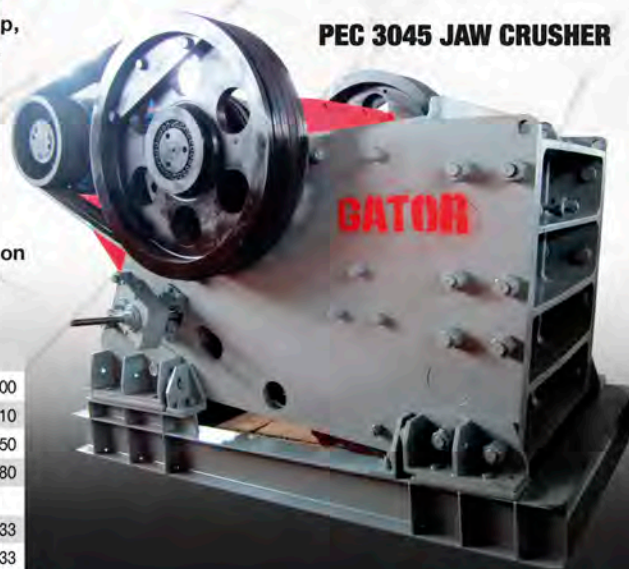
All PEC jaw crushers are of the single-toggle type with a deep, symmetrical crushing chamber and easy setting adjustment. Each model has a large feed opening for its size and an ideal nip angle, giving smooth material flow, high reduction efficiency and high capacity. Their simple design conceals many advanced features that give easy operation, simple maintenance, long life and a low cost per ton.

The unique rubber footings and body-carried motor installation brings great benefits for foundation works and investment.

Specifications

Feed Opening	30" x 45"	Weight (LBS)	
Discharge setting	3" to 8"	Crusher	48500
Maximum feed size	25"	Flywheel	2010
Production range	125 to 500TPH	Swing jaw die	2050
Rotor speed	300 RPM	Fixed jaw die	2680
Required horsepower	150HP	Bearing information	
Fixed jaw length	64-5/8"	Pitman bearing No.	24056 CA/W33
Swing jaw length	56-1/2"	Frame bearing No.	23152 CAK/W33

PEC 3045 JAW CRUSHER



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AMMANN

Ammann's APH 110-95 vibratory plate extends the company's portfolio of triple-shaft high-performance compactors. With a centrifugal force of 110 kN, this is the most powerful vibratory plate ever built by Ammann.

Thanks to the fully hydraulic enclosed drive system with no V-belts and no centrifugal clutch, there are no wearing parts in the drive. As a result, the APH 110-95 can operate smoothly, even under the most adverse conditions, said Ammann. The vibratory plate is driven by a water-cooled Kubota D1105 3-cylinder diesel engine.

At a working speed of 37 m/min and a working width of up to 95 cm, the APH 110-95 can achieve surface coverage of 2,109 sq m per hour. That is equal to the performance of a 7-t single drum roller, according to Ammann. The vibratory plate has an operating weight of 825 kg and a frequency of 48 Hz. ■

Ammann APH 110-95 vibratory plate.



PAVELAB

The 75-PV50A15 pave analyzer extractor from Pavelab Systems - the asphalt division of Controls Group - is designed for separation and extraction of bitumen, filler and aggregates from asphalt samples by use of solvents. It represents the second generation of automatic closed loop bitumen and binder extractor developed by Pavelab Systems.

The unit has been equipped with key features that ensure the most convenient testing conditions in a healthy environment (neither fumes nor noises). It is used either to determine the binder content or to recover, using a rotary evaporator, a representative bitumen

sample used to perform other tests such as penetration, softening point, etc. Furthermore, aggregates including filler, are also separated, not disturbed by high temperatures and available for sample grading. ■



The 75-PV50A15 pave analyzer extractor from Pavelab Systems.

PALFINGER

The new Palfinger P280AXE access platform has a total length of 6.89 m, a gross weight of no more than 6 t, a working height of 28 m and a maximum lateral reach of 15 m. With a smaller stabilisation area, the P280AXE determines the maximum range depending on the situation. This ensures safety and makes it easy to obtain the maximum reach from tight conditions.

Regardless of the stabilisation width, the boom can be rotated 360° and the basket itself 90° left and right. The collision protection provides protection for the operator. It prevents collisions between the platform and cab and the individual components of the platform itself. ■



Palfinger P280AXE access platform.

DRESSTA

Dressta unveiled the new TD9 hydrostatic crawler dozer. This is the first of its three new world-class models that range from 74 to 101 net hp, powered by Cummins engines. The TD9 is expected to be launched in the third quarter of 2015.

Dressta's variable bi-directional dual path hydrostatic drive is controlled by a programmable electronic control module. This provides an excellent match between load and ground speed, regardless of the ground condition or specific dozing application. The result ensures that operators have full command during the most challenging of tasks, such as when dozing with a full load or performing precise final grade operations.

The operators have the ability to adjust the presets of the tractor to meet the requirements of the task at hand. They can choose to programme variables such as forward to reverse speed ratio, or enable 'power', 'normal' and 'economy' modes depending on the job conditions. The versatility to choose between different modes and the flexible speed control provide both enhanced productivity and excellent grade accuracy.

Independent track control delivers the required speed changes to each side and allows for smooth, full-power turns. On-site manoeuvrability and job performance are further strengthened by the stable counter-rotation feature, whilst the low centre of gravity delivers stable and safe operation when working on slopes or in rugged terrain.

The ergonomics of the cab and an intuitive, highly-responsive control system make operating the new TD9 a delight for the operator. The newly designed ISO-mounted operator cab with positive pressure features a comfortable interior space that is protected by a robust external ROPS for optimal safety. A fully adjustable operator seat provides the user with ample leg room and ease of access to all controls.

The cabin's large glass windows provide good visibility to the outside environment, blade corners and rear of the tracks. Control grips have been designed so that the user can comfortably operate the machine for hours, and are designed for the ease of operation whether wearing heavy gloves or not. The hand wrap controls are designed to reduce the risk of the operator's hands slipping from the levers, particularly when working in hazardous environments such as on steep slopes. In addition, the new heating and air conditioning system features multiple vents to provide large volumes of fresh air quietly and efficiently in order to maintain the operator's desired working temperature.


As well as providing a comfortable internal environment, Dressta has developed the machine to be highly responsive to the operator's wishes. Ensuring the crawler dozer performs as a mechanical extension of the operator's skill was an essential consideration in the design. In achieving this, the hydraulic controls have been tuned to perform seamlessly at the command of the operator so they can perform long hours of fatigue-free usage. For the additional benefit of the operator, the machines are supplied both GPS and Trimble-ready to help them achieve the requirements of any given task.





Dressta's new compact dozers are designed for a wide range of applications, from power dozing and site preparation, to landscaping, final grade and fine-finishing jobs around houses. ■




Dressta TD9 hydrostatic crawler dozer.

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BOMAG

Bomag's new BM 2000/75 cold planer features a milling width of 2,000 mm, milling power of 75 hp and an operating weight of 36 t. It is ideal for use on major construction sites such as motorways and airports.

Thanks to the variable milling range - Powerdrum, standard and fine milling rotor – the cold planer can also work on many other applications. The machine's power is efficiently transferred to the milling drum by adjustable milling and travel speeds. The design of the milling drum, the precisely positioned tool holder system and the cutting tools ensure the maximum transfer of forces into the asphalt for efficient use of the machine's capability.

The BMS 15 exchange holder system produces outstanding rotational behaviour of the cutting tool and low wear and high output since the cutting tools can be quickly replaced by knocking out from behind. This reduces downtime and increases the planer's productivity.

The integrated dust extraction system filters the fine dust by means of a vacuum in the milling box. Thanks to the air line's enlarged cross-section, the system runs with a reduced suction speed resulting in quiet and maintenance-free operation. Extended crawler tracks improve traction and stability.

The completely vibration insulated operator stand is designed so that the driver can sit and work comfortably and always has an optimum view of the milling edge. Service components are easily accessible and, due to their location, can be maintained quickly



Bomag BM 2000/75 cold planer.

and simply. This applies to the tanks, service points in the engine compartment and work on the milling drum. A hydraulically folding loading belt is also fitted as standard on the BM 2000/75.

The Bomag BM 2000/75 cold planer is expected to be at first available for all European markets and worldwide by the end of the year. ■

KOBELCO

Kobelco G-series crawler cranes are equipped with 'G Mode' to help conserve energy. The winch in this series allows for maximum speed, even at low idle, to save energy. The Auto Idle Stop function will stop the engine on the crane when it is idling, reducing emissions and saving fuel. The G-series features a compact structure for transportability, a large cab design, an LMI touch screen, an improved counterweight self-installation mechanism and an optional counterweight detection device.

The CKE1350G has a maximum lifting capacity of 135 t at 4.5 m, with a boom length ranging from 15.2 to 76.2 m. Its fixed jib offers a maximum lifting capacity of 27 t and the luffing jib features a maximum lifting capacity of 36 t. The main and auxiliary winches have a maximum line speed of 120 m/min and a rated single-line line pull of 132 kN. The crane has an operating weight of 136 t, a transport weight of 32,430 kg and a counterweight of 55,000 kg. It travels at 1.3 km/h.

The CKE2500G has a maximum lifting capacity of 250 t at 4.6 m, with a boom length ranging from 15.2 to 91.4 m. Its fixed jib offers a maximum lifting capacity of 27 t and the luffing jib features a maximum lifting capacity of 80 t. The main and auxiliary winches have a maximum line speed of 110 m/min and a rated single-line line pull of 132 kN. The crane and has an operating weight of 217 t, a transport weight of 44,960 kg and a counterweight of 90,400 kg. It travels at 1.0 km/h.

Both models are powered by a 271 kW, 1,850 rpm, four-cycle,



Kobelco CKE2500G crawler crane.

water-cooled, vertical inline, direct-injection, turbo-charged Hino engine with an intercooler.

In addition, the Kobelco Remote Observation Satellite system (KCross), which allows remote monitoring of the unit from the owner's desktop, is standard on all G-series models. ■

SKYJACK

The new Skyjack SJ86T telescopic boom lift with jib features a working height of 23.21 m and a horizontal outreach of 23.42 m. The jib has a range of +65 degrees to -60 degrees and features optimised designs that improve its strength.

A key feature of the SJ86T is its dual capacity capabilities. With a two to three person capacity rating that increases productivity, the SJ86T makes a great addition to any fleet. This telescopic boom lift provides an unrestricted platform capacity of 227 kg and a restricted capacity of 341 kg.

The default is restricted capacity. Lights on the control boxes on the base and platform indicate which zone the operator can be in. Once the platform reaches the restricted area, the amber light flashes to notify the operator that they have reached the limit of the restricted area. The operator must then switch the toggle to the restricted capacity before moving into that zone.

The SJ86T is specially designed to offer customers low lifecycle costs as well as a greater return on their investment. This model also shares components with other Skyjack models - including the axels, relay-based control system, fibreglass cowlings and modular platform railings.

All Skyjack machines are designed around the company's Simply Reliable philosophy. Troubleshooting and maintenance are made



Skyjack SJ86T telescopic boom lift.

easy through the use of Skyjack's colour coded and numbered wiring system - Skycoded. In addition, using an analogue-based control system allows Skyjack aerial work platforms to operate using a simplified system, ensuring less maintenance and lower costs. ■

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ATN

The new ATN Mygale 23 (MG23) is a compact and lightweight spider lift with a 23 m working height, featuring a telescopic riser, telescopic top boom, articulated jib and a 'speed-up' system that enables the user to rise from 0 to 23 m in under 1 minute. Equipped with both a Kubota diesel engine and AC power, the MG23 provides the flexibility of bi-energy allowing operation outside and inside of buildings.

The MG23 comes with a visual self-diagnostic system as standard. With a stowed width of only 1.19 m, a gross weight of 3,100 kg, low ground pressure and non-marking tracks the MG23 is ideal for use in areas with difficult access and restricted or challenging ground conditions.

The Piaf 1010 is designed based on the popular Piaf 1000R self-propelled mast boom, which replaces the wheels of the P1000R with non-marking tracks. As a result, the Piaf 1010 can be used in areas requiring low ground pressure or rough terrain capabilities. This new model completes the range of Piaf on tracks, with the existing Piaf 810.

The Piaf 660R adds a stock picking facility to the range; this latest development of the ultra-compact electric self-propelled mast lift features a height adjustable load tray with an 80 kg capacity, suitable for warehouse, logistics and retail environments. ■



ATN MG 23 spider lift.



ATN Piaf 1010 mast boom lift.

VOLVO PENTA

Volvo Penta's latest additions to its engine lineup include the new 5- and 8-l off-road diesel engines, featuring a newly designed platform. Displacement has been increased compared to previous versions, and the new engines offer improved engine block stiffness, as well as higher torque at low speed. But despite a larger displacement, fuel consumption is reduced by as much as 2.5 percent.

The new D5 and D8 engines are available to meet Stage II/ Tier 2, Stage IIIA/Tier 3 equivalent and Tier 4 Final/Stage IV emissions standards. All of Volvo Penta's engines, regardless of emission stage, share a common footprint, with components like the turbocharger located in the same place on all models - making design and installation easier for OEMs. ■



The D8 engine.

LIUGONG

The LiuGong E-series excavators - comprising the 922E, 925E and 930E models - are equipped with Cummins 6.7 l engines in compliance with EU Stage 3B regulations, with net power of 117 kW@2,000 rpm for the 922E, 129 kW@2,000 rpm for the 925E and 147 kW@1,900 rpm for the 930E.

The smaller 922E has an operating weight of 22,000 kg and a maximum digging depth of 6,595 mm; the 925E has an operating weight of 25,500 kg and a maximum digging depth of 6,925 mm; and the 930E has an operating weight of 31,300 kg and a maximum digging depth of 7,300 mm.

In the new E-series, the engine features Cummins VGTTM Turbocharger technology, which continuously adjusts the vehicle's airflow boost to precisely match engine rpm and load demands to achieve a higher working efficiency. The intelligent power control (IPC) system and a highly sensitive hydraulic system work together to reduce fuel consumption while increasing productivity. Six working modes optimise the machine's working performance.

The E-series' ROPS cab features expansive legroom, a new multi-function LCD monitor, an automatic air conditioner, increased visibility and large storage space.

In addition, LiuGong's new 856H wheel loader is powered by a Cummins QSB6.7 engine and adopts mature variable geometry turbocharger technology to provide excellent torque. The high pressure common rail fuel injection system improves injection pressure and optimises fuel consumption. With this powerful engine, the 856H can work in extreme conditions in Europe and the rest of the world.

Modern ZF technology is applied in the driveline system, and the 856H features a ZF AP3000 wet axle with strong carrying capacity. The axle housing and main transmission system are reinforced to improve strength and anti-load capacity, with carrying capacity being increased by 40 percent from the previous model. It has a long service life, with average life cycle being increased by 250 percent. The ZF 4WG200 transmission works efficiently with the machine to achieve an optimal power output. An automatic shift transmission with kick down function and electric proportional FNR lever make operating more convenient and reduce operator fatigue.

The 856H's new cab design allows for improved visibility to the work tool and improves all-around visibility for safety. The cab is ROPS and FOPS certified in compliance with ISO3471 and ISO3449 safety standards. ■



LiuGong 922E excavator (above) and 856H wheel loader.



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CENTER ROCK

Center Rock Inc is a US-based manufacturer of downhole drills and bits located in Berlin, Pennsylvania. The company offers drill bits with a full range of face and head designs, button insert configurations and shank styles in many sizes to meet various application requirements.

According to Center Rock, the company uses 100 percent American premium alloy steel and high quality tungsten carbide/polycrystalline diamond carbides as raw materials for its drill bits. Center Rock bits are also heat treated and shot peened during the manufacturing process to deliver a durable and reliable balance of strength and toughness. Large bit forgings are individually ultrasonically tested and screened for inclusions and flaws to ensure longevity and peak performance in tough drilling environments. In the design process, the company uses advanced flow simulation to create a product with improved chip removal features, smooth rotation and enhanced wear characteristics. ■

Center Rock offers a wide range of downhole drills and bits.



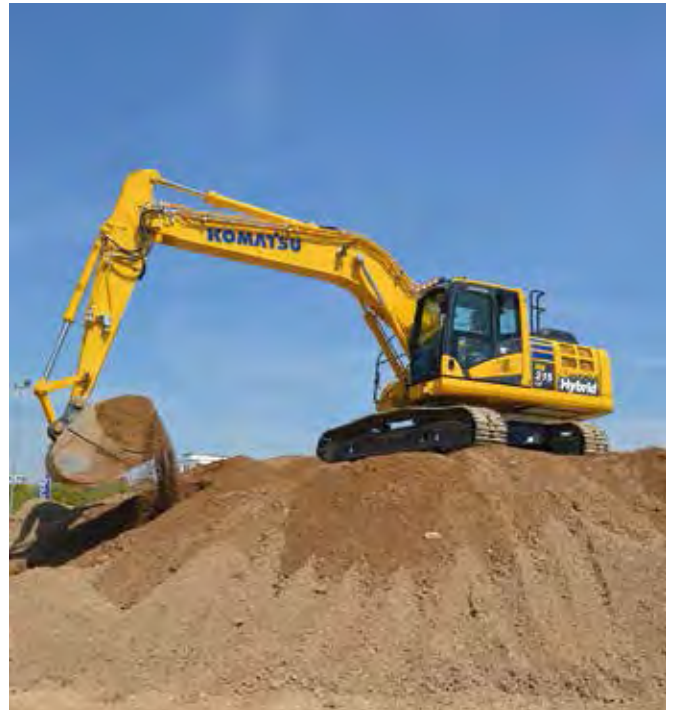
KOMATSU

The new HB215LC-2 hybrid hydraulic excavator is a 'third generation' hybrid model from Komatsu, with an increased operating weight of 22,550 kg and a bucket capacity of 1.68 cu m. It is powered by Komatsu's hybrid system, which works on the principle of swing energy regeneration and energy storage. It includes Komatsu's electric swing motor, power generator motor, ultra capacitor and a 104 kW SAA4D107E-2-A diesel engine. Komatsu's ultra capacitor provides fast energy storage and instantaneous power transmission.

The kinetic energy generated during the swing-braking phase is converted to electricity, which is sent through an inverter and captured by the ultra capacitor. When accelerating under workload conditions the captured energy is discharged quickly for upper structure rotation and to assist the engine as commanded by the hybrid controller. The reserve power stored by the hybrid technology represents additional horsepower that is available to maximise machine performance by supporting the engine, or is used for swing power.

The latest Komtrax technology on the HB215LC-2 sends machine operating information to a secure website utilising wireless technology. Data such as operating hours, fuel consumption, location, cautions and maintenance alerts are relayed to the web application for analysis. The Komtrax fleet monitoring system increases machine availability, reduces the risk of machine theft, allows for remote diagnosis by the distributor and provides other information to drive business efficiency and productivity.

The ROPS-certified cab provides a more comfortable and quieter work environment to help operators maximise productivity. The cab is mounted on viscous isolation dampers that help provide low vibration levels. A higher capacity air suspension high back seat and heat are standard for improved comfort. A high resolution 7-in LCD colour monitor features enhanced capabilities and the operator can easily select up to six working modes to match machine performance



Komatsu HB215LC-2 hybrid hydraulic excavator.

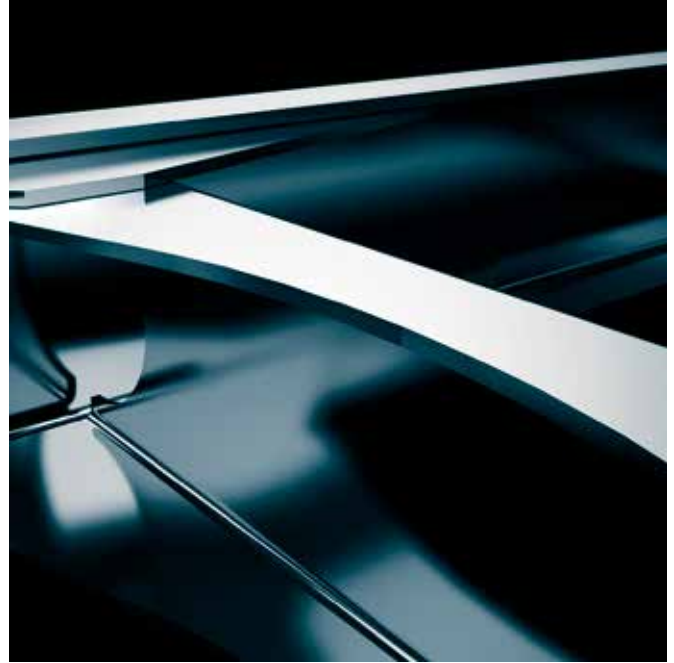
to the application. The monitor panel provides information on ECO guidance, operational records, fuel consumption history and utilisation information. A standard rear-view camera with a wide landscape display allows the operator to view directly behind the machine. ■

SSAB

Strenx is a new, high-strength structural steel product brand from SSAB. It is designed for sectors where structural strength and weight savings are key competitive factors, especially in the lifting, handling and transportation industry. It is also suitable for construction, rolling stock, offshore and agriculture sectors, as well as for the frames of heavy mobile machines. Customers are now able to design more competitive and sustainable products – cranes that reach further, trailers that carry more payload, trucks that use less fuel, etc.

Strenx covers the three product brands - Optim, Weldox and Domex - that are well-known trademarks of SSAB and the former Ruukki. According to SSAB, Strenx features the world's widest choice of high-strength structural steels in terms of strength and dimensional range. Yield strengths range from 600 to 1,300 Mpa, which is believed to be the strongest steel available on the market. Strenx is available in plate, strip and tubular products in thicknesses ranging from 0.7 to 160 mm. ■

Strenx is a new, high-strength structural steel product brand from SSAB. It is designed for sectors where structural strength and weight savings are key competitive factors.



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GENIE

The Genie SX-180 boom lift is one of the highest reaching machines of its kind on the market. Providing the benefits of both vertical and horizontal jib rotation to position workers and gear exactly where they are needed, this machine combines the benefits of high-precision access and placement up to 56.86 m, with a horizontal outreach of up to 24.4 m. Thanks to its compact Genie X-chassis system, the axles of the Genie SX-180 boom lift are rapidly extendable and retractable to combine the stability required on the job with a narrow profile for ease of transport.

The Genie Z-62/40 boom lift benefits from significant improvements compared to its predecessor Z-60/34. The Z-62/40 diesel powered boom lift increases working height from 20.39 to 20.87 m and horizontal outreach from 11.05 to 12.47 m. Providing a maximum lift capacity of 227 kg, up-and-over clearance has also been increased from 7.80 to 8.13 m. Further enhancements include zero rear tail swing, reduced front turntable swing in stowed position, plus the ability to reach 1.68 m below grade. All of these features are available on a diesel-powered machine that weighs only 10,430 kg and stows to the compact size of 7.58 m with the jib in folded position. ■



Genie SX-180 (above) and Z-62/40 boom lifts.



BAUER

The BG 30 ValueLine rotary drilling rig from Bauer has been optimised for Kelly drilling. The BT 80 base carrier was designed and built by Bauer. A rotary drive with a maximum torque of 300 kNm makes it possible to drill with a diameter of up to 2,500 mm. Using a four-part kelly bar, it is possible to reach drilling depths of 68 m; with a five-part kelly bar, a depth of 87 m is even possible. Temporary casings can be installed directly using the rotary drive. In difficult conditions, a BTM torque converter or a casing oscillator can also be retrofitted.

In addition, an integrated service platform enables easy and safe access for all maintenance work in the uppercarriage. There is a metal grating step that is connected to part of the side panelling and that is pulled out from the uppercarriage. The side panelling serves as protection against falling.

The crowd cylinder is installed 'in reverse'. The hydraulic lines that supply the crowd cylinder stop at the other end of the cylinder. Uncoupling the lines when disassembling the rig is no longer necessary. This 'reverse' installation solution makes disassembly easier and eliminates the risk of oil leaking on the couplings. The mast can be tilted forwards during rigging procedure whereby the permissible inclination will be shown on the mast inclination system. In this position, all hydraulic hoses of the rotary drive can be connected up from the ground surface. ■



Bauer BG 30 ValueLine rotary drilling rig.



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HAULOTTE

The new Haulotte HA20 RTJ rough-terrain articulated boom lift features a working height of 20.6 m, a horizontal outreach of 12.1 m and an up and over clearance of 8.1 m. It offers a lifting speed of 48 seconds.

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 is very compact. According to Haulotte, two units of HA20 RTJ can be transported on a low flat bed trailer.

The HA20 RTJ is designed with anti-corrosion treatment, which has been applied on all pivot points and non-painted parts, thus increasing its durability. There is also pre-diagnostic screen and plugs to enable the connection to Haulotte Diag in order to receive an advanced diagnosis when needed.

To alert the operator to the potential risk of overhead trapping or crushing, the HA20 RTJ is fitted with the Haulotte ACTIV[®]Shield Bar secondary guarding device. ■

Haulotte HA20 RTJ articulated boom lift.



BESSER

The new Besser Megapac machine features a large pallet size with traditional Besser harmonic vibration. It is outfitted with two servo motors that provide control of vibration frequency. According to Besser, product height changes are accomplished in 5 minutes or less, and complete mould and height changes are completed in 15 minutes or less. The Megapac produces eight 200 mm x 200 mm x 400 mm concrete units per cycle, from 25 to 300 mm, including standard, architectural and hardscape units at up to 7 cycles per minute.

In addition, the Bescopac machine is known for its small footprint, low cost and the ability to produce standard, architectural and hardscape units, from 60 to 250 mm highly desirable. It boasts a production rate of up to 1,080 units per hour.

Besser also offers a range of machines to produce pipes in varying diameters and lengths. The BiDi Advantage Series machine produces pipes in diameters from 200 to 3,134 mm and in lengths from 2.5 to 3.5 m. Advantage machines combine advanced pipe-making technology with the Bidirectional Rollerhead system to produce pipes with excellent wire-to-concrete bond, improved compaction and superior appearance. High production Advantage machines manufacture pipes in uniform lengths with precise joint detail and quality inside and outside finish. Reinforcing cage twist problems are eliminated, leading to higher product strengths.

Manufacturing dry cast products is simple with the Vibro-Mac machine, which offers producers a versatile, high production system to make such products and shapes as elliptical, arch, round, pre-bed, jacking and PVC protective-lined pipes, box culverts and manhole products. Steel end ring, tongue and groove, profile gasket, confined O-Ring, bevel and big bell R-4 pipes can also be produced on one or more of the machine's stations.

Producing three different pipe sizes or shapes in a single



The Bescopac machine from Besser.

production run, the Besser Tri-Cast machine provides excellent flexibility to producers serving this market. The machine manufactures round, arch and elliptical pipes, box culverts, utility vaults and manhole products such as risers, eccentric and concentric cones and catch basins. Tri-Cast machines are available to produce pipes with a diameter of 300-1,800 mm and maximum lengths of 2.5 m or 3.5 m. ■



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TEREX CRANES

The new Terex CTT 182-8 flat top tower crane features a maximum capacity of 8 t. It delivers over 5 percent increase in lift capacity at its maximum 65 m jib length when compared to the previous model. Improvements to the winch mechanism elevates maximum hoist speeds by up to 31 percent for faster lift cycles, while an AC engine with inverter provides improved manoeuvrability and higher lifting precision. New electrical box positioning and grouping of internal electrical components simplifies maintenance and offers increased reliability in all weather conditions without the need for low-temperature equipment.

Designed for use in a variety of applications from residential buildings to major infrastructure projects, the CTT 182-8 tower crane offers a load moment of 180 mt. Its main jib can be configured with a variety of lengths from 35 to 65 m, in 5 m increments, and offers a 2 t capacity at its maximum jib length. Available in a variety of heights and combinations to meet jobsite demands, the crane offers a maximum freestanding height of 67.2 m. Other advantages include the modular design of its jib, common counter-jib ballast, and fast and easy transport and set-up.

In addition, the Terex Explorer 5600 all terrain crane features a new capacity calculating system, which significantly boosts lift capacities especially over the outriggers, compared to 360-degree lifting capacities. Load charts are calculated for every boom position, subject to slewing angle of the superstructure, which may increase capacities up to more than 200 percent when operating over the outriggers. The new capacity calculation system allows the crane operator to position outriggers independently and asymmetrically. It also features an enhanced visualisation to easily provide the crane operator with additional information on capacity in relation to the boom position.

Companies now have greater flexibility, allowing the same type of lifts to be accomplished with less counterweight to save on transport costs. The system detects the amount of counterweight on the crane body and automatically slows and eventually stops slewing movements when the boom moves beyond the designed lifting area, providing safe operation.



The Explorer 5600 offers a total length of just 14.3 m and a carrier width of only 2.75 m. Thus it is very compact, resulting in excellent manoeuvrability. The crane's unique single-engine concept enhances performance of both road travel and lifting, while lowering operating costs through low fuel consumption and reduced maintenance. The crane also offers many features to increase its roadability, including an axle load of less than 9.1/12/16.5 t per axle with 2,440 mm space between axles and a maximum of 1.4 m front overhang. ■

Terex CTT 182-8 flat top tower crane (top) and Explorer 5600 all terrain crane.



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CASE

The new C-series graders from Case Construction Equipment offer two models with operating weights of 13 and 16 t. They are available in 6x4 and 6x6 All Wheel Drive versions. These graders provide operators with a comfortable ride, outstanding controllability and a good feel for the precision of the controls. The Ergopower transmission with torque converter and automatic mode ensures smooth shifting and matches perfectly the speed and power to the application for perfect controllability and smooth operation.

The 13 t model is available with 24-in tyres independently of the choice of transmission. These bigger tyres reduce the bumping effect on uneven terrain and in applications such as road maintenance and forestry, adding to the operator's comfort.

The load sensing hydraulic system's pressure compensation allows simultaneous movement, which is key to the grader's controllability. The control levers are directly connected to the main valve and the lever stroke required to activate the functions is shorter. As a result, the operator enjoys a faster blade reaction that gives a better feel for the blade's action, and the controllability of the mouldboard controllability is maintained for the whole duration of the grader's life.

The encapsulated roller-mounted slewing ring, which further adds to the grader's controllability, does not require regular greasing and setting, while the layout of the hydraulic system's components provides excellent accessibility to the main components for servicing.

To guarantee reliability for the exuberant drawbar pull, the mouldboard frame is designed with 'A-shape' technology that enables to always compensate the traction effort, drastically reducing the twisting effect when the grader is working with the blade off-set. The exclusive design of the multi radius blade dramatically cuts the demand for pushing power, increasing the material mixing capacity on fine grading jobs.



The C-series grader from Case.

The 'No-Spin' technology of the 100 percent differential lock ensures that the power is automatically transferred between the two sides of the tandem whenever there is a loss of traction, resulting in best-in-class drawbar pull in all soil conditions. The C-series' outstanding traction is also due to the positioning of the cab at the rear of the machine and on top of the tandem. This set up has the added benefit of greater comfort for the operator, who is always facing the working direction.

The two All Wheel Drive models feature a standard creep mode with fully integrated electronic control that gives the machine great controllability when carrying out precision work and in applications such as compaction that require high engine rpm at low speed. In creep mode the engine speed can be unconnected to linear speed so the required oil flow can be supplied independently. ■

CUMMINS

Cummins Emission Solutions, specialising in aftertreatment technologies, introduced the first of its next generation of aftertreatment platforms for future emissions regulations, the EcoFit Single Module. This platform product is a potential solution designed to meet Stage V requirements in a small, lightweight, simple and robust advanced aftertreatment system package.

The EcoFit Single Module, designed for heavy-duty and midrange engine applications, is up to 60 percent smaller and 40 percent lighter compared to today's combined SCR and DPF systems while achieving advanced emissions reductions levels. The system enables easier equipment integration for OEM customers, and its lower

weight minimises the impact on equipment weight, which will contribute towards improving fuel economy.

Advancements in catalyst technologies are enabling efficiency improvements throughout the entire system and Cummins Emissions Solutions has invested in diesel particulate filter technologies with higher ash capacities, allowing for more time between cleaning intervals for its customers. The SCR catalysts, coupled with the EcoFit UL2 Liquid-Only Urea Dosing System, offer enhanced NO_x reduction and, linked with improved thermal management capability, deliver the optimum solution for emissions reduction and minimised fuel and AdBlue usage. ■



The EcoFit Single Module is the first of Cummins' next generation of aftertreatment platforms for future emissions regulations.

CARMIX

The Carmix 3.5 TT self-loading concrete mixer features a length of just over 5 m with the front loader raised, making it ideal for use in limited areas. It can also rotate the barrel at 300° to load from over 2 m high on all four sides of the machine. The short turning radius (1,700 mm internally and 3,700 mm externally) ensures great manoeuvrability on site. The machine has an output of 3.5 cu m and can operate on slopes up to 30 percent even when fully loaded.

The Carmix 3.5 TT is equipped with Promix, a new digital data monitoring system for concrete. It allows operators to control the machine accurately, with data updates every 10 seconds on the slump, temperature, humidity, rotational speed of the mixer and an indication showing the mixture is ready. The information can be saved to an external computer or sent to other mobile devices over the GPS network.

The ability to monitor numerous parameters quickly and effectively allows direct control over product quality and ensures that this quality is maintained over time, for every batch. The Carmix 3.5 TT is said to be the first in the series that features Promix. The system is also available on the 5.5 XL and 2.5 TT models. ■



Carmix 3.5 TT concrete mixer.

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TEREX TRUCKS

Terex Trucks' 28 t TA300 and 38 t TA400 articulated dump trucks are designed to keep downtime to a minimum in the toughest of conditions. The oil-immersed brake disc system has a fully enclosed, straightforward design that keeps maintenance easy and minimal, allowing for longer service intervals. Further efforts have been made to make service quick and easy with ground level service access points, an electronic raising hood and a fully tilting cab.

The Terex articulated dump trucks offer excellent driver comfort and control thanks to reduced interior cab noise levels, new control positions for ease of operation, and improved heating, ventilation and air conditioning. The new cab instrumentation is designed specifically for off-highway applications.

The TA300 is fitted with an independent front suspension system, an improved powershift transmission and a hydrodynamic retarder for more control during descents. The six forward/three reverse transmission provides a maximum forward speed of 50 km/h and 30 km/h in reverse.

Fully independent front suspension comes as standard in the TA300 and as an option in the TA250, enhancing truck operator comfort and ride quality. This innovative design enables improved productivity and stability in rough terrain environments. The bogie beam rear suspension system is also fitted on all Terex articulated dump trucks, improving ride quality and ensuring minimal maintenance, therefore reducing downtime.

The TA400 is the highest capacity machine in the Terex articulated hauler range and delivers a heavy-duty, efficient performance in all conditions. It is built to meet the demands of most extreme operations, from quarries to mining.

The TA400 is now equipped with the latest generation of transmission controls that incorporate adaptive shift schedules for consistent smooth shifting on all haul conditions. As a result, machine momentum is maintained and productivity increased, while operational costs are lowered thanks to efficient fuel consumption.

Furthermore, machine downtime can be reduced with on-board prognosis for preventative maintenance and minimal service intervention time. A six-stage modulating transmission retarder enables safe downhill speed and preserves the life of the primary service brakes. The TA400 transmission is also installed with the latest lubrication oil specification that extends oil service periods to 6,000 hours, further reducing operational costs.

Terex Trucks' rigid dump trucks are developed with the perfect balance of power, effective gearing and optimum weight distribution in order to provide excellent productivity in the most demanding jobsites. They range from the 41 t capacity TR45, to the TR100. The TR100 is the highest capacity truck produced by the Scotland-based manufacturer, with a 91-t payload capacity.

The trucks' abrasive-resistant body with exhaust heating ensures cleaner dumping and limiting carry-back that enhances productivity. A long 15° sloping tail chute gives good load retention and permits controlled dumping. The trucks' spacious cab is ergonomically designed for operator safety, comfort and productivity. Onboard diagnostics and centralised hydraulic test points are in place to reduce downtime.

The Shift Energy Management (SEM) system in Terex rigid haulers provides better engine/transmission integration by electronically controlling engine torque during gear shifting. This smooth acceleration and gear shifting optimises haul cycles times,



Terex TA300 articulated dump truck (above) and TR100 rigid dump truck.



and enhances operator comfort. The trucks utilise a force-cooled multi-disc brake system that provides safe control, with an integral fail-safe secondary park/emergency brake.

Terex rigid dump trucks feature two individual retarders, giving the operator the flexibility to select the optimum retardation for various applications and conditions, which in turn enables safer operation and greater operator control. The transmission retarder preserves the primary braking system. The trucks also feature excellent weight distribution, representing lower ton kilometre per hour (TKPH) promoting extended tyre life.

The high performance heavy-duty engine fitted in Terex rigid dump trucks has been calibrated specifically for hauler applications. With extended overhaul intervals, the trucks offer outstanding productivity and low ownership cost. Combined with a robust drivetrain and rear axle gearing, they provide excellent traction, rimpull and exceptional reliability on every stretch of haul road. Electronic control and in-cylinder design optimises fuel combustion, ensuring best power delivery and strong fuel economy. ■

HYUNDAI

Weighing in at 1.7 t, the new Hyundai R17Z-9A mini excavator has true zero swing capability and two travel speeds, travelling at 2.2 km/h at the lower end and 4.1 km/h at the higher end of its range. There are two canopy posts offering the operator an optimal work environment. The boom cylinder is placed in the traditional position under the boom.

When fitted with a 960 mm long dipper arm, the R17Z-9A features a maximum digging depth of 2,190 mm. Operators can fully customise their work environment and operating preferences to meet their individual needs. The machine is powered by a Kubota D902 engine rated at 11.7 kW.

The new Hyundai HX300 L crawler excavator weighs in at 30 t and is powered by a Cummins engine. The machine's rear working lights have been positioned in such a way that provides an excellent visibility for the operator. A new machine guard has been installed and the air filters are highly accessible for simple maintenance. The cabin has a new, large front window and the door can be opened easily from the inside with an additional handrail.

The HX series is equipped with a new, large 8-in touchscreen monitor. It is also easy to read and the main view of the screen can be adjusted according to the preferences of the operator. Four different arms are available for the HX300 L as well as a long reach boom



Hyundai R17Z-9A mini excavator.

and arm combination for earthmoving, digging and loading tasks. According to Hyundai, the HX300 L can also be used as a tool carrier for heavy demolition equipment. ■

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LIEBHERR

The 710 HC-L luffing-jib crane from Liebherr is a new development in the 700 mt class and available in two lifting capacity versions: a 50 t version and a version with a maximum lifting capacity of 64 t. The crane features a hook speed of up to 218 m/min.

Quick-release fastenings for the slewing platform, cab and jib, and electrical connectors for the drive units and switchboard plant make the crane easier to erect. Depending on the requirements for site planning, the cab can be installed on the left or right of the slewing platform if the crane climbs externally.

Liebherr has developed a new slim tower system for this crane class, the 24 HC. Due to its high rigidity, a freestanding hook height of up to 74.8 m can be achieved. With its small external dimension of just 2.40 m, it is very suitable when space is at a premium on site. This tower system can be climbed both in the elevator shaft and on the outside of the building.

In addition, Liebherr's new LTC 1050-3.1 is intended to replace the LTC 1045-3.1. Thanks to its active, speed-dependent rear axle steering, the LTC 1050-3.1 has good lane stability at high speed and is very manoeuvrable at low speed. The vehicle dimensions and turning circle radius have not changed compared to its predecessor. This means that the turning circle radius over the telescopic boom with 385/95 R25 (14.00) tyres is just 7.5 m. In constricted areas on the jobsite the boom can be luffed upwards to bring the turning circle of the chassis into play. The chassis length is 8.9 m and can be reduced to 7.7 m by removing the front storage box. Even with 16.00 size tyres the vehicle width stays within 2.55 m.

The LTC 1050-3.1 is designed to be an 'all-in crane' so that its gross weight of 36 t and axle weight of 12 t include the entire counterweight of 6.5 t, the double folding jib, 445/95 R25 (16.00) tyres, Telma eddy current brakes, 6x6 drive and a hook block. As such, the 50-tonner is immediately ready for use when it arrives on site. This model is considerably more powerful than comparable city cranes on the market, said Liebherr. The strong telescopic cylinder and the correspondingly enhanced crane controller allow heavy loads to be telescoped, which is particularly useful for installation work in factory buildings.

The six-piece 8.2 m - 36 m telescopic boom is extended and bolted automatically using the telematic controller, some 10,000 of which have now been fitted. The 7.5 m - 13 m double folding jib includes a 1.5 m assembly jib, which can be set to an angle of up to 60°. The assembly jib and an optional second winch make the LTC 1050-3.1 ideal for assembly work in constricted areas and low industrial buildings. A three-roller compact hook block with a double hook is available to use the perfect hoist heights for these applications. The maximum hoist height is achieved with a hook traverse, which is installed instead of the roller insert in the assembly jib.

In the hydraulic system, the electric 'load-sensing' control ensures accurate operations. Up to four movements can be actuated simultaneously. Depending on the requirements for the lifting task and of the crane driver, the slewing gear can be easily switched from 'open' to 'hydraulically locked'.

The Liebherr LICCON2 crane control features a mobile, multifunctional BTT Bluetooth terminal for setup functions. The crane driver also has the option of attaching and removing the hook block with visual contact via remote control of the hoist winch and the luffing cylinder of the telescopic boom.

With the EComode, the crane driver can set the required



Liebherr 710 HC-L luffing-jib crane (above) and LTC 1050-3.1 compact mobile crane.



working speed using the control lever. The LICCON2 controller then calculates the perfect engine speed for it. This value is set on the crane engine using the engine control unit. The purpose of this adjustment is to reduce fuel consumption and minimise noise emissions.

Another innovative system is the VarioBase variable support base. With this feature, each individual crane support can be extended to any length and the crane operation is then made safe by the load moment limiter within the LICCON controller. ■



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MANITOU

The new MAN'GO 12 access platform from Manitou offers an economical alternative in the 12 m sector. It is driven by the wheel engines. The machine retains its all-terrain character through control and management of the distribution of hydraulic oil in the four-wheel engines and differential hydraulic locking on demand.

The engine is located in the chassis, resulting in a lower centre of gravity and, in turn, helping to make the machine lighter. This design also enables the width of the turret to be reduced, to improve the operator's view of the steering wheels; this significantly increases safety on congested sites.

Instead of a three-part articulated arm supported by two rams, Manitou made the choice of lifting the structure arm driven by a single ram and a system of fulcrums favouring speed of movement. A 1,500 mm jib also improves access to the working zone. This overall structure provides a simplified version of the elevation part, helping to reduce the total cost.

The hydrostatic transmission from Poclain provides flexible and precise machine controls at low speed, and the ability to drive the access platform on very steep slopes. Hydac supplies all hydraulic units and components for optimal distribution at the level of the steering and the structure.

According to Manitou, MAN'GO is lighter and narrower than its competitors. With a weight close to 4 t, the machine is about 1 t lighter, and at 1.80 m width, it is 10 cm narrower. ■



Manitou MAN'GO 12 access platform.

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