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CONSTRUCTION

MARCH - APRIL 2016



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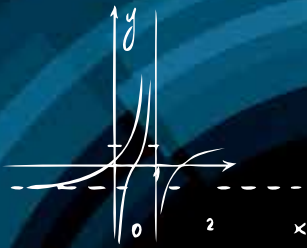
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Tabsakae Granite's quarry in Thailand.

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SOUTHEAST ASIA CONSTRUCTION is published six times a year by:

Trade Link Media Pte Ltd. RCB Registration no: 199204277K
 Address: 101 Lorong 23, #06-04 Prosper House, Singapore 388399
 Tel: +65 6842 2580, Fax: +65 6842 2581 / +65 6745 9517
 Website: www.tradelinkmedia.com.sg
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The magazine is available free-of-charge to applicants in the building and construction industries who meet the publication's terms of control. For those applicants who do not qualify for free subscription, copies will be made available, subject to the acceptance by the publisher, of a subscription fee which varies according to the country of residence of the potential subscriber. Airmail (per year): Singapore - S\$45; Malaysia and Brunei - S\$90; Rest of Asia - S\$140; Japan, Australia, New Zealand, Middle East, Europe and USA - S\$170 (Incl. 7% GST Reg: M2-0108708-2).

Printed in Singapore by Kim Hup Lee Printing Co Pte Ltd.
 MCI (P) 044/06/2015 • ISSN 2345-7082 (Print) and ISSN 2345-7090 (E-periodical) • KDN No: 1560 (1271)-(6)

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JP Nelson Delivered Asia 2nd Largest Vibratory Hammer To Japan

Project Location: Kushiro port, Hokkaido
Project Name: International Strategic Bulk Port

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has begun construction of the International Strategic Bulk Port Project, it is designed to improve port facilities to reduce ocean transportation costs.

200M marks a historical moment for JP Nelson Equipment, it is the first large capacity hydraulic vibratory hammer deployed in Japan. The project is in the middle of the sea with temperature at around -20 degrees temperature. Preparation work must be done to acclimatize the 200M for usage in cold weather conditions.

During operation, oil leaks from the vibrating hammer is not uncommon, while it is tolerated on land it is not acceptable in the sea, with precious wild life at risk, there is a strict zero tolerance to any oil leak. This requirement is one of the most challenging engineering aspect for JP Nelson to tackle. Fortunately, this is not the first vibratory hammer working in the sea for JP Nelson, they reference their past experience to good use and JP Nelson's engineers worked hard to ensure zero leakage.

The contractor has a difficult job to drive 1.6m diameter piles to 73.5m depth and a high N value of 50. The 200M is not only muscle but also has stamina for continuous operation. So far, the performance of the 200M has exceeded all expectation and the job may even complete in half the time! With every second counts especially out in the sea, it is no wonder that the contractor is reportedly very happy with the performance.

PVE 200M has high eccentric moment of 200 kgm and a centrifugal force of 4300 kn. This is a much improved 95 percent increase from its earlier predecessor the 110M. It uses forced lubrication technology to deliver the necessary cooling power for continuous operation. The power pack is also powered by a twin Volvo engine with an oil flow of 1600 litre/min.



Changi Terminal 5 (MOT) / Tuas Boulevard Extension

The ground improvement projects started on year 2015 onwards.

The main scope of this project is soil stabilization to prepare for further construction activities. Water elements present in the soil must be drawn out for compaction. To accomplish this, the construction team will use the PVD manufactured by JP Nelson to construct a Pre-fabricated vertical drain (PVD). Till date, JP Nelson has successfully manufactured and delivered more than 10 units of PVD machine.

There are challenges faced in Singapore on the hard ground conditions on certain areas, traditional PVD machines may not be efficient enough to do the job whereby they will need pre-bore method to loosen the ground before performing the job.

JP Nelson's PVD machines are designed with a mast structure length from 20m ~ 55m equipped with hydraulic torque of 250 kNm ~ 450 kNm. With this high strength, the machine stability cannot be compromised too. Therefore PVD base machine has to be coupled with bigger capacity up to 120ton with long extension crawler track.

Ingenuity is hard to define, but you know it when you see it. At JP Nelson, the company take pride in solving the most difficult technical challenges for their customers.

Aurecon wins Philippines and Vietnam building projects

Aurecon has been appointed by SM Prime Holdings Inc to provide structural engineering design services for the SM Megamall Towers, a new high-rise office building in Metro Manila. Aurecon will work closely with Arquitectonica, the architect on the project, helping the company bring its vision to reality from the concept engineering phase right through design development.

“Our involvement in this exciting project is to provide ingenious engineering solutions that achieve the critical balance between a dependable structure and one that expresses the architect’s aesthetic vision,” said John Webb, Aurecon’s market director - Built Environment, Asia. “One of the biggest challenges with this ambitious architectural design will be addressing the very high loadings from both typhoons and earthquakes that occur in the Philippines.”

The 50-storey SM Megamall Towers development will dominate the heart of Ortigas in Mandaluyong City, a major commercial business district within Metro Manila. The tower’s 124,200 sq m floor area will also feature three levels of underground parking, plus aboveground parking.

Aurecon will lend its structural engineering expertise to four initial phases of the project, including concept design, schematic design, design development and construction documentation review. “The tower is S-shaped in elevation,” said Mr Webb. “And so one of the biggest challenges is developing a structure that can be constructed effectively with edges that move in or out at every level without compromising the ability to withstand seismic activity.”

Landmark 81

Construction of the new Landmark 81 development in Ho Chi Minh City, Vietnam is expected to start soon. Upon completion, the 461.2 m high building is set to be the tallest skyscraper in Vietnam and the sixth tallest in Asia. It will be the focal point of the Vinhomes Central Park development, a multi-purpose urban development commissioned by local company Vincom Group, which will include residential, retail and leisure spaces.

Aurecon is managing all engineering work related to the building services as well as the lighting and the facade of Landmark 81. According to Aurecon, the project is currently at the detailed design stage and the company is developing its plan for the building in close co-operation with the developer, Vincom Group, as well as architect, Atkins; structural engineer, Arup; contractor, Mace; and other key partners.

Included in Aurecon’s remit are all services in the building, including HVAC, electrical, fire protection, plumbing, lightning protection and the elevator system. With tight time pressures on the project, Aurecon was given just three months to develop detailed designs for the building services. The company developed its designs in the Revit platform, which not only allowed it to create the most efficient programmes for the project but also to map their performance using 4D BIM, charting their progression over the building’s lifetime.



© Arquitectonica

The building services design includes a number of notable challenges for the team at Aurecon. For example, for the first time in Vietnam, a central air conditioning system will be integrated into all residential apartments, removing the local condensing units outside individual apartments to deliver a smoother look, explained Aurecon. The HVAC system also has to meet green building standards, so waste heat from the air conditioning units will be recovered and used elsewhere, including in the heating of hot water. Furthermore, in the three basement levels, Aurecon has created a 36,000 sq m system that includes concrete plenums and jet fans along the dividing walls. This set-up eliminates the need for traditional ductwork in the ceiling and increases the available headroom.

In terms of lighting, Aurecon’s work covered all requirements for both the facade and the surrounding landscape, and there is a strong emphasis on energy efficiency. For example, all the luminaires use LEDs for better efficiency, while the plan for the exterior includes suggested use of solar-powered lighting. This will not only reduce overall energy consumption but also minimise the need for wiring.

Several of the facade-mounted luminaires presented a challenge for the lighting team, but as Aurecon was also handling the engineering of the facade, the two internal teams were able to work together to find a solution. Aurecon’s work on the facade was awarded later in the project, but despite the tight timeline, the company was able to deliver a proposal that met all requirements, including some challenging features - such as the all-glass wall entrance that will comprise a 26 m-high glass and stone system with minimal framing members.

The Landmark 81 is scheduled to complete in 2017. It will include a five-star hotel, serviced apartments, residential apartments and retail space over a total floor area of 241,000 sq m. ■



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Top: SM Megamall Towers.
Left: Landmark 81.

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Singapore construction demand 'to be driven by public sector'

Singapore's Building and Construction Authority (BCA) projects that the total construction demand or the value of construction contracts to be awarded this year will be between S\$27 and S\$34 billion, with about 65 percent driven by public sector demand. If the forecasted estimates this year are met, this will be the highest proportion of construction demand from the public sector since 2002, said BCA.

Last year, the total construction demand was approximately S\$27.2 billion, with public sector projects accounting for slightly more than half of the demand. It was slightly lower than BCA's earlier estimates of S\$29 to \$36 billion, due to the rescheduling of a few major public infrastructure contracts such as MRT projects from the fourth quarter of last year to early this year.

On the other hand, the total construction output or progress payments made for the work done in 2015 remained high at about S\$35 billion, due to the strong construction demand in the preceding two years. This contributed to about 4.7 percent of GDP last year.

In 2016, construction demand from the private sector is expected to slow down from previous years due to less favourable economic conditions and an increased supply of completed private housing projects and offices. However, this is supported by a higher construction demand from the public sector, largely due to an increase in civil engineering demand.

Key projects this year will include ramp-up in the Home Improvement Programme for HDB flats, construction of the new National Cancer Centre, State Courts' new building at Havelock Square, JTC's Integrated Logistics Hub, PUB's water reclamation and sewerage projects, Changi Airport's three-runway system (package 2), improvement works to the Kranji Expressway and Pan-Island Expressway, and the remaining contracts for the Thomson-East Coast MRT line.

BCA expects the total construction output in 2016 to moderate to between S\$32 and S\$34 billion, partly due to the lower construction demand in 2015.

The average construction demand is expected to be sustained between S\$26 and S\$35 billion in 2017 and 2018, and S\$26 to S\$37 billion in 2019 and 2020. BCA estimates public sector construction demand to be between S\$16 and S\$20 billion annually from 2017 to 2020, with about 60 percent of the total demand coming from building projects and the remaining from civil engineering projects.

Civil engineering construction demand is expected to remain strong beyond 2016 due to major infrastructure works including the construction of new MRT lines, the North-South Expressway, associated infrastructure works for Changi Airport Terminal 5 and phase 2 of the Deep Tunnel Sewerage System. ■

XCMG strengthens commitment to Indonesian market

XCMG has signed a cooperation agreement with the Indonesian Chamber of Commerce and Industry (ICCI), which will see ICCI become the formal advisor of XCMG in Indonesia and promote XCMG's business development in the country. Both parties will cooperate in infrastructure construction, mineral extraction and processing, manufacturing and some other aspects.

ICCI has over 600 members and branches, including the Indonesia Mineral Processing and Smelting Association, and covers various industries such as construction, mining and shipbuilding, to name a few. Seven ICCI representatives headed by its executive chairman recently visited XCMG's facility and plants for heavy-duty loaders, heavy-duty cranes and excavators.

Furthermore, XCMG and ICBC Indonesia (a financial institution) have also signed a cooperation agreement and organised a forum conference for senior officials from Chinese enterprises in Indonesia. The events took place in the Indonesian capital Jakarta.

The forum conference was to discuss the Chinese government's 'Belt and Road' initiative, aiming to encourage the Chinese enterprises to be involved in the construction industry in Indonesia with the help of Chinese construction machines.

In 2013, the Chinese government proposed the 'Belt and Road' initiative that covers many ASEAN countries, including Indonesia. With significant progresses and achievements made in existing Sino-Indonesian cooperation projects, the forum conference was expected to further enhance the cooperation between XCMG and other Chinese enterprises in Indonesia to jointly make new contributions to the construction industry in Indonesia.

Indonesia is a key market for XCMG in the Southeast Asia region. The company currently has two local dealers in the country, GMT and CINDO. ■



ICCI and XCMG have signed an agreement that will see ICCI become the formal advisor of XCMG in Indonesia and promote XCMG's business development in the country.



XCMG has also signed an agreement with ICBC Indonesia to cooperate on the 'Belt and Road' initiative.



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Centre for Lean & Virtual Construction opens in Singapore

Singapore's Building and Construction Authority (BCA) has established the Centre for Lean & Virtual Construction to further enhance communication, work effectiveness and efficiency among all stakeholders in a construction project. The facility is said to be the first of its kind in Singapore for the built environment sector, and is equipped with an array of the latest 3D immersive technologies and Building Information Modelling (BIM) software for virtual design and construction (VDC) with a special focus on Lean Construction. It aims to gear the industry towards both mindset change and process change based on the concepts of Lean & Virtual Construction, leading to drastic improvement in construction productivity. It is also believed to be the first large-scale fully immersive and experiential learning facility for VDC in Southeast Asia, with industry firms sponsoring most of the software components.

The centre facilitates the VDC process, where stakeholders of the entire construction value chain can converge and bring their respective designs to life before anything is built physically. The VDC process integrates the design, prefabrication and construction phases of a project, allowing all stakeholders to collaborate and identify upstream design clashes, plan for the prefabrication process, and simulate the downstream construction workflow virtually with process and production improvements in mind through Lean Construction principles. This can lead to a quantum shift in work processes as compared with conventional methods of construction, with reported productivity improvements averaging more than 20 percent, said BCA.

"Technology and innovation will drive transformative change in the built environment sector. It is now possible to virtually walk through building plans before actual construction begins – this will enable firms to build faster and more effectively," explained Desmond Lee, Senior Minister of State for Home Affairs and National Development. "Technologies such as BIM and VDC are key enablers in the push for greater productivity in the sector. We are changing



The new Centre for Lean & Virtual Construction in Singapore is believed to be the first large-scale fully immersive and experiential learning facility for VDC in Southeast Asia.

the way we build and this presents exciting opportunities for young, talented Singaporeans."

Dr John Keung, CEO of BCA added, "The centre is a metaphor of the exciting prospects of construction IT in the built environment sector, demonstrating the power of VDC, BIM and Lean Construction on the design, construction and delivery of construction projects. However, investing in such technology may not be the priority for the average industry firms, due to the relatively high investment costs. With the opening of this one-stop centre, we hope industry firms of all sizes could come forward to take the first step in transforming their processes."

To gear up competency in the sector, the BCA Academy will launch three new Specialist Diploma programmes in DfMA (Design for Manufacture & Assembly), Lean Construction and VDC in 2016. ■

Major railway projects between SE Asia and China start

The groundbreaking ceremony of the China-Laos railway project was recently held in the Laos capital, Vientiane. This project is an important part of the Chinese government's 'One Belt, One Road' initiative. With a total investment close to 40 billion RMB, the line is over 400 km long and planned to be completed in 2020.

The construction of China-Thailand railway, another project under the 'One Belt, One Road' initiative, has also started. The



groundbreaking ceremony of the project recently took place at the Chiang Rak Noi railway station, Bang Pa-in District, Phra Nakhon Si Ayutthaya, Thailand. Once completed, the line will be connected to the China-Laos railway.

The Chinese government has encouraged Chinese equipment manufacturers to take part in the 'One Belt, One Road' initiative. Among them is Sany, which has been active in the Southeast Asia region for a number of years. The company attended both groundbreaking ceremonies and expects to make significant contributions to the projects. ■



Sany executives attended the groundbreaking ceremonies of two major projects under the 'One Belt, One Road' initiative, the China-Laos railway (far left) and China-Thailand railway (left).



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Black & Veatch to build Lontar extension in Indonesia

PLN, Indonesia's national electricity utility, has selected Black & Veatch to build the 315 MW Lontar Extension Coal Fired Steam Power Plant project in the Kemiri district, Tangerang Regency, Banten Province, Indonesia. Together with consortium partners Sumitomo Corporation and PT Satyamitra Surya Perkasa (SSP), Black & Veatch will bring leading project management skills to deliver the EPC (engineering, procurement and construction) contract on schedule.

As part of Lontar, Black & Veatch will again implement a 'constructability' programme. It is an advanced project management technique applied in the proposal, engineering and procurement stage as well as throughout the build process to give a more predictable and better construction timeline. It provides a construction driven process and mind-set to the entire project process from conceptual engineering, through fabrication and shipping. All work is planned with construction in mind.

Constructability is an approach that Black & Veatch has shared for a number of years with PT SSP's local engineers and professionals both on site as well as in formal classroom environments. It was actively used to successfully deliver Tanjung Jati B Units 3 & 4 ahead of schedule in 2012, an addition of 1,320 MW to the Java-Bali grid

featuring Sumitomo, Black & Veatch and PT SSP.

"Constructability puts a special focus on construction in areas often removed from what's happening on the ground, like the engineering and design process. The result is a much smoother experience for the people on site: reducing errors, delays and cost overruns," said Jim Schnieders, senior vice president and managing director, Power EPC, Asia based in Jakarta. "Beyond technology and hardware, it's a powerful example of how companies like Black & Veatch transfer knowledge that creates a sustainable benefit to the engineering and construction community in Indonesia."

Constructability is a key component for Lontar as it is to be built alongside the existing and fully operational units. This calls for careful planning. As a result, the Lontar expansion will allow PLN to supply a more timely electricity boost to the people of Jakarta ahead of developing greenfield sites. Lontar will also use supercritical coal-fired technology to optimise efficiency and output.

Black & Veatch is the topline EPC provider and overall technical lead. The company is also providing equipment supply as well as construction management and commissioning. Sumitomo is responsible for the boiler and steam turbine supply. PT SSP is responsible for the erection of the entire facility. ■

Enerpac appoints new integrated solutions manager

Enerpac has appointed Maxim Lee as its integrated solutions (IS) manager for Southeast Asia. He will work closely with Enerpac territory managers and distributors throughout the region to provide solutions for heavy and complex lifting, shifting and positioning projects.

Mr Lee's experience spans heavy lifting and process automation engineering sales and support across such industries as heavy duty overhead cranes in applications for power generation, steel making, waste-to-energy, heavy manufacturing, pulp and paper, military aviation, container shipping, depots and intermodal terminals.

"Maxim Lee's experience encompasses market leaders in SE Asia's leading industrial, commercial, materials handling and infrastructure sectors, which are the major markets for IS," said Joseph Wang, managing director of Enerpac SE Asia, which is headquartered in Singapore. "He has the industry knowledge and experience to offer great value to customers seeking the safest and most cost-efficient ways to handle challenging projects including movement and positioning of huge machinery and plant."

Mr Lee said, "My focus as IS manager will be on integrating innovative new methods and advanced Enerpac technology into new and existing projects, in areas such

as infrastructure, heavy manufacturing, minerals, metals, oil and gas, power generation, construction, waste-to-energy and safety."

"I will also work closely with our well established Enerpac territory manager network and our outstanding distributor network to ensure they are ideally equipped with service and technical support for their customers to ensure Enerpac integrated solutions can assist them to perform complex tasks more safely and efficiently." ■



Maxim Lee (left), Enerpac's new IS manager for SE Asia, with Michael Miller, IS leader for Enerpac Asia Pacific.

Imer Oru appoints Myanmar distributor

Imer Oru Far East Pte Ltd (IOFE) has appointed Ko Htaik International Co Ltd as its distributor for Myanmar market. Ko Htaik will be promoting the company's green and blue catalogues range of machinery. Ms Poe, director of Ko Htaik, said that she sees great business opportunity in this partnership as the machinery will help to improve work efficiently and productively in the country.

According to IOFE, the company has successfully appointed distributors and achieved excellent results in Australia, Indonesia, Singapore, Malaysia, Philippines, Thailand, Cambodia and now Myanmar. IOFE is a subsidiary of Imer Group based in Italy. ■



Ko Htaik International Co Ltd has been appointed as Imer Oru's distributor in Myanmar.

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Anhui has new landmark

Construction has begun on the Evergrande International Financial Centre in Hefei, Anhui province, China. This 518-m supertall building, designed by Atkins, is believed to be the first skyscraper and highest landmark in the province.

“Our design concept was inspired by bamboo, which according to Chinese culture, represents prosperity and elegance,” said KY Cheung, Atkins’ project design director. “The development will help increase the land value of Binhu district, enhance the image of the city of Hefei and facilitate the city’s development.”

Atkins was commissioned by Evergrande Group to provide planning concepts for two plots in the Binhu new area of Hefei in Anhui province, and architectural conceptual design for the Evergrande International Financial Centre. With a total gross floor area (GFA) of 660,000 sq m, the high-rise commercial and residential complex comprises a five-star hotel, luxury serviced apartments, grade-A offices and a large integrated shopping mall to provide high-end entertainment and high-end lifestyle experience for visitors and residents.

In addition, Atkins recently celebrated the opening of its first mixed-use development in Chengdu, the Seaton Plaza. Atkins was commissioned by LH Group to provide architectural design for the Seaton Plaza development, which comprises the five-star luxury hotel Hilton Chengdu, a serviced apartment complex and a grade-A office tower. It is located in the prime location of the Tianfu new district. ■



The new Evergrande International Financial Centre in Hefei, Anhui province (left) and the newly opened Seaton Plaza in Chengdu (below).



Trimble wins additional contract for Beijing’s new airport project

Trimble has secured another contract for Beijing’s new airport project. In April 2015, Trimble won the initial bid to supply the project with a construction information management system. The contract has now been extended to include additional machine control systems for soil stabilisation.

Beijing’s new airport is expected to handle approximately 72 million travellers, 2 mil t of shipping and 620,000 flights by the year 2025. It is a massive construction project with an unprecedented amount of civil aviation investment by the Chinese government. In order to construct the airport in a safer, more efficient manner, achieve transparent management and maximise construction quality, the project is using construction technology from Trimble to integrate construction and operations.

Trimble was chosen to implement a browser-based, locally-hosted digital construction information management system for tracking and monitoring construction operations in real-time. The Trimble solution allows users to create 3D constructible models, perform soil stabilisation, automate construction processes and effectively manage information. Based on the successful soil stabilisation results using Trimble machine control over the past four months, another 15 systems have been ordered.

“The research results for dynamic compaction have been extremely promising,” said Li Qiang, chief engineer at the Beijing new airport construction office. “As a result, the project is pushing forward with a larger scale deployment to further the research into creating new methods and standards for airfield construction.” ■

Snorkel appoints sales director for East Asia



Snorkel has appointed Ken Goh (left) as its sales director for East Asia. Mr Goh joins Snorkel from Pramac (Asia) Pte Ltd, where he was responsible for regional sales and business development, as well as new product development.

Mr Goh has over 16 years of regional sales experience, the majority of which has been within technical and capital equipment sectors, including six years in aerial work platforms. Mr Goh began his career in electrical engineering; working in commercial vehicles, he progressed to sales engineer, before moving into sales and marketing for a regional heavy equipment sales and leasing company.

In his new role, Mr Goh will be responsible for Snorkel equipment sales across East Asia, through the development of the existing Snorkel distribution network, as well as direct sales to rental companies and major accounts.

Snorkel CEO, Matthew Elvin said, “Ken’s appointment is further evidence of Snorkel’s commitment to better support our customers globally. We have a strong footprint already in Asia through our distributors, and Ken will work closely with them to maximise the effectiveness of the network. In addition, Ken will be targeting key accounts to identify additional sales opportunities within the region.” ■

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Kobelco Construction Machinery and Kobelco Cranes to merge

Kobe Steel Ltd will combine its subsidiaries, Kobelco Construction Machinery Co Ltd and Kobelco Cranes Co Ltd, starting 1 April 2016. The Kobe Steel Group's construction equipment business saw Kobelco Construction Machinery spinning off the crane business in 2004. Following the establishment of Kobelco Cranes, these two companies have specialised in their respective fields in Japan and overseas.

Under its medium-term business plan launched in May 2013 covering fiscal years 2013 to 2015, Kobe Steel said it would strategically expand its machinery-related businesses. The Group has decided to merge the two companies together to further strengthen its

business foundation and accelerate global development in relation to the construction equipment business.

The merger is expected to improve business efficiency, strengthen product development capabilities and bolster global development. It will also enable Kobe Steel to pursue new possibilities with the synergy derived from the accumulated technologies of its excavators and cranes. Considerations will continue in regard to the consolidation of domestic and overseas locations.

Based in Tokyo, Japan, the new company aims to take a new leap forward as a comprehensive construction machinery manufacturer that combines the two product menus of excavators and cranes. ■

New luxury houses to be built in Hong Kong

A joint venture of BPE Asia Real Estate and National Properties, a subsidiary of National Electronics Holdings Limited, will build luxury detached houses in Tai Tam, the Island South District of Hong Kong. This proposed development includes seven luxury detached houses, which are located on a site of approximately 3,009 sq m each to be constructed with an elegant classic design including basement carports, private infinity pool and internal elevator. Site formation and foundation works for the project have been completed and the construction of superstructure works is ongoing. Completion of the first show house is expected in 18 months' time (mid 2017).

"The Hong Kong residential property market is unlike any other gateway city in Asia. Hong Kong has a population of approximately 7.5 million people of which approximately 1.4 million live on Hong Kong Island, yet there are less than 750 single family detached or semi-detached houses located within developments of eight homes or less. Furthermore, we estimate that there is an average supply of just 15 such houses coming to the market per annum over each of the next three years," explained Charles Lam, managing director of BPE Asia. ■



The new houses will have an exclusive access roads and excellent panoramic sea views.

Leighton Asia in second contract at Boundary Crossing

Leighton Asia, in joint venture with Chun Wo Building Construction Limited, has been awarded a HK\$1.15 billion contract for ancillaries building works for the Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities project. The works form part of the Hong Kong government's boundary crossing facilities project, for which the Leighton Asia-Chun Wo joint venture is already constructing the HK\$8.3 billion passenger clearance building.

The scope of works includes the construction of 14 buildings, associated services, earthworks and landscaping, as well as the procurement, testing and commissioning of a mobile X-ray vehicle scanning system and baggage inspection system. The ancillaries building works were commenced on 31 December 2015, with completion targeted for November 2017. ■

Goldhofer's first semitrailer in MPA-K series delivered to Hong Kong

The first semitrailer in the new MPA-K series from Goldhofer has been delivered to Tai Wah Sea & Land Heavy Transportation Ltd based in Hong Kong.

The MPA-K 5 (0+5) has a deck length of 10.5 m plus a 7.4 m extension. With an axle load of 12 t at 80 km/hr and a total laden weight of 84 t, the five-axle MPA-K has a payload of approximately 60 t, increasing to about 90 t with the front three-axle bogie from the MPA-K modular system. At an axle load of 15.6 t, technical overall weight for the complete eight-axle semitrailer is thus over 150 t. Both bogies are compatible with the MPA-K universal gooseneck. That means both the front and the rear bogie can be coupled to the gooseneck without making changes to things like steering rods, thus minimising adjustment work and saving valuable time.

The MPA-K range is a modular semitrailer system comprising various bogies, decks (drop deck, flat bed, vessel bridge), semitrailer bogies with extension spine, and goosenecks. The front bogies come with one, two or three axles, and the rear bogies with between four and seven. The semitrailers offer single or double extendability. The MPA axle technology developed by Goldhofer is one of the highlights of the new MPA-K, comprising as it does just a wheel carrier, strut and extension arm. The result, amongst other advantages, is high permissible axle loads, a loading height of only 780 mm, a 350 mm suspension stroke, a steering lock angle of 60° and a highly maintenance-friendly system. ■



Jason Ho (left) of Tai Wah Sea & Land Heavy Transportation and Goldhofer area sales manager Jean-Philippe Martin.

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Iconic landmark for Istanbul New Airport

AECOM and Pininfarina have won an international design competition for the regional air traffic control (ATC) tower and technical building at the Istanbul New Airport. The winning design, chosen by İGA, marks AECOM's first collaboration with Pininfarina, the design house renowned for its car designs for Ferrari and Alfa Romeo, among others.

The ATC will be the landmark for Istanbul New Airport, which is set to be the world's largest new airport in terms of annual passenger capacity. The competition scope was to deliver the concept designs for the tower, showcasing contemporary sustainable architectural design that reflects the multi-cultural and historical characteristics of Istanbul city.

The AECOM and Pininfarina design evokes the aerodynamic forms used in automotive and aviation design, and includes an elliptical tower that will be visible to all passengers flying in and out of the new

airport. The tower shape is inspired by the tulip, which has been the symbol of Istanbul for many centuries and is an important cultural reference in Turkish history.

In early 2015, AECOM was also appointed by İGA to deliver designs for all the airside works at the airport. The new airport will have an initial capacity of 90 million passengers per year. It will be located on the European side of the city, 35 km from the centre on a site adjacent to the Black Sea. Subsequent planned phases will expand the airport to include six runways and three terminal buildings. When all phases are complete, the airport will have an annual capacity of up to 200 million passengers.

İGA is a consortium of five leading Turkish contractors comprising Cengiz, MAPA, Limak, Kolin and Kalyon. The consortium was awarded the concession to build Istanbul New Airport as the engineering, procurement and construction contractor and will also be the operator. ■



© AECOM & Pininfarina

When completed, the ATC will be the landmark for Istanbul New Airport.

SDLG G9220 motor grader goes to Oman

Shandong Lingong Construction Machinery Co Ltd recently celebrated two important milestones; the company sold its 100th SDLG motor grader in region EMEA, which also becomes the first grader of its kind to be sold in Oman, a G9220.

The G9220 was delivered to Sunshine International LLC, a leading construction company based in Oman. The machine was supplied by General Engineering Services (Genserv), SDLG's local dealer, and has already been set to work carrying out road maintenance and repairs in Oman.

The G9220 is a multi-purpose machine

with an operating weight of 16,500 kg. Offering a 164 kW Dalian Deutz engine, combined with a ZF power shift transmission, the G9220 delivers reliable operation. The engine also provides three distinct power curve settings to give the smoothest grade on any terrain while simultaneously reducing fuel consumption. And, offering greater versatility, the unit's machine blade control system (MBCS) allows for ultimate grading precision. This system is controlled by hydraulic mechanical levers in the cab, meaning the operator can swing the blade himself/herself if required. ■



Arun Pandey, managing director of Sunshine International, has acquired the first SDLG G9220 motor grader in Oman.

Bhoir Group acquires six Liebherr LR 1300 SX crawler cranes

Crane rental company Bhoir Group, headquartered in Mumbai, India, has placed an order for six new Liebherr LR 1300 SX crawler cranes and three units of derrick equipment.

The LR 1300 SX is a 300 t class crane with a strong main boom, and thus has an excellent load chart especially with the main boom and luffing jib combinations. The crane can be fitted with a maximum of 92 m of main boom and a luffing jib of maximum 113 m with various boom combinations, and

can reach a maximum height of 169 m (56 m main boom and 113 m luffing jib).

With derrick, the combination of main boom and luffing jib can reach a height of 196 m (83 m main boom plus 113 m luffing jib plus derrick).

"We find the LR 1300 SX versatile, which can be used in power, cement, steel plants and refineries. Our clients too prefer the LR 1300 SX due to its high reach and load capacity," said Mr Bhoir, owner of the Bhoir Group. ■



Representatives of Bhoir Group and Liebherr.



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Sweden's Hallandsås tunnels

The Hallandsås railway tunnels in southwestern Sweden are now open. It is said that these two tunnels are the country's most important railway infrastructure project in 40 years. It took 10 years and an investment of €850 million to complete them.

The project was initiated in 1970 but did not effectively get under way until 2004, following two failed attempts by other companies to build them. Vinci Construction Grands Projets and its Swedish partner Skanska were the first to succeed in boring through a complex geological formation to construct two parallel tunnels with a unit length of nearly 5,500 m and an interior diameter of about 9 m.

The Hallandsås tunnels are part of the national refurbishment programme of the Malmö-Gothenburg railway line, which is expected to make a strong contribution to opening up the economy of western Sweden. Its capacity will increase from four to 24 trains per day, the travel time between Malmö and Gothenburg will be shortened and the load capacity of freight trains will double.

The project introduced one-of-a-kind environmental management measures. A broad-based ecological management programme was applied to protect water and the local ecology as a whole. The County Administrative Board, the environmental assessment group and the neighbouring Båstad and Ängelholm municipalities also continuously monitored construction. ■



© Vinci

The Hallandsås tunnels are part of the national refurbishment programme of the Malmö-Gothenburg railway line.

Eurovia wins motorway contracts in Poland

Eurovia has won contracts in Poland to design and build two motorways, worth a total of €120 million. One of the contracts relates to a 19.73 km section of dual carriageway and 12 civil engineering structures (viaducts and a bridge) on the S3 motorway south of the city of Legnica, near the border with the Czech Republic. This road forms part of the international E65 road in the trans-European corridor, and serves the whole of western Poland as well as a number of large cities in the country (Szczecin, Gorzów Wielkopolski, Zielona Góra and Legnica). The works are scheduled to start in April 2016 and expected to last 30 months (excluding winter periods).

The other contract relates to the building of the bypass for the city of Szczecinek (population 40,000) in western Pomerania, in the northwest of Poland. This busy stretch of dual carriageway is located on the route of the S11 motorway that will eventually link the north of the country at Koszalin with the urban area of Katowice (in the south of the country). The works are expected to last 34 months (excluding winter periods). ■

US construction equipment exports 'still in decline'

Exports of US-made construction equipment dropped 17.6 percent for the first three quarters of 2015 compared to the same period in 2014, for a total US\$10.8 billion shipped worldwide, according to Association of Equipment Manufacturers (AEM). All world regions experienced declines, led by Africa and South and Central America. The AEM equipment manufacturing trade group cited US Department of Commerce data it uses in global market reports for members.

Canada dropped 15 percent, for a total US\$4.4 billion; South America declined 28 percent, for a total US\$1.4 billion; Europe dropped 11 percent, for a total US\$1.4 billion; Asia decreased 10 percent, for a total US\$1.4 billion; Central America fell 21 percent, for a total US\$1.1 billion; Australia/Oceania declined 5 percent to US\$645 million; and Africa decreased 36 percent to US\$611 million.

The third quarter of 2015 marked the 11th consecutive quarter that US construction equipment exports experienced year over year declines. According to AEM's third quarter North American Construction Equipment Industry Conditions Trends Report initial results, 35 percent of survey exporters indicated they experienced a decrease in exports while 50.9 percent of respondents felt the market had remained stable.

Contrary to the second quarter, imports also declined - 5.71 percent year over year. Declining imports is a bigger signal to the US market, especially now that imports are relatively cheaper under the stronger dollar. In the third quarter AEM industry conditions survey, 42.3 percent of respondents indicated US demand for equipment was lower this quarter compared to 2014, while 30.7 percent felt the market remained stable. For the next 12 months, overall growth is still expected.

While the global environment is still positive for construction and construction equipment, one of the bigger clouds could be the Chinese market, said AEM. It is the US' ninth largest export market for construction equipment and it declined 25 percent year to date. Another cloud is Brazil, added AEM, which just announced its economy was going deeper into a recession after three consecutive quarters of contraction in its GDP. While exports to Canada, the US' largest trading partner, also decreased, by 15 percent year to date, Statistics Canada recently reported that the economy returned to quarterly growth.

While it is hard to pinpoint the exact cause of the declining exports, some of the possible explanations may be the difficulties in exporting equipment with engines that require ultra low sulfur diesel, strengthening local manufacturing industries and a strong US dollar making US manufacturers less competitive, explained AEM.

The top 10 countries buying the most US-made construction machinery during the first three quarters of 2015 (by dollar volume) were (in order): Canada - US\$4.4 billion, down 15 percent; Mexico - US\$906 million, down 23 percent; Australia - US\$602 million, down 3 percent; Chile - US\$388 million, down 11 percent; Brazil - US\$347 million, down 39 percent; Peru - US\$267 million, down 26 percent; South Africa - US\$264 million, down 50 percent; Belgium - US\$230 million, down 34 percent; China - US\$214 million, down 25 percent; and United Arab Emirates - US\$182 million, up 57 percent. ■

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Global construction equipment market 'to improve in 2016'

Global sales of construction equipment are forecast to grow 3.9 percent in unit terms in 2016, to 760,508 machines, according to specialist economic forecasting and market research consultant, Off-Highway Research.

The expected improvement follows a weak performance in 2015, when global unit sales fell more than 10 percent from the total of nearly 818,000 machines sold in 2014. In 2016, growth is expected in the European, North American and Indian equipment markets. Off-Highway Research also forecasts a stabilisation in China, where sales of construction equipment have fallen from a peak of 435,070 units in 2011 to a projected 131,345 machines in 2015 – a decline of 70 percent in the space of four years.

“There can be no doubt that 2015 was a tough year for the global equipment industry, due to slowing world economic growth and weak commodity prices,” said David Phillips, managing director of Off-Highway Research. “Unit sales fell to their lowest since the crisis years and the drop in the Chinese market was particularly brutal. However, there were improvements in several developed countries which helped offset some of these losses.”

The gradual improvement in Europe that began in 2014 is expected to continue this year, with unit sales rising from a provisional 125,705 units in 2015 to 130,503 machines. Similarly, the buoyant North American market should rise a further 4 percent to 186,025 machines. Continued steady improvements are expected in the Indian construction equipment market, with unit sales expected to rise to 46,414 machines, compared to 38,554 in 2015. Meanwhile in China, the market is expected to show an uptick of around 4 percent, with sales stabilising at 137,820 units. In Japan, construction equipment sales are expected to fall from 79,998 units in 2015 to 73,825 machines in 2016. The key drivers of this are a tailing-off of reconstruction work following the 2011 earthquake and Tsunami and the winding down of the government's economic stimulus programmes.

Mr Phillips said, “Off-Highway Research's forecast is for the start of a gradual return to health in the global construction equipment market in 2016. However, as has been the case since the crisis years of 2008 and 2009, business confidence remains fragile, and the uncertain geopolitical outlook around the world could have a negative impact on the sector.” ■

New president and CEO for Manitowoc Cranes



Barry L. Pennypacker (left) has been named president and CEO of Manitowoc Cranes. He will report to current interim chairman and CEO of The Manitowoc Company, Kenneth W. Krueger. The current president of Manitowoc Cranes, Larry J. Weyers, will continue with the company as executive vice president of Manitowoc Cranes.

Upon the execution of the previously announced spin of Manitowoc Foodservice, The Manitowoc Company will change its name to Manitowoc

Cranes. Mr Pennypacker will then serve as president and CEO of Manitowoc Cranes and Mr Krueger will serve as chairman of the board of Manitowoc Cranes.

Most recently, Mr Pennypacker served as founder, president, and CEO of Quantum Lean, a privately held manufacturer and supplier of precision components. Prior to that, he was president and CEO, as well as a director, of Gardner Denver, a manufacturer and marketer of engineered industrial machinery and related parts and services, from 2008 until 2012.

Prior to joining Gardner Denver, Mr Pennypacker served in positions of increasing responsibility at Westinghouse Air Brake Technologies Corporation, a worldwide provider of technology-based equipment and services for the rail industry with his last position being vice president-group executive. He has also served in a number of senior management positions and operational roles during his time at The Stanley Works, a worldwide producer of tools and security products, and Danaher Corporation, a manufacturer and marketer of professional, medical, industrial and commercial products and services. ■

Tekla transitions to Trimble brand

Tekla Corporation has transitioned to the Trimble brand as of 1 January 2016. Trimble acquired Tekla in 2011 and the rebranding reflects both the evolution of Trimble as well as its vision for the future.

Since the acquisition, Trimble and Tekla have shared a common vision - to transform the building lifecycle through advanced, accessible and intuitive technologies and to drive increased collaboration across the industry. Trimble combines strong domain knowledge with a broad portfolio of technology and capabilities to develop customer-centric solutions that are transforming the planning, design, construction and maintenance and operation of buildings and civil infrastructure. With an open approach to Building Information Modelling (BIM), the name change reflects the combined companies' strong commitment to customers - providing

the opportunity to more tightly connect Tekla software to Trimble's broad portfolio of design-build-operate (DBO) solutions.

The tighter integration of Tekla's BIM software solutions with Trimble's building construction estimating, project management and BIM-to-field solutions will enable a compelling set of productivity solutions for contractors around the world. Clients can benefit from dedicated workflows and productivity solutions that are unmatched in the construction industry.

Furthermore, the tighter integration of Tekla with Trimble's construction software portfolio will enhance the ability to integrate data throughout a project lifecycle, while eliminating costs through better accuracy and interoperability - providing customers with a broad and sophisticated BIM capability. ■

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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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Date	Events in Asia	Organiser & Contact
16 to 20 Mar 2016	Worldbex 2016 World Trade Center Metro Manila Manila Philippines	Worldbex Services International Tel: +632 656 9239, Fax: +632 477 1899 Email: info.worldbex@gmail.com Website: www.worldbex.com
9 to 10 May 2016	Trenchless Asia 2016 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	Westrade Group Ltd Tel: +44 845 094 8066, Fax: +44 870 429 9275 Email: pharwood@westrade.co.uk Website: www.trenchlessasia.com
12 to 14 May 2016	BuildTech Yangon 2016 Myanmar Convention Centre Yangon Myanmar	Sphere Exhibits Pte Ltd Tel: +65 6319 4037 Email: lingoh@sph.com.sg Website: www.btyangon.com
17 to 19 May 2016	Coat & Corrosion Asia 2016 Putra World Trade Centre Kuala Lumpur Malaysia	ECMI ITE Asia Sdn Bhd Tel: +603 8023 0820, Fax: +603 8023 0830 Email: enquiry@ecmi.com.my Website: www.coatcorrosionasia.com
8 to 10 Sept 2016	Cambuild 2016 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.cambuildexpo.com
14 to 16 Sept 2016	Concrete Show South East Asia 2016 Jakarta International Expo Jakarta Indonesia	UBM Tel: +62 21 2930 5959, Fax: +62 21 2930 5960 Email: niekke.budiman@ubm.com Website: www.concreteshowseasia.com
21 to 23 Sept 2016	Concrete Asia 2016 IMPACT Exhibition and Convention Centre Bangkok Thailand	Impact Exhibition Management Co Ltd Tel: +65 6702 3005 Email: theresa.gan@giec.biz Website: www.concrete-asia.com
3 to 5 Nov 2016	OneBuild 2016 Kuala Lumpur Convention Centre Kuala Lumpur Malaysia	One International Exhibition Sdn Bhd Tel: +603 8943 7488, Fax: +603 8943 7599 Email: info@oneinternational.com.my Website: www.oneinternational.com.my
22 to 25 Nov 2016	Bauma China 2016 Shanghai New International Expo Centre Shanghai China	Messe München GmbH Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bauma-china.com Website: www.bauma-china.com
12 to 15 Dec 2016	Bauma Conexpo India 2016 HUDA Ground, Gurgaon Delhi India	Messe München GmbH Tel: +49 89 949 20251, Fax: +49 89 949 20259 Email: info@bcindia.com Website: www.bcindia.com
Date	Events outside Asia	Organiser & Contact
11 to 17 Apr 2016	Bauma 2016 Munich Trade Fair Centre Munich Germany	Messe München GmbH Tel: +49 89 949 11348, Fax: +49 89 949 11349 Email: info@bauma.de Website: www.bauma.de
31 May to 4 Jun 2016	CTT 2016 Crocus Expo International Exhibition Centre Moscow Russia	IMAG Tel: +49 89 5529 12330, Fax: +49 89 5529 12350 Email: christina.jaugstetter@imag.de Website: www.ctt-moscow.com
22 to 25 Feb 2017	Samoter 2017 Verona Exhibition Centre Verona Italy	Veronafiere Tel: +39 045 829 8111, Fax: +39 045 829 8288 Email: info@samoter.com Website: www.samoter.com
7 to 11 Mar 2017	Conexpo-Con/Agg 2017 Las Vegas Convention Centre Las Vegas, Nevada USA	Association of Equipment Manufacturers Tel: +1 414 298 4167, Fax: +1 414 272 2672 Email: international@conexpoconagg.com Website: www.conexpoconagg.com

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Trenchless Asia 2016 to be held in Malaysia

Trenchless Asia 2016 will be held for the first time at the Kuala Lumpur Convention Centre (KLCC) in Malaysia, from 9 to 10 May 2016. According to the organiser, Westrade Group, the move to Kuala Lumpur has attracted significant industry support from exhibitors wishing to penetrate this emerging market, where trenchless technology is increasingly utilised in many engineering projects.

Country Pavilions have been confirmed by Germany, Japan, Singapore and China, each of which will feature several companies displaying a range of products and expertise. Individual stands are also already booked by organisations from Malaysia, UK, USA, Australia and India.

In addition, the two-day exhibition will incorporate a conference programme being compiled in conjunction with the International Society for Trenchless Technology (ISTT) and in consultation with relevant Government departments and industry associations based in Malaysia.

“We are delighted to be supported by local industry to ensure that we present a topical conference programme relevant to the Malaysia market, as well as the Southeast Asia region,” said Paul Harwood, managing director of Westrade Group. “The move to Kuala Lumpur is a significant step for Trenchless Asia, which has previously been held in Hong Kong, Shanghai and for the past two events in Singapore.

The timing of the move to Kuala Lumpur is significant as many major infrastructure programmes are being planned, including the US\$1.7 billion project in the Klang Valley, which will see the construction of regional sewage treatment plants, sewer networks and upgrading of the existing sewerage facilities. Moreover, as there is increasing government pressure placed on contractors to use trenchless methods to reduce environmental impact and to minimise disruption during such works, Trenchless Asia presents an excellent opportunity for the industry to present a wide range of products available. ■

Website: www.trenchlessasia.com

bC India has new name, new venue

bC India has been renamed as Bauma Conexpo India and will take place from 12 to 15 December 2016 at the HUDA Ground, Gurgaon/Delhi.

The first bC India in 2011 marked the start of a cooperation between Messe München and the Association of Equipment Manufacturers (AEM) for international events in the construction machinery sector. The last edition in 2014 was held in Greater Noida/Delhi, drawing 635 companies from 25 countries and 26,018 trade visitors. The show is held every two years. ■

Website: www.bcindia.com



The last bC India took place in 2014.

New layout for Conexpo-Con/Agg 2017

Conexpo-Con/Agg 2017, returning from 11 to 17 March 2017 at the Las Vegas Convention Centre, Las Vegas, USA, will feature a streamlined show layout to create better synergy between outdoor and indoor space product areas as well as to make it easier for visitors to navigate the show.

The Gold Lot includes an expanded Gold Hall and now extends to Las Vegas Boulevard, using the site of the demolished Riviera Hotel. A new Bronze lot (with Bronze Hall) has been added south of South Hall, extending the length of the building. Both lots will feature registration areas as well as registration in the Westgate Convention Centre (formerly Las Vegas Hilton) adjacent to North Hall.



Conexpo-Con/Agg takes place every three years showcasing the latest equipment and product innovations, with exhibitors and visitor from all industry segments around the world. ■

Website: www.conexpoconagg.com

Conexpo-Con/Agg 2014.

Messe München strengthens in Russia and Africa

Messe München has purchased the CTT Expo show in Moscow from Russian trade fair company Media Globe LLC. CTT's international co-organiser is IMAG, a Messe München subsidiary. This partnership enables Messe München to tap into an already existing extensive network in, and know-how of, the Russian market. CTT has been held in Moscow every year since 2000, boasting an area of 53,900 sq m and 670 exhibitors. In May 2016 it will open its doors for the 17th time.

In addition, IMAG has signed a partnership agreement with CIBEX East Africa. This includes a distribution collaboration for selected countries in 2016 and 2017. CIBEX is an international trade show for construction, infrastructure, building and energy. It is being organised through a collaboration between Trade and Fairs East Africa and planetfair. The third edition of CIBEX will take place from 1 to 3 March 2016 at the Kenyatta International Convention Centre (KICC) in Nairobi, Kenya. ■

Website: www.ctt-moscow.com/ www.cibexeastfrica.com

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IPAF safety campaigns 2016

IPAF recently launched two safety campaigns. One of them was IPAF pre-start inspection videos for the mobile elevating work platform (MEWP) industry, which demonstrate how to conduct pre-start inspections for scissor lifts and booms. IPAF encourages its members and industry friends to share these videos with their contacts. MEWPs are one of the safest ways to perform temporary work at height, but it is important to keep the equipment safe through good maintenance regimes like pre-use checks, explained IPAF.

In addition, IPAF has developed a load chart that is convenient for most climbing work platform (MCWP) users to put up the safe working load of the particular MCWP on the work platform. This will help prevent overloading or point loading. IPAF encourages its members and industry friends to share this load chart with their contacts. MCWPs allow efficient work on the facade of buildings where conventional methods may be uneconomical, said IPAF.

The campaigns were launched during IPAF members' night in Singapore on 15 January 2016. The event was attended by more than 90 members and guests from the industry, with Raymond Wong, senior assistant director of WSH Compliance & Investigation/Manpower Capability Building as guest of honour. ■

Websites:

<https://www.youtube.com/watch?v=zhFobbbrFKE> (IPAF pre-start inspection video for vertical lift)

<https://www.youtube.com/watch?v=siXQzUV84kA> (IPAF pre-start inspection video for boom lift)

http://www.ipaf.org/fileadmin/user_upload/documents/en/MCWPLoadChart.pdf (MCWP load chart)



Raymond Wong, senior assistant director of WSH Compliance & Investigation/Manpower Capability Building, stressed the importance of pre-start inspections and making operators understand the reasons for carrying out all these checks.



Mr Wong and IPAF members officially launched this year's IPAF safety campaigns on 15 January 2016.

New generation of learning tools

IPAF's MEWP operator training programme takes a giant leap forward with a new generation of learning tools. After two years of research, testing and significant investment, the new learning materials are set to deliver flexibility and interactivity, with the same emphasis on practical training.

For the first time, trainees have the option of completing the theory part of the course via an interactive eLearning module. They can complete the eLearning module online – anytime, anywhere, on any device, at their own pace.

Trainees opting for the instructor-led theory course will also benefit from the same graphics, animations and learning techniques. They will continue to interact with an instructor and fellow students in a classroom setting.

Whether they complete the theory part via the eLearning module or the instructor-led course, all trainees must still pass a supervised theory test at an audited and approved training centre. Trainees will then proceed to the practical session and must pass a supervised practical test conducted by an IPAF-certified instructor. Successful trainees will receive a Smart PAL Card (Powered Access Licence) as proof of operator training. ■

Website: www.ipaf.org/eLearning



Trainees now have the option of completing the theory part of the course via an interactive eLearning module.

IPAF Asia Conference returns in July

The next IPAF Asia Conference & Showcase will be held on 20 and 21 July 2016 in Singapore. This is a two-day event with a conference in the morning and a product showcase in the afternoon.

Last year, the IPAF Asia Conference was held in May in Hong Kong attracting nearly 150 delegates, marking the growing interest in the emerging use of powered access equipment and

in safety concerns. The day before the conference, many delegates also attended the site visit at Modern, the first IPAF-approved training centre in Hong Kong. ■

Website: www.ipaf.org/asiaconference



IPAF Asia Conference 2015 in Hong Kong.

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SJ46/51 AJ



SJ63 AJ



SJ61/66 T



SJ82/86 T



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Gomaco introduces 'intelligent' slipform pavers

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

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

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

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

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

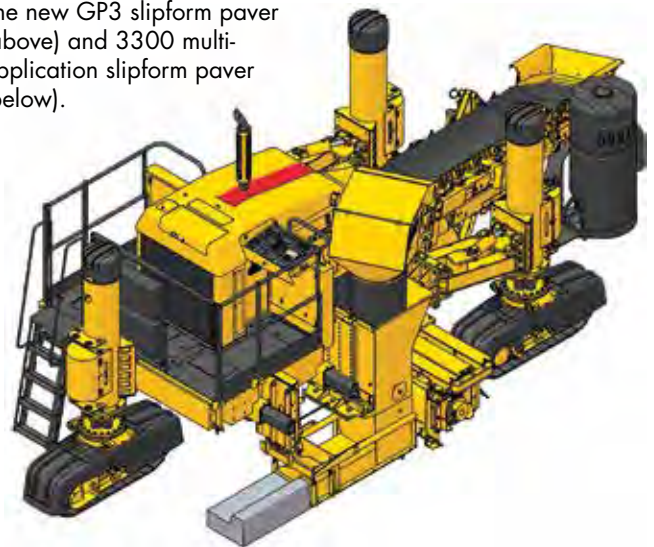
G+ Connect allows all the smart accessories and guidance system for the Gomaco paver to be easily interfaced. Simply 'connect' a 3D stringless guidance system, IDBI, tie bar inserter (TBI), power transition adjuster (PTA), Gomaco Smoothness Indicator (GSI) and more to the GP3 slipform paver. The GP3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

In addition, Gomaco's new 3300 multi-application slipform paver features extreme steering capabilities with Smart Leg and Track Positioning, and a Smart Telescoping Mould mounting system for paving from the right side or left side of the paver. The original GT-3300 has been re-engineered with the latest in technology with the G+ control system.

Gomaco's 3300 was specifically designed for right side and left side pour capabilities. It features a symmetrical design that makes



The new GP3 slipform paver (above) and 3300 multi-application slipform paver (below).



it easy to pave from either side. Its U-shaped operator's platform provides a complete view of the entire paving operation from anywhere on the platform. The control console easily slides from side-to-side to accommodate the direction of the pour. The 3300's design includes a 6.1 m long conveyor with four-way hydraulic positioning, which allows perfect placement of the concrete into the hopper on either side of the 3300. The four-way positioning includes pivoting tilt, pivoting swing, longitudinal slide and sideshifting. The conveyor hydraulically folds to reduce the overall transport length of the paver.

The 3300's Extreme Steering is accomplished with hydraulic rotational drives on the tracks and G+ controls. The 3300's two front legs are mounted on parallelogram-style pivot arms and the rear leg has power slide for positioning. Their smart leg positioning is accomplished with smart cylinders and the G+ digital control system along with Smart Track Rotation to provide the G+ control system with the exact location and position of the tracks and reference to their straight ahead line.

Another unique feature on the 3300 is the Smart Telescoping Mould mounting system for reference to G+ for repeatable mould offset. It has the Gomaco Hook-and-Go mould mounting system to quickly and efficiently change from one mould profile to the next. The trimmerhead and mould sideshift and vertically-adjust to clear obstacles, which allows the 3300 to pave right up to obstacles. ■

Website: www.gomaco.com

Dingli's newly upgraded JCPT scissor lift

Dingli's newly upgraded JCPT-series scissor lift, the JCPT1217RTI, features a maximum gradeability of 40 percent. This is 1.33 times higher compared to its predecessor, the JCPT1217RT, said Dingli. The new JCPT1217RTI is also equipped with a more powerful hydraulic motor.

In addition, two different driving modes are employed. When the lift operates on a smooth and steady road, the rear-wheel double-drive mode is activated to achieve energy saving; and when the lift runs on a rough road or slope, the four-wheel drive mode is used.

The JCPT1217RTI's chassis has also been improved, resulting in a minimum ground clearance of 0.29 m, with an increase of 0.1 m. ■

Website: www.cndingli.com



Right: Dingli's newly upgraded JCPT-series scissor lift, the JCPT1217RTI.

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Sandvik's geoSURE system enhances tunnelling process

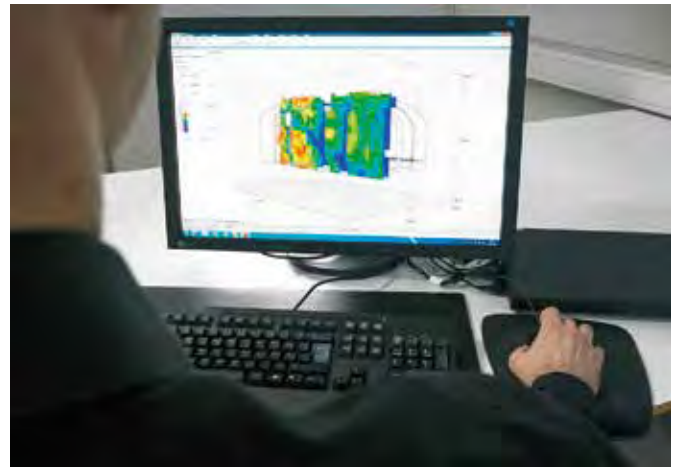
Sandvik Construction has added a new rig-integrated, high precision, online rock mass analysis and visualisation system to its existing offering for tunnelling process optimisation – geoSURE. It is fully integrated to the iSURE tunnelling project management software, providing rock mass information and a view inside the drilled rock.

Designed to be used with Sandvik underground construction drills rigs, geoSURE delivers real-time onboard analysis of the rock mass, which provides many advantages to the overall tunnel process optimisation. Not only is it an easy way to fulfill the most advanced reporting requirements in the industry, it also acts as an important tool for the assessment of rock reinforcement or injection requirements. In addition, it serves as an assisting tool for charging and blasting control as well as a complementary tool for geological mapping.

The benefits of geoSURE are best demonstrated in the way it supports the assessment of the need for rock reinforcement or injection. Once the online data produced by each drilled hole is analysed and further visualised using the iSURE tunnelling project management system, a view inside the rock is formed providing geologically meaningful information. This may then be used to support the formation of bolting and injection plans as well as backing up the charging and blasting procedures.

The present approach for geological mapping is based on visual sighting and time consuming laboratory measurements, said Sandvik, but the development of geoSURE now enables the use of a handy tool which speeds up and enhances this process. Using information gathered from every drilled hole and visualising the rock allows geologists quick and up-front access to information that has traditionally taken some days to be available. As a result, the tunnelling process can be further adjusted and optimised for even more efficient tunnelling operations.

The geoSURE system enables the drill rig to act as the analyser as all information is provided in real time on the drilling rig itself. There is no need for any third party devices, add on sensors or separate data transfers, as the analysis is fully integrated into the drill rig. This means that geoSURE takes full use of the drilling information thus providing accurate and repeatable results. Being a Sandvik built-in solution, geoSURE is seamlessly integrated to the control system of the drill rig thereby ensuring ease and speed of use, and



The geoSURE system, which provides views inside the rock (above), is designed to be used with Sandvik underground construction drills rigs (below).

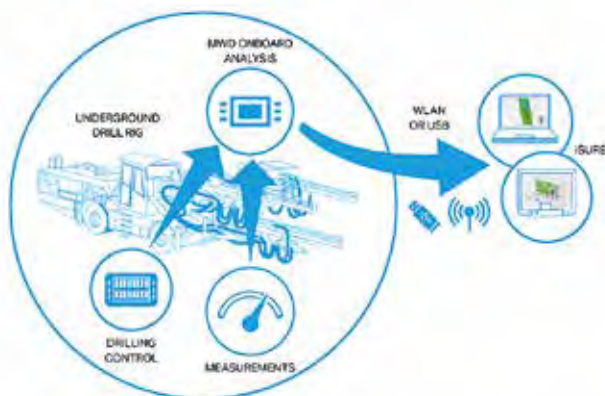


also allowing the quality, testing and support functions synonymous with Sandvik service.

The real time on-board analysis includes features such as fracture, rock strength and water indication. The extended analysis of the data allows the evaluation of the rock strength class, rock quality class and rock quality number. These features can then be further visualised using the iSURE tunnelling project management software. The 2D planar view provides an overall outlook of the tunnel section, including 2D interpolation, side view, top view and unrolled view. For more detailed inspection, the 3D structural view of the tunnel section can be used. This features 3D interpolations, plane intersections and isosurfaces and curves. The iSURE system also provides the former 3D view and one hole MWD diagram with the new geoSURE variables.

According to Sandvik, geoSURE is currently available for Sandvik i-series tunnelling jumbos. The geoSURE system includes the delivery of hardware components and iSURE software license. All physical components are easily installed and delivered with the system package, with the primary component being one AWDU unit (Analysis While Drilling Unit) for each drilling boom. ■

Website: www.construction.sandvik.com



All information is analysed real time on the drilling rig. Visualisations are done by using the Sandvik iSURE tunnelling project management system.



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Innovative telehandlers from Genie

The new Genie GTH-4014 and GTH-4018 telehandlers feature a lift height of 44 ft and 58 ft respectively. The hydrostatic transmission and the new gearbox offer the benefits of high torque and high traction speeds. On the job site, their long reach, class-leading outside turning radius, overall machine width and excellent drivability, provide operators the ability to work more productively when performing construction tasks up to five or six floors high, or tasks such as masonry in congested and confined spaces.

The cab has been redesigned to include optional and standard features including an air suspension operator seat, improved joystick ergonomics, a tinted top view front window, a large glove box and manual holder inside the door, plus a repositioned air conditioning duct to optimise operator comfort. New control features include an electrically controlled parking brake, operated by an intuitive switch on the dashboard (instead of the previous manual hydraulic system under the seat) for increased braking efficiency. Excellent visibility from inside the cab provides operators the wide field of vision they need. Thanks to the upgraded overload system, the calibration process is much easier and faster.



Genie GTH-4018 telehandler.

In addition, these new telehandlers now offer solutions to help minimise damage, such as rubber or steel mudguards, a toughened spring back and folding rear view mirror, and tough steel protected front and rear lights. For easy maintenance and troubleshooting, the manifold, the fuel tank, the radiator, filters and greasing points are all positioned within easy reach. Hydraulic

boom greasing points are also simple to access. Even the engine covers are designed to open at just the right angle for comfortable access during inspections and maintenance.

Both models come with new engines that offer new emissions standards (new Stage IIIA and IIIB engines) according to local legislation. ■

Website: www.genielift.com

Tecniwell grout mixing plants and cement silos

Tecniwell grout mixing plants come in different sizes with production capabilities of up to 30 cu m/hr. There are skid mounted and containerised versions featuring manual or completely automatic working system.

In addition, Tecniwell horizontal cement silos feature a compact design for easy transport and reduced environmental impact. They are fitted with internal screw conveyor, relief pressure valve, vibrators system, twist locks for stacking on the top of mixing plants, safety system kit, electronic load cells and LCD cement weight display as option.

Headquartered in Italy, Tecniwell manufactures special equipment for ground stabilisation and in particular for advanced jet grouting technologies. For the past 14 years, Tecniwell has been working with Singapore-based Foundation Associates Engineering Pte Ltd on the Southeast Asian market. ■

Website: www.fnapl.com



Tecniwell grout mixing plants come in different sizes with production capabilities of up to 30 cu m/hr.

Recent developments in SPT energy measurements

Pile Dynamics recently released a redesigned system for SPT hammer calibration. Both the hardware of the SPT Analyzer and the software used for analysis and reporting of Standard Penetration Tests (SPT) energy measurements have been completely revamped.

Standard Penetration Tests are a widely used geotechnical investigation tool that involves drilling an exploratory boring into the soil, driving a sampler into the bore hole and recording, among other things, the number of hammer blows required for it to travel a certain penetration – the N value. The sampler is connected to the bottom of a drill rod, and may be driven by a variety of SPT hammers, each of which with a different efficiency. This variability may cause the same soil to behave very differently depending on the equipment used for the test. Project specifications therefore often require that N be normalised based on the energy transferred by the hammer to the sampler. According to Pile Dynamics, both the European code EN ISO 22476-3 and the North American standard ASTM D4633 state that the only acceptable method of determining this energy is by force and velocity measurements.

The SPT Analyzer system includes a main unit that processes strain and acceleration measurements obtained during the test itself. The measurements are acquired by attaching a rod section specially instrumented with two strain gage bridges and two Pile Dynamics- brand accelerometers (collectively referred as sensors) to the SPT drill string. Once the hammer hits the drill string, the SPT Analyzer processes the strain and acceleration measurements, which respectively yield the force and velocity necessary for the calculation of transferred energy.

In the newest release of the SPT Analyzer, smart sensor technology allows the programme to 'read' the rod instrumentation, so that sensor calibration and rod cross sectional area are input automatically to the SPT Analyzer. This simplifies the initial test setup considerably. This latest model of SPT Analyzer also responds to multi touch gestures and has numerous colour schemes available,



Pile Dynamics recently released a redesigned system for SPT hammer calibration. Both the hardware of the SPT Analyzer and the software used for analysis and reporting of SPT energy measurements have been completely revamped.

making things like adjusting time scale or display to better view data in the field much simpler than previously. A preprogrammed set of output quantities tailored to SPT calibration is presented to the user, who can, however, modify it to fit a particular project need. Data quality checks are available.

The Pile Driving Analyzer (PDA) system PDA-8G, also manufactured by Pile Dynamics, may also be used for SPT Energy calibration by adding on the SPT Software to the PDA software suite. ■

Website: www.pile.com/pdi

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Potain cranes construct Thailand building and China bridge

Syntec Construction Public Company Ltd has taken delivery of Thailand's first Potain MCR 160 luffing jib crane, a new model that was officially launched in July 2015. The crane has been designed to offer excellent capabilities in both internal and external climbing configurations. For greater flexibility, it can be configured on either 2 m mast sections or narrower 1.6 m sections, depending on job site needs.

The MCR 160 has been installed on its first job, the 130 m tall Rhythm Sukhumvit 36-28 residential development in Bangkok being built for AP (Thailand). Syntec Construction is the main contractor on the job. The crane has been performing well, lifting a range of construction materials, including steel rebar, in loads weighing up to 10 t. It was installed at an initial 36.7 m height and with a 45 m jib, but it will be climbed to 140 m by the project's end in July 2016. The Rhythm Sukhumvit 36-28 residential project is due for completion by early 2017.

Placing tower cranes inside tall buildings is becoming an increasingly popular construction method, especially in Asia, said Manitowoc. When the tower crane is positioned centrally inside the building (usually inside the elevator shaft) it can access the entire area of the project more easily. A further advantage is that this configuration means the crane does not need to take up space outside the building, which is particularly useful on congested downtown job sites.

The MCR 160 can lift a maximum of 10 t and can be rigged with up to 50 m of jib. It offers a 2.4 t jib-end capacity and can be equipped with Potain's Vision cab, which offers excellent all-round visibility and an ergonomic design.

Adding to the crane's flexibility is a choice of three winches. There is the standard 60 LVF 25 winch, which is the unit that Syntec Construction specified with its purchase. This unit is a 45 kW rated hoist that can lift a 2.5 t load at speeds of up to 88 m/min. The other two optional winches available on the crane are the 75 LVF 25 Optima, a 55 kW rated hoist that can lift the same 2.5 t load at speeds of up to 95 m/min; or the 100 LVF 25 Optima, which has a larger rope capacity, with 1,270 m available versus the 500 m available on the 60 LVF 25 or the 895 m available on the 75 LVF 25. This winch can lift a 2.5 t load at speeds of up to 128 m/min.

S B Siam Co Ltd, Manitowoc's Thailand-based Potain dealer, sold the crane to Syntec Construction and was involved in the commissioning and erection of the crane. According to Manitowoc, Syntec Construction will also add a second MCR 160 to its equipment fleet, which will join several Potain MCR 225 cranes that the company purchased previously.

Furthermore, Chinese contractor Second Harbor Engineering is currently working on the largest project in its history – the 11 km long Hutong Yangtze Bridge. Once completed, the bridge will become a major connection for the Shanghai-Nantong Railway, one of the country's most important thoroughfares.

China Zhongtie Bridge Engineering is handling the lift work for the project and determined that the bridge's design required a pair of cranes that could reach working heights of at least 100 m, combined with an ability to pick loads of up to 18 t. To serve these needs, the company chose two Potain MC 480 tower cranes, built in China at Manitowoc's factory in Zhangjiagang. The cranes arrived on site in December of 2014.

The Potain MC 480 provides a 25 t capacity and up to 80 m of reach, capabilities that easily serve the project's lifting requirements.



Thailand's first Potain MCR 160 luffing jib crane is currently working on the 130 m tall Rhythm Sukhumvit 36-28 residential development in Bangkok.



Second Harbor Engineering recently used Potain MC 480 tower cranes to help complete the largest project in its history – the 11 km long Hutong Yangtze Bridge.

Also speeding construction are the 100 LVF 63 Optima winches that spool 726 m of wire rope and can lift 18 t loads at up to 20 m/min when rigged in a four-fall configuration.

Both the Potain tower cranes are mounted on platforms that will climb alongside the bridge pylons as they are built. When pylon construction is complete, the platforms will tower 235 m into the air. The cranes themselves will also be continually climbed during the project and will reach final working heights of 100 m, meaning the cranes will be working at total final heights of over 330 m. Both MC 480 cranes have been configured with 45 m jibs for the duration of the project.

Hutong Yangtze Bridge is being constructed as both a highway-railway bridge and double-pylon cable-stayed bridge. Upon completion, it will have a main span of 1,092 m. ■

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Volvo machines hard at work in Singapore and Indonesia

Covering an area of 24.43 sq km, Singapore's Pulau Tekong Island is currently undergoing a redevelopment. The project is part of the government's plans to boost Singapore's land space from its current 71,400 to 76,600 ha, and its population from 5.3 to 6.9 million by 2030.

Handling the huge amount of earth moving required in the land reclamation process is local contractor Kok Tong Construction Pte Ltd (KTC Group), which has 22 machines from Volvo CE on the job. In total there are 18 A40E articulated haulers and four excavators – two EC700 units and two EC480 units. The machines are running tirelessly, loading earth and sand that arrives at the island by barge before being transferred to the fleet of Volvo haulers for delivery to the required deposit points. The trucks travel along an uneven haul road approximately 1 km long, and then unload at the job site.

At present, the Volvo machines are delivering an average of 17,000 cu m of sand and earth during each 12 hour shift. As the project progresses, the amount of earth and sand delivered to the project will increase. In total, 3 mil cu m of material will be moved over the five year project. At the project's peak seven barges of imported earth and sand, each holding up to 4,000 cu m of material, will arrive at the island daily. To meet the demanding schedule, the haulers are running at average speeds of between 20 and 25 km/h over the course of a daily shift. The longest-serving Volvo hauler on the project has clocked up 27,000 hours so far.

The Volvo A40E features the Volvo drivetrain that works in partnership with the engine, transmission and axles to deliver excellent performance. The hauler also includes a self-compensating, hydro-mechanical steering system, making it easy to manoeuvre. Working alongside the A40Es are two EC700C excavators, which include the high-torque, low-revs 336.5 kW Volvo V-ACT engine, offering up to 10 percent better fuel efficiency compared with competitors, said Volvo CE. Their advanced hydraulics also deliver more responsive digging and lifting, while the air-conditioned cab ensures maximum operator comfort and enhanced visibility.

The other two excavators are both EC480DL units, featuring the fuel-efficient Tier-4 D13H engine, which delivers a stronger performance but with lower fuel consumption than competitors, claimed Volvo CE. The unit also has a three-piece, high tensile steel undercarriage allowing it to work productively in tough conditions. And downward speed of the digging arm has been increased by 15 percent over its predecessor, meaning faster cycle times and higher productivity.



Working on Indonesia's Trans-Sumatran Highway project, the Volvo ABG5820 paver is equipped with an electronically controlled travel drive.



Volvo A40E articulated haulers (above) and EC480DL excavators (below) handle the huge amount of earth moving required in the land reclamation process on Singapore's Pulau Tekong Island.



In addition, the Trans-Sumatran Highway project in Indonesia stretches for over 2,500 km in total. Once completed, the upgraded road network will make travelling the length of the island from north to south and to all of the major coastal towns much quicker and more efficient.

Two contractors, PT Rodateknindo Purajaya and PT Baniah Rahmat Utama, are using a collection of machines from Volvo CE to work on their respective stretches. PT Rodateknindo Purajaya has the contract to handle approximately 50 percent of the upgrade work. The company has seven Volvo CE units on the job, including three compactors, two excavators, a paver and a wheel loader.

The paver in question is an ABC5820 that has a standard 5 m paving width and an electronically-controlled independent travel drive fitted to each crawler unit. This system monitors track movement and controls the motor's response accordingly, ensuring both straight line and fixed radius paving. The compactors on the project include two 11 t class single drum SD110 units; plus a 7 t class double drum DD70. Helping with earthmoving and materials handling on the job are a 21 t rated EC210B Prime excavator and an L90F wheel loader.

For the updating of the stretch in South Sumatra at the Bengkulu border, PT Baniah Rahmat Utama is the main contractor. The company presently has three G970 motor graders employed there and 10 compactors (five SD100DC units and five SD110 units). Plus, the company is using an L120F wheel loader at a nearby asphalt and ready mix plant, which is supplying materials to the job site.

All of the machines belonging to both PT Rodateknindo Purajaya and PT Baniah Rahmat Utama were purchased from Volvo CE's dealer in Sumatra – PT Indotruck Utama (ITU). ■

Website: www.volvoce.com

Sennebogen goes to Changi Airport's Terminal 5

Aly Energy has supplied a Sennebogen 6113R telescopic crawler crane to the Penta Ocean – Koon JV for land preparation works on Changi Airport's Terminal 5. Aly Energy is a Sennebogen dealer in Singapore.

The crane is being used to load the precast duct banks onto the trailers, which then transport them to the airside. After that, these duct banks weighing from 4 to 10 t are installed along the new services corridor - which stretches to about 6 km - involving high voltage, low voltage and telecom cables.

According to the joint venture, the efficiency and versatility of this massive 120 t crane has streamlined the services diversion works and enhanced the progress of the project. ■

Website: www.aly.com.sg



Right: The Sennebogen 6113R has been acquired by Penta Ocean - Koon JV to work on Changi Airport's Terminal 5.

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Peri's efficient formwork solution for Singapore projects

The Marina One development in Singapore covers a total gross floor area of approximately 341,000 sq m. It features two 34-storey residential towers, two 30-storey prime grade A office towers and a retail podium. This project is a complex structural challenge for all involved due to the unique and artistic building shape. The residential towers have irregular placed balconies decorating the building front side facing the street, whereas the internal 'green heart side' offers an unusual ripple-shape design. Curved edges optimise the buildings artistic merit.

Peri's Skytable system was chosen as the most effective solution to meet the project's requirements. This is due to the extremely large area covered by each floor of the residential towers. The Skytable system is able to cover up to 150 sq m of floor slab per unit and can be easily moved between floors with a single crane lift. This large coverage greatly reduces the construction cycle time between floors. The remote controlled moving procedure also allows personnel to work from a safe and secure position at all times.

The Peri CB and RCS-P climbing systems are being used as platforms and safety screens for the vertical elements of the building. The RCS-P climbing system is rail-guided and ensures safe working areas at the highest levels. The climbing shoe can be mounted on the wall and the slab edges, allowing greater flexibility when climbing this complicated structure.

The CB 240 / CB 160 climbing scaffold systems are framework brackets for supporting large area wall formwork during construction of the building core walls. Their design allows for fast striking procedures, simple crane handling and safe access to the large working space provided by the decking.

In addition, Peri's system has been used at the Bukit Panjang Station, part of the Downtown Line 2 (C912) project, covering the



Above: Peri's Skytable system being used to support the staggered balconies on the Marina One development.

Below: The Skytable and RCS-P climbing protection panel on one of Marina One's residential towers.



Above: Peri's Up Rosett Flex system in combination with ST 100 stacking towers and Vario GT 24 wall formwork system at the Bukit Panjang Station.



Left: An aerial view of the Bukit Panjang Station.

design and construction of the MRT station including a civil defence shelter and its associated tunnels with three basement levels.

The 16.6 km long Downtown Line 2 comprises a depot and 12 stations, including three interchange stations that link to the North East Line, North South Line and Circle Line. The project started in July 2009 and was completed in 2015. The main station, entrances and tunnel structures were constructed by cut and cover method. This construction method requires flexible and productive formwork solutions with a high safety standard to allow smooth operation underground.

The Peri Up Rosett Flex, designed as a table form, was adopted for the cut and cover tunnel. With its ability to allow any adjustments to be made to suit the project, the shoring units can be moved to the next casting position with the Peri moving trolley quickly and efficiently.

For the concourse and the roof slab shoring of the station, the ST 100 shoring towers and Multiprops were used in combination to cast slabs with varying layouts and thickness of up to 2 m. Both systems feature lightweight components and simple assembly process.

The Vario GT 24 wall formwork was chosen for the wall construction because of its continuously adjustable element connections for all designs and applications. In the areas with space constraints, the Trio panel formwork was used due to its versatile panel formwork system. ■

Website: www.periasia.com

Auger Torque overcomes challenges in Pilbara project

Auger Torque has supplied its 25,000MAX earth drill to the Australian piling contractor, Pilewest, for use in a drilling project in the Pilbara region of Western Australia.

Pilewest required an earth drill that is reliable with high performance and flexibility to work in anything, including soft ground, sand and clay, and even solid rock. The company finally chose the 25,000MAX earth drill from Auger Torque.

The earth drill was used together with a Takeuchi TL12 High Flow to install cyclonic tie down foundations for the solar frames that will power the communication sites along a new railway line. The combination of the two created a skid steer loader with a massive 25,000 Nm of torque. The varying ground conditions, remote and difficult access and extreme weather conditions were all incredibly harsh on the equipment.

The 25,000MAX earth drill is intended primarily for 15-22 t excavators, so a custom heavy-duty frame had to be designed and then fabricated in house at Auger Torque's Brisbane factory. Working on a tight time frame and the remoteness of the worksite meant that there was no margin for error. ■

Website: www.augertorque.com.au



Top and above: The Auger Torque 25,000MAX earth drill is mounted on a Takeuchi TL12 High Flow; together they install cyclonic tie down foundations for the solar frames that will power the communication sites along a new railway line.




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XCMG plays 'heavy' role in Sanyuan Bridge project

The girder replacement project for Beijing's Sanyuan Bridge has been completed. Built in 1984, the bridge is located in Beijing's Northeast Third Ring Road; it is one of the busiest traffic sections in the city connecting the Third Ring Road, Jingshun Road and the airport expressway.

On 13 November 2015, the project started. The old girder was split into side-span and mid-span, with the former being divided into nine sections and the latter into inner and outer rings. However, the bridge plate turned into 'V' shape due to perennial pressure. The highest point in the middle of the old girder rose by 30 cm during lifting operations, while the lowest point increased by less than 3 cm. Cracks also occurred in the middle of the mid-span. For safety reasons, the old girder was dismantled on site and transported by segments.

The old girder was split into 27 sections for easy lifting. The inner ring was divided into 15 sections, and the outer ring 12 sections. The lightest element weighed 75 t and the heaviest 139 t. Four XCMG all-terrain cranes, featuring 500 t and 300 t, and two 260 t crawler cranes were used for lifting and transporting the 27 sections of the old girder.

Two girder carriers were also used. One of them was the 'Shen Tuo' girder carrier featuring a dead weight of 216 t, 50 m long and 5 m wide, and has 96 tyres. The vehicle's maximum lifting stroke is 1,400 mm, overall lifting capacity is 2,200 t and maximum travel speed is 6 m/min. It can also achieve 360-degree turn in situ.

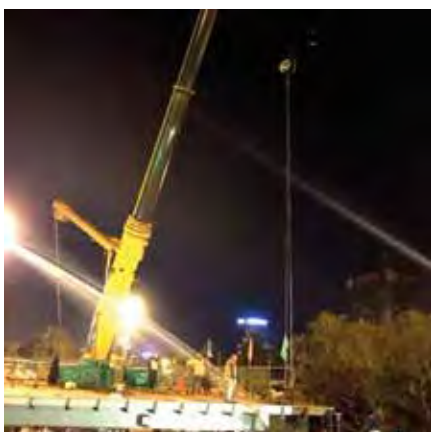
On 15 November, the new girder with a total weight of more than 1,300 t was put into position, completing the girder replacement for the Sanyuan Bridge. ■

Website: www.xcmg.com



Above and left: The girder replacement project for Beijing's Sanyuan Bridge was completed in November 2015.

Below, left and right: XCMG cranes were used on the project to lift and transport the sections of the old girder.



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Gomaco 4400 slipforms parapet at 33 m elevation

The I-40/240 interchange in Memphis, Tennessee, USA, currently handles 200,000 vehicles per day and has turned into a congested mess because of continued growth on the east side of the city; the number is expected to increase to 350,000 in the next 20 years. In September 2013, the Tennessee Department of Transportation (TDOT) let project number CNM305, the Memphis I-40/240 Interchange, to ease congestion and increase traffic flow on I-240 and I-40 and also the local roads connecting into the interstate system. It is believed to be the largest project ever awarded by TDOT.

WMC Contracting Company was tasked to slipform over 12,192 m of four different wall profiles on the Memphis I-40/240 interchange. To help with the work, the company chose a Gomaco 4400 barrier paver. The machine's 406 mm auger was designed specifically for the low-slump concrete used for barrier applications. It has four-way hydraulic positioning to place the auger perfectly for receiving the concrete and the delivery to the mould, which can be placed on either side of the four-track paver. In addition, the operator's platform has a unique U-shape that puts the operator on top of the action and provides a 360 degree view of the entire paving operation. The control console slides from side-to-side to quickly and easily accommodate right-side and left-side pours.

It is the company's first machine to feature Gomaco's proprietary G+ control system. The tractive system on the 4400 allows for the minimum speed and smooth crawl necessary for a vertical wall. The G+ speed dial turns to adjust in one percent increments and a speed display feedback allows for smooth, precision paving speed control.

Since the 4400 joined the company, it has been at work on the I-40/240 interchange and other projects in the Memphis area. One of the more challenging pours was slipforming the TDOT standard 620-05.01 concrete single slope parapet on the eastbound I-40 flyover. The 4400 and its crew worked on a flyover 33 m above ground level slipforming the new parapet.

The I-40 eastbound flyover is the fourth level of the interchange. It is said to be the first of its kind in West Tennessee and stands over Sam Cooper Boulevard, I-240 northbound and the I-240 southbound ramp bridge. The flyover is 707 m long, so WMC Concrete had 1,415 m of parapet to slipform on the structure.

The single slope parapet is 914 mm tall, with a 178 mm top cap, and 762 mm bottom width. Federal regulations limit the size of the ready-mix loads to 4.2 cu m per truck so WMC Contracting, instead of running the normal four truck rotation, increased to between six to eight trucks to keep the 4400 supplied with concrete.

The concrete for the project is a state of Tennessee 3,000 psi Class A slipform mix design with four to six percent air content. Concrete slump averages 38 mm. Production on the wall averages 244 m of parapet and 68.8 cu m of concrete during a six hour day of slipforming. Finishing work is kept to a minimum behind the paver, with a broom finish applied, a clear spray cure, and joints saw cut into the wall at 3 m intervals.

WMC Contracting Company continues to work on the project slipforming the different profiles of wall using the 4400's right-side and left-side slipforming capability. The entire I-40/240 Interchange has a project completion date of July 2017. ■

Website: www.gomaco.com



Above: WMC Contracting will be slipforming over 12,192 m of four different wall profiles on the Memphis I-40/240 project.

Left: WMC Contracting slipforms new bridge parapet on a flyover for the Memphis I-40/240 project. The company is working 33 m above ground level with its Gomaco 4400 barrier paver. Parapet production averages 244 m during a six-hour day.



Right: WMC Contracting slipformed 1,415 m of 914 mm tall single slope parapet on the flyover.

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Zeng Guang'an,
chairman of LiuGong.

GOING THE DISTANCE

THE SLOWDOWN IN ECONOMY HAS HIT THE CONSTRUCTION EQUIPMENT INDUSTRY WORLDWIDE – BUT FOR LIUGONG, THIS MEANS A NEW DIRECTION. THE COMPANY'S KEY EXECUTIVES RECENTLY SHARED WITH SOUTHEAST ASIA CONSTRUCTION THE CHALLENGES AND OPPORTUNITIES THAT LIE AHEAD.

Founded in 1958 in Liuzhou, China's Guangxi region, LiuGong began its globalisation in 2003. The company was quick to establish overseas subsidiaries and undertake mergers and acquisitions in key regional markets. Its international offices are now located in Singapore, Hong Kong, India, UAE, Africa, Brazil, Netherlands, Poland, Russia and the US, coupled with eight overseas parts depots.

In addition, LiuGong has built a network of more than 380 dealers in over 136 countries. The company also works closely with its global partners, such as Cummins, ZF and Metso. LiuGong said that today its overseas business accounts for more than 35 percent of the total revenue, with overseas employees making up 20 percent

of the staff and overseas assets accounting for nearly 10 percent of the total assets.

Zeng Guang'an, chairman of LiuGong, attributes this success to the company's global vision, confidence and commitment. "Judging from our current status and so far satisfying achievements, LiuGong's globalisation strategy has been ahead of the era and all our efforts are paying off."

The company's drive to succeed clearly comes from its genuine aspiration to learn and grow. Mr Zeng explained, "As a newcomer in the global arena, we need to be open minded and learn from other OEMs, especially the Americans and Europeans. They are more developed, and they can come up with quick yet effective solutions.

Chinese companies are good at making policies, but we still lack the ability to solve difficult problems. European and American companies are capable of handling both tasks.”

He added, “The economic slowdown last year provided us with a wake-up call to improve ourselves. So we maximised our capabilities and revised our policies according to the market situation.

“Despite the domestic market’s tumble, LiuGong still performs well in sales revenue and profits due to our overseas business. Meanwhile, the overseas markets have played a significant role in the improvement of product technologies, product quality and LiuGong management systems.” Mr Zeng predicted that international business will account for 40 percent of LiuGong’s revenue in 2020.

Innovation matters

Refining its strategy, LiuGong has made a fresh start to its technical innovation. The company established a new global R&D centre in Liuzhou, which was officially opened in June 2015. This initiative is expected to boost the company’s research and development capability to a level comparable with leading global construction equipment manufacturers. “We are adjusting to a ‘new normal’ to enable us compete with international giants,” said Mr Zeng.

“By virtue of the world-class hardware that the LiuGong global R&D centre is equipped with, there will be a fundamental change for the better in how we approach R&D. There is no doubt that it will improve our experimental and research abilities, while enabling us to incorporate key technological advancements into our products.

“One of the main objectives of the new development centre will be to encourage greater interaction between our R&D facilities worldwide: expert teams exchanging information and better utilising resources, and a more efficient process in turning technological development into application.”

He emphasised, “R&D is the nucleus of the future and the ability to be innovative is an uppermost priority for the future. The new centre is a significant commitment to future technology, with many more scientific and technological advances being made. We are confident it will provide all tools we need to become the game-changing company in the construction equipment industry.”

The new R&D centre spans 110,000 sq m, which consists of an office complex covering an area of 22,000 sq m, a global

“R&D IS THE NUCLEUS OF THE FUTURE AND THE ABILITY TO BE INNOVATIVE IS AN UPPERMOST PRIORITY FOR THE FUTURE.”



Above: Mr Zeng meets up with LiuGong customers at the 2014 bauma China exhibition.



Left: VP of LiuGong, David Beatenbough, is in charge of the company’s research and development.



LiuGong’s new global R&D centre in Liuzhou covers an area of 110,000 sq m, which includes an office complex, a global test centre, a prototype centre, seven laboratories and a large outdoor experimental field. It can accommodate approximately 1,200 engineers and designers from around the world.

test centre with an area of 100,000 sq m, a prototype centre, seven laboratories and a large outdoor experimental field. It can accommodate approximately 1,200 engineers and designers from around the world.

Development of engineers' talent is a key target at LiuGong, and the new R&D centre has several specialised training laboratories including virtual reality studios and industrial design studios, which will also be the focal point for technical training within the company.

"Recruiting top class talent is always a challenge," said David Beatenbough, vice president of LiuGong, who is in charge of research and development. "We do have several methods to find our engineers, such as working together with several universities in China and Poland. Some of our programmes are just that, personalised recruiting assistance, while others are cooperative research ventures that may result in skilled experts wishing to join LiuGong."

Mr Beatenbough pointed out, "We want to bring highly skilled people to LiuGong whose primary outlook is to teach and inspire their colleagues in their specialities.

"I am not interested in bringing in engineers just to build a better machine; I want to hire engineers who build a better machine in a way that educates and hones the skills of their fellow employees."

The new R&D centre will initially focus on major research, development and testing for LiuGong's lines of wheel loaders, excavators and graders. One of its first projects will be the completion of research and development, as well as testing for the latest models of H-series wheel loaders.

The comprehensive range of laboratories will develop sophisticated measures to test and optimise all aspects of machine performance, such as structural design, materials science, electronic and hydraulic efficiency, cooling, vibration and noise. The laboratories will allow accelerated endurance testing as well as a wide variety of performance testing.

The new R&D centre will also facilitate the development of LiuGong components to be used across its product lines. "We have invested heavily in our component development capabilities as well as our production facilities," explained Mr Beatenbough. "We produce a wide range of components not only for our wheel loaders and excavators, but also for our other product lines. For example, axles for skid steer loaders, cylinders for several product lines, electronic controllers for numerous

"I AM NOT INTERESTED IN BRINGING IN ENGINEERS JUST TO BUILD A BETTER MACHINE; I WANT TO HIRE ENGINEERS WHO BUILD A BETTER MACHINE IN A WAY THAT EDUCATES AND HONES THE SKILLS OF THEIR FELLOW EMPLOYEES."



Above: Mr Beatenbough conducts equipment testing.



Left: In 2015 LiuGong opened its first manufacturing plant in Brazil, located about 180 km from São Paulo.



applications, and many other components for various product lines.

"This effort will continue, and we are investing in several new R&D projects applying our component technology to new applications and product lines."

When asked whether LiuGong will supply its components to other OEMs in the

Above: One of the first projects to be carried out by LiuGong's new global R&D centre in Liuzhou is the completion of research and development, as well as testing for the latest models of H-series wheel loaders (pictured).

Continued on page 56...

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Continued from page 54...

future, Mr Beatenbough replied, “We must consider the quality of our components, capacity of our factories, and in some cases, protection of sensitive intellectual property. If we can meet those considerations, then yes, we will supply our components on an OEM basis.

“In fact, LiuGong currently supplies on an OEM basis through our JV’s with Cummins for engines and ZF for transmissions and axles. We also have a gear and transmission facility (ZZN) in Poland that produces, primarily on an OEM basis, sophisticated gears and drive line assemblies.”

With R&D and continual product improvement now considered fundamental to its business activity, LiuGong is confident the new R&D centre will help establish it as one of the world’s leading companies in the construction equipment industry.

“For LiuGong to continue our growth path, we need facilities that enable our design and engineering teams to innovate and utilise the technologies that will drive the future of our machines,” said Mr Beatenbough.

“I can confidently say that within a very few years there will be technologies and products from LiuGong that will advance the industry.”

Technology meets creativity

Apart from its technological developments, LiuGong has also invested in the design innovation of its machines. The company’s industrial designers play a critical role in this process.

“Design is a key element that enables LiuGong to differentiate its machines from the competitors. It reinforces our brand and reflects our identity. So we must get it right!” said Gary Major, LiuGong’s Industrial Design director.

“First impressions do count. The moment someone makes a contact with anything, be it a car, a painting or a piece of construction machinery, they’ll have an opinion on it within a second - though they might not be aware of it - which could influence their buying decision. That’s how aesthetics work.”



Gary Major, LiuGong’s Industrial Design director.

“DESIGN IS A KEY ELEMENT THAT ENABLES LIUGONG TO DIFFERENTIATE ITS MACHINES FROM THE COMPETITORS. IT REINFORCES OUR BRAND AND REFLECTS OUR IDENTITY. SO WE MUST GET IT RIGHT!”



LiuGong Industrial Design studio at the company’s new global R&D centre in Liuzhou.

‘ONE BELT, ONE ROAD’

The Chinese government’s ‘One Belt, One Road’ initiative - also known as ‘The Belt and Road’ or ‘B&R’ - is a trade network covering the Asian, African and European countries located along the routes of the ‘Silk Road Economic Belt’ and ‘21st Century Maritime Silk Road’. It aims to promote a win-win cooperation among participating nations by breaking infrastructure bottlenecks.

The initiative is presenting opportunities to many construction equipment manufacturers, including LiuGong. In the past 10 years, the company has set up a business network in 62 of the 65 B&R countries. And in 2012, by acquiring the civil engineering machinery division of the Huta Stalowa Wola and Dressta brand in Poland, the company expanded its dealer network and established a base at the start of the Silk Road Economic Belt construction.

The Silk Road Economic Belt covers a vast territory of geographical diversity, such as plateaus, deserts and frozen earth. The environments are also more demanding with extremely hot summers and freezing winters, which inevitably result in difficulties in the construction of infrastructure and



Left: Government officials joined the B&R seminar hosted by LiuGong in November 2015.



Right: A highlight of the seminar was the signing of a cooperation agreement between LiuGong and the China International Contractors Association to further promote LiuGong’s business in B&R countries.

place high demands on the heavy equipment used. This is where LiuGong machines will come handy, as they have been specifically designed for use in remote and tough conditions.

In November 2015, LiuGong held its 12th global dealer conference in Nanning, China, attended by approximately 300 representatives, comprising LiuGong dealers from more than 50 countries and over 100 guests including key customers and

government officials. As part of the event, LiuGong organised a B&R seminar to discuss the future development of business as part of the initiative, as well as to look at current projects that are taking place as part of the strategy. A highlight of the seminar was the signing of a strategic cooperation agreement between LiuGong and the China International Contractors Association to further promote LiuGong’s business in B&R countries.

Legislative changes, customer demands and new technologies make the design of construction equipment a complex process. Thus, it is necessary to get the right designers with the right skills.

However, as Mr Beatenbough mentioned earlier, it is not easy to find top-class talent. “This is especially true in Asia,” said Mr Major. “Industrial Design is not a common skill here. The best way is to build a relationship with local universities in China and other Asian countries, like Hong Kong.

“The ability to design is not something you can teach – it is an instinct; but you can build on that instinct to improve on the design. On top of this, you have to be visionary and able to design for the future. The shelf life is usually around five years, but if you can do it better, then do so.”

Another important task is to maintain consistency in the design, explained Mr Major, “We have a strong in-house team from a variety of professional design backgrounds. This allows us to ensure a fresh approach whilst maintaining continuity of form language and in turn deliver brand consistency.”

Mr Major added, “Compared to their predecessors, today’s operators are more design savvy, with better awareness of technology and higher appreciation of quality. They take form and detail more seriously and therefore, the aesthetic appearance of a machine can be a determining factor.

“Even though design tastes vary between countries, we usually try to design machines that are applicable for global use. Of course, from time to time we still need to fine-tune them depending on the markets.”

Many end-users might also wonder, doesn’t a higher quality of design mean higher costs of products, which could eventually reduce LiuGong’s competitiveness in the industry? “Not at all,” asserted Mr Major. “If a machine is well designed, it doesn’t necessarily have to be expensive. Although it may look expensive.

“The ultimate goal is that, if you see a LiuGong machine from a long distance away, you can recognise it immediately.” ■

Website: www.liugong.com



Top and above: Besides technological developments, design innovation is also a significant investment for LiuGong. By hiring top-class industrial designers, the company strives to be one of the world’s most revolutionary construction equipment manufacturers.

(*Note: More detailed information on LiuGong design innovation can be found in the Jan/Feb 2015 issue of SEAC.)

China-Laos railway

Among the first official overseas construction projects under the B&R initiative is the China-Laos railway, which seeks to boost the socioeconomic development of Laos, improve the nation’s transportation and generate enough jobs for local people. The groundbreaking ceremony for the project recently took place in Vientiane, Laos.

LiuGong expects to take part in the project. The company was present at the event, showing its nine machines including wheel loaders, excavators and road equipment. LiuGong’s local dealer in Laos is Weikai Import and Export Trading Company.

The 418-km rail line is scheduled for completion in 2020. Once operational, it is set to become Laos’ longest and fastest railway; it starts in Kunming and travels southward to Jinghong and Mohan until entering Laos through the city of Boten. It then travels past Luang Prabang and Vang Vieng before arriving in Vientiane.

The route passes through one of the most extreme geographic and climatic regions in the



LiuGong attended the groundbreaking ceremonies of China-Laos railway (left) and China-Thai railway projects.

world, and more than 60 percent of the construction will be bridges and tunnels. As a result, the project will need tough equipment that is flexible to work in harsh environments and can deal with complicated construction requirements.

China-Thai railway

Another project under the B&R initiative is the China-Thai railway, which also recently held its groundbreaking ceremony in Chiang Rak



Noi Railway Station, Bang Pa-in County, Phra Nakhon Si Ayutthaya, Thailand. Five LiuGong machines were on display at the event. It is a strategic cooperation project jointly developed and promoted by the two governments, aiming to achieve interoperability between the two countries through the railway. The total length of the railway is 873 km, and its expected cost is US\$12 billion. Once operational, the line will be connected to the China-Laos railway. ■



Tabsakae Granite's quarry aims to produce 50,000 t of aggregate each month.

THAILAND CALLING

Tabsakae Granite Co Ltd operates a quarry and a concrete plant in the Prachuap Khiri Khan region of Thailand. The quarry aims to produce 50,000 t of aggregate each month, with around 40 trucks carting the aggregates away every day. The company has permission to operate at the 130 rai (1 rai = 1,600 sq m) location for 10 years. About 60 percent of the aggregate production is sold to other companies, with 40 percent being used by the company's own concrete plant. This is situated approximately 40 km to the south of Prachuap Khiri Khan, and 40 km away from the quarry, delivering concrete within a 100 km radius. Another production line produces granite aggregate for use in dam protection in several regions of Thailand.

"Our clients come from Singapore, Bangladesh and Brunei because they prefer the high quality of our aggregates," explained Isun Atpaset, owner of Tabsakae Granite Co Ltd. The aggregate is also supplied throughout Thailand, with one interesting application being the planned lower east-west railway corridor, which is financed in cooperation with Japan. The railway line connects the planned Dawei Project in Myanmar (a deep sea port that is built to open up a new transport link between Southeast Asia and southern China) with ports in Vietnam and with China.

Complete mobile screening and crushing plant

Tabsakae Granite has worked closely with PV Mining & Exploration Co Ltd, a specialist in mineral excavation planning applications, to design a process of how to best produce products from the granite quarry, and then transport it for aggregate production.

The first stage of granite production at the quarry is currently accomplished by hydraulic breakers and excavators. However, this is only an interim solution, as PV Mining is undertaking the necessary legal and associated work for Tabsakae Granite to acquire a license to use explosives at the site. When permission is obtained to use explosives drill and blast will be used.

As for its screening and crushing system, Tabsakae Granite finally chose a solution from Sandvik Construction. "Mobile crushers and screens from Sandvik give me the maximum possibilities for conducting my business," boasted Mr Atpaset. "The flexibility and the high production rates were very impressive arguments."

Sandvik also provided support and advice, bringing different parts of the production process together. In addition to the equipment, professional training and advanced simulation programmes were used, drawing on data from numerous job sites from all over the world. "We needed only one month to teach our staff how to produce aggregates with the Sandvik crushers and screen," added Mr Atpaset.

The crushers and screens are used processing ballast from 63 to 25 mm, and concrete aggregates in fractions of 25 to 10 mm, and 10 to 0 mm. Cost effective production is ensured with the combined plant having low fuel consumption of around 100 l/hr. The plant currently works in closed circuit, in a 'star formation' designed to maximise the efficient production of the aggregates.

Continued on page 60...

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SENNEBOGEN

Continued from page 58...



The Sandvik mobile screening and crushing plant currently works in closed circuit, in a 'star formation' designed to maximise the efficient production of the aggregates.

A mobile jaw crusher is at the start of the plant, with the QJ341 used at the quarry designed to operate in a variety of different conditions. Equipped with a single toggle jaw crusher, this heavy duty machine delivers high output producing aggregates of the highest quality. It is designed to be able to work in rugged conditions, and is ideal for dealing with quarried materials. The QJ341 weighs 48.2 t (which is in the lower weight-range of the Sandvik crusher models available - 35 to 135 t) and has a 1,200 x 750 mm wide jaw opening. This enables high output at high reduction ratios, with the modern intelligent design meaning tricky applications are easily dealt with.

Operator control and use is inbuilt into the QJ341, with the Sandvik PLC control system and control screen making the crusher easily controllable. The automated control system, wide maintenance platforms and the dust-proofed components, are also designed for operator convenience and safety. The 350 hp Cat engine is powerful but has very low fuel consumption. To maximise output the jaw setting is hydraulically adjustable, and may be reversed in order to relieve blockages. Downtime of the crusher is minimal as the crusher may be started 'under load' with the hydraulic drive.

With his choice of cone crusher, Mr Atpaset said, "The QH331 satisfies all my demands on the production of high quality aggregates." At the heart of the QH331 is the CH430 cone. This is equipped with a hydroset system, which facilitates several adjustment functions. The automatic setting regulation system optimises production, as well as minimising interruptions and downtime by controlling the liner wear. A level sensor is also fitted for regulating the feed thereby optimising production, reduction and shape.



Isun Atpaset, owner of Tabsakae Granite Co Ltd.

Another useful feature on the QH331 is the remote camera. This enables viewing of the crushing chamber from ground level for ease of operation and operator safety. The 350 hp engine of the 32.8 t QH331 delivers maximum power transfer with high production capacity, but simultaneously delivers low fuel consumption by using the efficient direct drive system.

The final unit of the crushing and screening system is the QA451 Doublescreen, which features Sandvik's Doublescreen technology. This system enables an increase in throughput, control and screening efficiency due to the two inline independent screenboxes. "The Doublescreen with three decks is a huge advantage compared to a traditional single (screen) box because our productivity is visibly increasing," explained Mr Atpaset.

The QA451 has two screenboxes, each 3 x 1.5 m, a large hopper and extended conveyor belts. When used in conjunction with the tracked crushers, the QA451, as well as other Sandvik mobile screeners, is able to work in closed circuit operation. If in future an extension to the plant is needed, a fourth unit may be easily added. Facilitating enhanced production, the feeding position to this fourth upstream unit can be optimised by slewing, raising or lowering the fourth conveyor hydraulically.

By mid-2016 at the latest, plans are in place to move the whole mobile crushing and screening plant from the current site to another location. ■

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The highly complex technical challenges make the construction of the 3.34 km long tube for the Eurasia Tunnel one of the world's most demanding tunnelling projects.

THE BOSPHORUS breakthrough



From the launch shaft on the Asian side, the Eurasia Tunnel runs beneath the Bosphorus towards Europe – at a depth of up to 106 m below sea level. Inclinations of up to 5 percent were overcome.

The Bosphorus road tunnel project in Istanbul, Turkey, which broke through in August 2015, is a major achievement on one of the world's biggest and most challenging tunnel drives. At 13.66 m diameter and 11 bar of water pressure in fractured rock and soft ground, the 3.34 km long bore is unprecedented.

Making the job more difficult for both tunnellers and tunnel machine is the combination of challenges, including high water pressure, soft ground and very large diameters, as well as blocky, fractured, abrasive and difficult rock, among others. There was also a high seismic risk from the major Marmara fault line just to the south of Istanbul. Special yielding joint technology

has been applied at two critical points, the joint segments produced and tested in Japan.

The tunnel runs across the narrow Bosphorus seaway connecting the Black Sea to the small Sea of Marmara and the Mediterranean beyond it. The sea channel separates not only two sides of the city, but also two continents, Europe and Asia. The new route sits at the southeast end of the Bosphorus, on the populous urban coast of the Marmara sea, running between the historic Golden Horn peninsula on the west with its Blue Mosque and Hagia Sophia, and the port districts on the Asian side.

Currently ferries link the bustling conurbation at various points and there are two major road bridges at the mid-point of the Bosphorus - but both are clogged with traffic at rush hours. Now the new tunnel section, and the overall 14.6 km long highway it is part of, will cut journey times from a 100 minute round trip to a 15 minute direct journey. The link will also relieve traffic loads on the bridges without intruding on the famous skyline. To do this, the alignment must go 106 m deep under the Bosphorus.

The great channel was carved through the local Trakya Formation, a complex of sandstones and mudstones, by sudden massive flows of water between the seas in geological times. In the glacial period it was partly filled with soft alluvial deposits but the water is still 62 m deep where the tunnel crosses, with bedrock 40 m below that. The tunnel goes through the permeable sediment and highly fractured rock, each saturated with the seawater above.

“That meant using a TBM that could handle hard and soft ground and at high pressure. It had to be a slurry machine, a Mixshield type,” said Gert Wittneben, TBM construction manager for the YMSK

joint venture. YMSK JV is a combination of Turkish contractor Yapı Merkezi Construction as leader and Korean firm SK Engineering & Construction as partner.

The impermeable reinforced concrete segments used in the subsea tunnel have an average compressive strength of 70 MPa and were produced by the Yapı Merkezi prefabrication division.

TBM with special features

The TBM from Herrenknecht has a face provided with both hard rock discs cutters, mounted on six radial arms, scrapers and buckets and openings between the slurry support and spoil removal. The chosen TBM was designed with some special features to tackle the conditions. Firstly, it had to resist the very high pressure, up to possibly 12 bar. Then as far as possible it had to allow working conditions inside at atmospheric pressure, and a key element in this was to be able to change disc cutters.

“We have used a sophisticated system to allow the disk changing directly from within the cutter arms at atmospheric pressure,” said Werner Burger, head of engineering at Herrenknecht. He said the design approach was first used on a machine in Hamburg, but not at this size and depth. Discs, which are 19-in double edge types, are removed from the face along with their housing and a new cutter-housing unit is installed; this operation takes about two to three hours. Overall, approximately 500 excavation tools have been changed during the complete drive - all under atmospheric pressure from within the cutter arms.

Inside the TBM’s control cabin, a special monitoring system from VMT was used for the first time. It monitors the performance



The Mixshield type Herrenknecht TBM S-762 has a diameter of 13.66 m. One of the technical innovations is an accessible cutting wheel for safe replacement of the excavation tools under atmospheric conditions. Special lock systems allow interventions at up to 11 bar ambient pressure.



of the disc cutter system, measuring key values like rotation and temperature. Results are displayed on a screen where sound units are shown in green and abnormal discs show a yellow or red alert.

“Normally a disc should be revolving and if it slows or stops that is an indication of wear or even a possible breakage,” said Mr Wittneben. “It is important to know if a unit is jammed or broken, particularly to prevent metal debris getting into the rest of the face or spoil crusher system, where secondary damage can occur which is difficult to cope with.” He said that after a few teething problems the system has proved excellent and beneficial for the disc cutter performance. It works in conjunction with a wear detector pin system, which is a hollow projection alongside the disc with pressurised hydraulic fluid inside. If the disc wears too far the top of the pin is worn off and fluid released which a pressure detector picks up, again alerting the operator.

To change the heavy disc cutters and housing units, weighing up to 1 t, the TBM is fitted with an internal railway with a carrying trolley and lifting equipment. The same rail is also used to transport a diving pressure transfer chamber in case of interventions needed into the pressure chamber behind the TBM cutting wheel. The pressure compartment fits onto a special airlock at the top of the bulkhead, lifted up by a scissor platform at the end of the rail. Divers use the chamber to return to surface and enter a decompression unit where they have to stay up to three weeks after a dive. “The TBM bulkhead is also provided with a central lock to allow access into the central bearing area,” said Mr Burger. Both locks are part of a specification on the machine allowing for hyperbaric interventions, a feature to allow for possible maintenance or repair needs, which would otherwise have been extremely difficult if not impossible. Access from outside the machine, if it had stopped, would have been impossible at 106 m water head. Several uses have been made by an onsite diving team.

Other special features on the machine include extra ‘chisel’ grill bars across the slurry openings in the face. These allow for the heavily



Top: The cutting wheel of the 13.66 m diameter TBM briefly after the breakthrough in the target shaft on the European side of the Bosphorus. The different changeable excavation tools like disc cutters and scrapers placed on the six main spokes can be recognised easily.

Above: The TBM successfully crossed under the Bosphorus on 22 August 2015. The breakthrough celebration was attended by the Turkish Prime Minister Ahmet Davutoğlu (centre), vice chairman Erdem Arıoğlu from Turkish construction company Yapı Merkezi (right) and company founder and chairman of the board of management from Herrenknecht, Martin Herrenknecht.

fractured quality of the Trakya Formation, which meant blocks coming away from the face. They were kept in front of the cutting wheel until TBM action reduced their size enough to allow through the spoil grill into the jaw crusher and then slurry line to surface. ■

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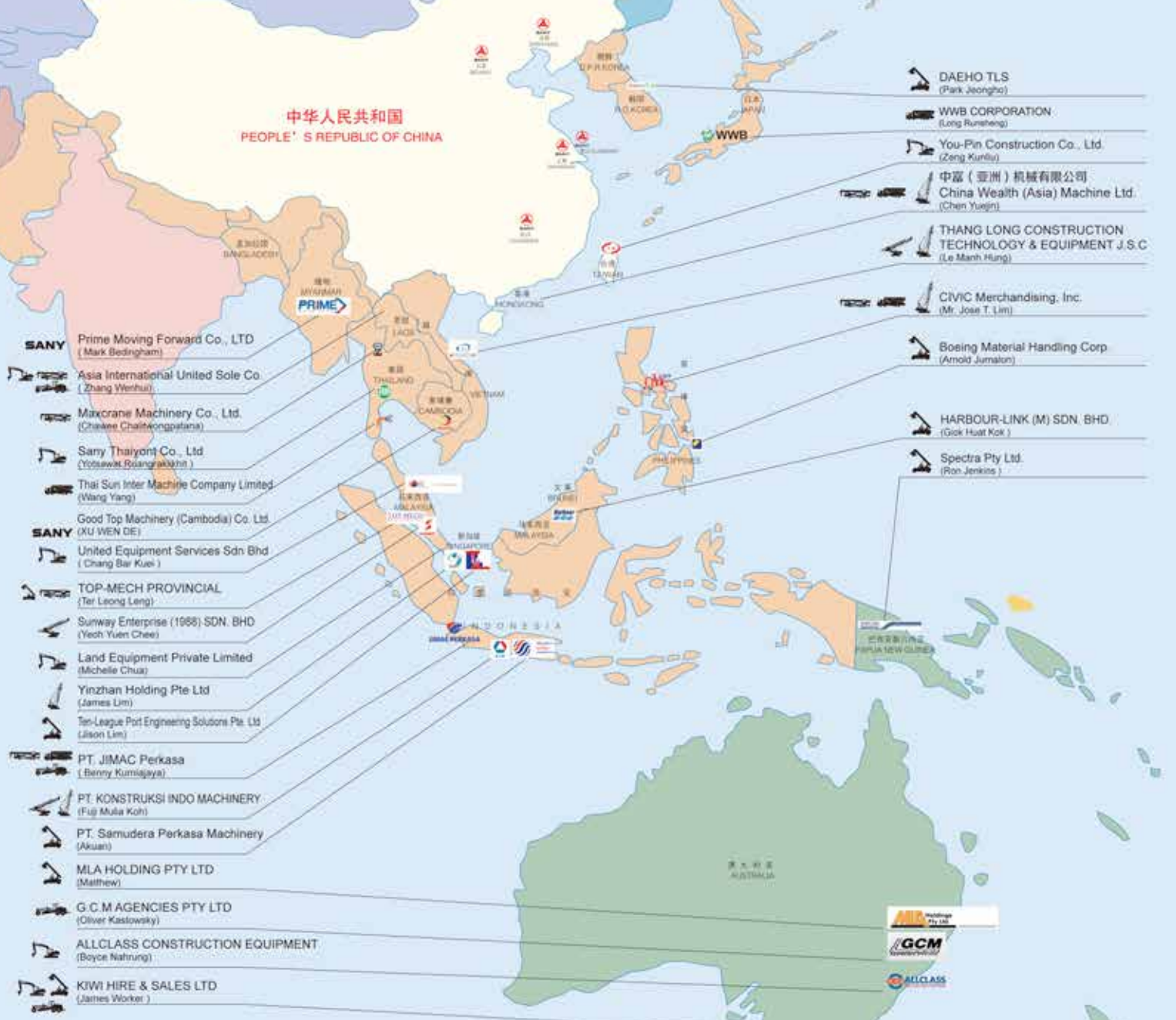
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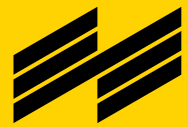
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BUILDING LUSAIL

Lusail is a new urbanisation project along the east coast north of Doha, the capital of Qatar. This new city will be built on a 38 sq km area starting at the West Bay Complex Canal, northeast of Doha. It stretches 7.5 km north along the coast and extends up to 5 km inland. After completion, it will be home to a population of 200,000, offer work for 170,000 people and accommodate 80,000 visitors. To this end, comprehensive earth movements have taken place since in 2007.

Lusail will include large blocks of land and bodies of water, internal connecting channels and offshore islands. Two pedestrian

bridges that connect three islands will provide a continuous pedestrian experience fringing a marina for 350 boats. Contractor on the project is FCC Construction-Petroserv JV

Bridge construction

The design of the bridge resembles a necklace featuring interlocking ellipses with concrete decks suspended by steel cables attached to slender pylons. The two bridges are 90 and 100 m long and built simultaneously. Doka was hired to supply preassembled formwork materials for the bridges.

The pedestrian bridge design resembles a necklace with interlocking ellipses.



The formwork system for the bridge construction consists of Staxo 40 load-bearing tower and Top 50 large-area formwork, which meets all architectural requirements specified by the customer. This includes the surface structure of the bridge deck that was to meet requirements of fair-faced concrete provided by Dokaplex formwork sheet.

Precision panel joints result in a perfect joint pattern that eliminates rework. Due to the course of the changing bridge level, the shoring tower has to be adapted accordingly for each pouring section. The Staxo 40 load-bearing

Continued overleaf...

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tower allows for precise adaptation of the shoring tower to the building specification. Adjustable U-heads and feet of the screw jacks with 75 cm extension range allow for easy height adjustment.

In order to provide for maximum efficiency in terms of construction time, the bridge deck formwork was assembled in advance. The finished systems were delivered just in time by way of special shipment and immediately ready for use.

“We are very happy with the pre-assembly of formwork systems. It saves us time and ensures quality. This process made assembling the formwork sheets on the load-bearing tower quick and easy,” said Victor Gomez Lopez, construction manager of FCC Construcción.

Doka had been involved since the planning stage, providing advice on all issues regarding options for formwork engineering pertaining to architectural requirements. Here, the ability to adapt quickly was also necessary, with the bridge design and consequently load-bearing tower and formwork requirements changing several times during planning, explained Doka. Theoretical and hands-on training session prior to start of construction were helpful for the crew, ensuring smooth implementation of processes and efficient construction progress.

The initial formwork was delivered in August 2013. In-situ concrete work for both pedestrian bridges was completed on-schedule by early 2015. ■

Website: www.doka.com

Below, left: The bridge deck formwork was assembled in advance. The Dokaplex formwork sheet provides a surface structure that meets requirements of fair-faced concrete.

Below, right: Thanks to its adjustable screw jack U-heads and screw jack feet, the flexible Staxo 40 load-bearing tower can be adjusted precisely to the changes in bridge height.



© Lusail

Above: Doka delivers a custom-made formwork solution for the 90- and 100-m long pedestrian bridges.

Below: Doka’s Staxo 40 load-bearing tower and Top 50 large-area formwork meet all architectural requirements specified by the customer.



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QUEENSFERRY CROSSING

In October 2015, Southeast Asia Construction visited the Queensferry Crossing in Edinburgh, Scotland, to take a close look at this massive project.

The new Queensferry Crossing, which sits alongside the existing Forth Road Bridge (FRB), is being built to safeguard the cross-Forth M90 motorway corridor following concerns about the long-term viability of the FRB. The Firth of Forth is an estuary on the east coast of Scotland, and also the mouth of the River Forth to the North Sea.

The Queensferry Crossing bridge will be a main transport artery between Edinburgh and the northern regions of Scotland. The construction project began in 2011 and is scheduled to be completed in 2016. Upon completion, this 2.7 km long bridge is set to be the world's longest cable stayed bridge with three towers.

The Forth Crossing Bridge Constructors (FCBC) – a consortium of Hochtief, Dragados, American Bridge and Morrison Construction – is building the bridge and connecting roads. The specimen design

for the Queensferry Crossing was completed by the Jacobs Arup Joint Venture on behalf of Transport Scotland. The final design, on behalf of FCBC, was undertaken by the Design Joint Venture comprising Grontmij, Gifford, Ramboll, and Leonhardt Andra and Partners.

Lifting challenge

More than 12 Liebherr cranes, including three Liebherr 630 EC-H 40 Litronic top-slewing cranes are involved in the project. In addition to the crane supply, the company is responsible for the cranes' overall development. This includes a special design for the high wind speeds, which prevail in this region, as well as the required calculations for the guying on the towers and the loads for the caisson foundation.



Top and right: The Queensferry Crossing over the Firth of Forth is being built next to the existing Forth Road Bridge. When completed, this new 2.7 km long crossing is expected to be the world's longest cable stayed bridge with three towers.

Above: Another crossing over the firth is the iconic Forth Bridge, also known as the Forth Rail Bridge. It is a landmark for Scotland and a UNESCO World Heritage Site.

Each of the three tower cranes stands on a client-constructed steel foundation known as a caisson, on the bridge towers in the water. The tower cranes were installed using a barge, on which a crawler crane stood. Previously, the individual crane parts were assembled on the mainland.

A particular challenge in the Queensferry Crossing project is the capacity required to handle 30,000 t of steel, with some high individual loads. The Liebherr 630 EC-H 40 Litronic tower cranes are ideal for such applications. The cranes are equipped with 36 m jib and lift up to 180 t at the jib head. At a radius of up to 18 m, the cranes are designed for a 40 t capacity. This configuration enables a particularly high handling capacity with heavy loads. This lifting capacity is also supported by the 110 kW high performance hoist gears from Liebherr, which are in use on the project and ensure fast lifting speeds.

To adapt to the high wind speeds resulting from the open North Sea location, the cranes are specified according to wind zone 'D 25' and configured with the particularly stable 500 HC tower system. The cranes are stationary mounted on 10 m 630 EC H undercarriage. In total, just five guying systems on the pylons are needed to reach the 212 m hook height. The special guying systems were manufactured by the client, on the basis of designs and structural



Left and below: More than 12 Liebherr cranes, including three Liebherr 630 EC-H 40 Litronic top-slewing cranes are involved in the project. Each of the tower cranes stands on a client-constructed steel foundation known as a caisson, on the bridge towers in the water.



Continued on page 74...



TRUCK CRANE AUGERS

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Continued from page 72...

calculations provided by Liebherr. The construction process-synchronised climbing procedure of the three 630 EC-H 40 Litronic tower cranes takes place via their own climbing equipment. Each crane reaches a total height of 235 m.

Since the start of the project in November 2011, a total of 12 different types of Liebherr mobile telescopic and lattice boom cranes have been deployed on the site. Operated by Ainscough Crane Hire Ltd, cranes with sizes ranging from 40 to 500 t have been used to lift components needed to construct the bridge. On average there are eight telescopic cranes on site each day, and in total there have been over 5,500 hire days. At least one model of almost every telescopic

crane that Liebherr manufactures has been used in the project. Smaller cranes are used for handling rebar, placing shuttering and carrying out general construction lifts. The larger cranes are called in to lift bridge deck segments and precast sections.

Two Liebherr LR 1300 crawler cranes, also owned and operated by Ainscough Crane Hire, have been located on the project. One is mounted on a barge situated in the river, which operates in support of the three Liebherr tower cranes. The second machine is based on the shore, and operates in support of the barge, loading out components that are taken to the base of the towers. ■

Website: www.liebherr.com



To adapt to the high wind speeds resulting from the open North Sea location, the cranes are specified according to wind zone 'D 25' and configured with the particularly stable 500 HC tower system.

Project information: www.forthreplacementcrossing.info



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MILAN CENTRALE RAILWAY STATION

The second largest railway station in Italy after Roma Termini, Milan's main railway station handles 600 trains per day. It serves as a terminus for numerous city and airport shuttle buses, and as a station for M2 and M3 lines of the underground railway network. The station recently underwent a facelift in preparation for the Expo Milano 2015, which took place from May to October 2015.

Restructuring work started in 2005 and was more or less completed in 2010, which included renovation work and consolidation of the historic parts of the station to integrate them with the updated ones. It was deemed one of the most important conservation projects on a public building ever carried out in Italy. The 'mixture' of antique parts and modern services gave the station a new lease of life, providing a more modern and functional layout inside an architectural monument.

The project included cleaning and upgrading the original Liberty and Art Deco



Above: Milan's main railway station has undergone a facelift.

Left: Topcem hydraulic binder mixed with Ghiaietto 0-8 mm gravel was used to make the new screed.



Above: Demolishing the old, damaged flooring.



style structure, installation of a new ticket office, new ramps leading directly to the two lines of the metropolitan railway network, connections with the two lateral piazzas and new shopping areas and restaurants. The 'Royal Room', the waiting room originally used by the Savoia royal family on platform 21, was also renovated and is now used to host events and conventions.

Second phase

Various interventions have been carried out at the railway station since 2005. Apart from conservative renovation work on the original parts of the station, which was done in collaboration with the Lombardy Region Cultural Heritage Body, there was also work to strengthen the structure, install stone and porcelain tile floorings, repair the old Gneiss stone flooring and waterproof some areas of the station.

After completing the work mentioned above, the second phase got under way by rearranging the thoroughfares and areas used by the passengers in transit. The Italian National Board required that work on these areas should be performed without



A view of the area in front of the platforms before the renovation.

Continued overleaf...



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Above: Milan's main railway station has been transformed into a more functional, modern and welcoming structure without compromising its characteristic monumental style.

Right: The screed was reinforced by positioning a galvanised mesh at the mid-point.

Left: The slabs of marble were bonded with Keraflex Maxi S1 and the joints were grouted with Keracolor FF.



interrupting the rail traffic. As such, the new flooring in front of the platforms had to be installed mainly at night to avoid interference with passengers passing through the station. It was also important to use products that were safe and quick to apply, but with the capacity to withstand constant, intense foot traffic. For this, Mapei provided its solutions.

Work was carried out on around 4,000 sq m of surface, with 400 sq m covered with asphalt tiles and the remainder with slabs of 3 cm thick Sicilian Perlato marble. The existing flooring was made from large slabs of marble on a bed of mortar, which by now had started to give way; the slabs became detached and were considered a hazard for passengers.

The first step was to demolish the old marble flooring and bed

of mortar down to the reinforced concrete floor slab. A new screed from 4 to 8 cm thick was laid using Topcem special normal-setting, quick-drying (four days), controlled-shrinkage hydraulic binder for screeds, mixed with Ghiaietto 0-8 mm gravel by Vaga (Mapei Group).

The screed was bonded to the floor slab using a bonding slurry made from water, cement and Planicrete latex for cementitious mixes with a 50 x 50 mm galvanised mesh made from 2 mm diameter wire positioned at the mid-point of the screed.

Once the screed had cured (after around 48 hours), the materials chosen for the flooring were installed. For the marble slabs, the recommended adhesive was Keraflex Maxi S1 high-performance deformable cementitious adhesive with no vertical slip, extended open time and low dust technology for ceramic tiles, class C2TE S1 according to European standard EN 12004.

The slabs joints were then grouted with Keracolor FF pre-blended, polymer-modified cementitious mortar. The asphalt tiles, on the other hand, were bonded with Granirapid two-component, high-performance, deformable, rapid-setting and hydrating cementitious adhesive, particularly suitable for bonding floorings subject to heavy traffic. ■

Website: www.mapei.com.sg

The article courtesy of Realta Mapei International no. 54



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The Parc Olympique Lyonnais under construction.

PARC OLYMPIQUE LYONNAIS

France's new football stadium, the Parc Olympique Lyonnais, has recently been inaugurated. Located in Décines-Charpieu, just east of Lyon, the 59,500-seat venue was built by the French football club Olympique Lyonnais to replace the former stadium, Stade de Gerland, at an estimated cost of €250 million. The area surrounding the stadium serves as a new leisure centre and public space, bringing together shops, restaurants, hotels and a football museum.

The first major national event scheduled for the stadium, six UEFA Euro 2016 football matches, is scheduled for June 2016. As such, construction activities were at a fever pitch to complete the stadium by the January 2016 deadline.

Roof installation

With the major structural work and seating areas complete, work turned to installation of the steel structure that supports the enclosure roof. For this critical lifting project, the Sarens Group, a specialist in heavy lift and engineered transports, was brought in to carry the load.

The company answered the call with its 650-t Terex Superlift 3800 lattice boom crawler crane. "We chose the crane for its versatility," said Sam Voeten, project manager for the Sarens Group. "For this project, we needed high capacity at a short radius as well as high lifting capabilities when working at an extended radius without reconfiguring the boom."

Crews prepped the high-capacity crane for the more than 800-km trip from its location in Cherbourg, in northern France, to the stadium. Within one week, 46 trucks carried the crane's body, boom segments, structure and counterweight for working inside the stadium. "We needed a total of 540 t of counterweight for the structure, central ballast and superlift tray to perform all lifts," explained Mr Voeten.

The Superlift 3800 crane's design includes several unique features to assist with transporting components over the road. "No component is over 3 m wide," explained Guntram Jakobs, manager product marketing for Terex Cranes, "so the Superlift 3800 crane is built with transport in mind. It can be easily transported to any market around the world, and features like nesting boom segments and interchangeable counterweight slabs reduce the number of truckloads and lower transportation costs."

The crawler crane's compact transport design also helped out at the stadium. "The access tunnels for truck deliveries were only 5 m high by 4 m wide, so the narrow transport dimensions of the Superlift 3800



crane helped us to get components inside the stadium for rigging,” said Mr Voeten.

Once on site, a crew of five assembled the crane and superlift structure within four days. The crane configuration for the Parc Olympique Lyonnais project required 60 m of main boom with a 42-m fly jib and 36 m of superlift mast. The crane’s hydraulic pinning feature helped Sarens’ rigging crew to quickly assemble the crawler and main boom, while the quick connection system enabled the superstructure to be installed within 15 minutes.

Mr Jakobs explained that crane rigging is not only about speed but also operator aid. “Nothing can slow a project to a grinding halt faster than an accident or worker injury,” he said. “That’s why Terex offers items like our award-winning fall protection system.”

The Terex fall protection system provides safety when rigging the boom sections of the Superlift 3800 lattice boom crawler crane. The device includes a vest harness equipped with a shock absorber and provides secured, tethered walking and working on the main boom. The system stops a fall prior to the rigger reaching the ground, lessening the possibility of injury.

Within two weeks of leaving Cherbourg, the Superlift 3800 crane was ready for months of work to erect the stadium’s steel structure. The Parc Olympique Lyonnais design boasts an enclosed roof, so football games can be played in any weather condition. Sarens’ crews were charged with placing preassembled segments of the steel structure supporting the roof. The smaller exterior flanges were about one third of this size, weighing 50 t each.

The roof supports were placed around the entire circumference of the stadium, and there was limited room for the crane to do its work. “Management of the free space inside the stadium was a challenge,” said Mr Voeten. “Terex helped us by studying the specific parking conditions for this project and corresponding maximum permissible wind speeds at the various working radii.”

The Superlift 3800 crawler crane’s structure was equipped



Top and above: The 650-t Terex Superlift 3800 lattice boom crawler crane was used by Sarens to help with the roof installation.

with 165 t of counterweight, 50 t of central ballast and 325 t on the variable position superlift tray, which offered working ranges from 11 to 19 m. “The Vario superlift system gave our workers more possibilities and flexibility in the use of the superlift tray,” explained Mr Voeten.

The crane quickly and efficiently hoisted and placed the large 150-t inner structure segments. Working at a radius of 43 m, the crane hoisted the structure to its drop-off height of 45 m. With limited space for positioning the crane, crews worked at up to an 81-m radius - nearly the entire length of the football field - to position the smaller 50-t assemblies. These exterior sections were also positioned at 45 m heights for final assembly.

By the second quarter of 2015, Sarens’ crews had the supporting structure in place for final roof installation. ■

Website: www.terex.com/cranes

WE'LL ALWAYS HAVE MUNICH



An aerial view of bauma 2013.

b auma, the world's leading sector event for construction machinery, building material machines, mining machines, construction vehicles and construction equipment, will return to the Messe München exhibition centre, Munich, Germany, from 11 to 17 April 2016. With a total exhibition space of 605,000 sq m, bauma is also believed to be the largest trade show in the world.

In 2013 bauma broke all previous records, attracting a total of 3,421 exhibitors from 57 countries, and 535,065 visitors from over 200 countries. Organised by Messe München, the show takes place every three years in Munich.

bauma Open Innovation

Messe München is launching a new service for the sector: the 'bauma Open Innovation' online platform. bauma participants and other professionals interested in the sector can use this platform to solve their innovation-related challenges, by calling upon the expertise of Messe München's entire cross-disciplinary network of contacts.

On this platform, companies can engage in applications or technology 'scouting'. For example, companies can seek out new

industries or fields of application for their existing products and services, and/or find appropriate technological solutions to meet specific challenges they are facing.

The bauma Open Innovation platform is not the first of its kind at Messe München. A similar concept has already been implemented for the ISPO trade fair. The benefits of such an interdisciplinary 'Open Innovation' method are obvious: via the platform project organisers have virtual access to the combined expertise of over two million visitors and more than 30,000 exhibitor contacts. If a company harnesses their knowledge, wishes and requirements early on in its innovations development, then development times and costs can be lowered. In terms of application scouting in particular the interdisciplinarity of this cross-industry network can help to identify new fields of application for products and services.

THINK BIG!

Following its successful launch at bauma in 2013, the second 'THINK BIG!' initiative will be held at bauma 2016. It is being organised by the German Engineering Federation (VDMA - Verband Deutscher Maschinen- und Anlagenbau) in cooperation with Messe München.

The initiative will feature an extensive and interactive programme focusing on technical training, educational and career opportunities in the construction and building materials machinery industry.

‘THINK BIG!’ is on each day in Hall B0 during bauma 2016. A total of 16 companies, training institutions and associations will be taking part and offering participants a real hands-on experience, as well as explaining the training options and what’s involved in day-to-day work in their companies. To make the whole thing even more exciting, the companies will be bringing along digger, grader and welding simulators, pinball machines, electronic control panels and table football tables operated with joysticks. The schoolchildren will be able to bend miniature masts and experience high-precision electrohydraulics on a hydraulically controlled maze. Also on hand will be trainees, HR people and technical experts and engineers from the companies, ready to talk to the attendees.

The centrepiece of the event will once again be the big ‘Workshop Live!’ stage, featuring 20-minute shows taking place each day, on the hour, between 10:00 and 16:00. Here trainees will be working with construction machinery, while also being interviewed about their training. Companies from the sector will be providing the necessary equipment: a transport platform, a small milling cutter, a wheel loader, a hose pump, a wheel loader axle, a vibratory plate, a roller and a mobile excavator. All the action is broadcast live on giant screens.

“Compared to 2013, this year we have structured the initiative better and have now integrated the vocational colleges and

universities,” said Joachim Schmid, managing director of VDMA Construction Equipment and Building Material Machinery Association. In the new section called ‘Vocational college live!’, teachers and students from these institutions will be giving insights into the courses and explaining what’s different about these colleges as compared to normal schools.

In the ‘Study’ area, students and scientific assistants from various universities will be giving insights into their day-to-day activities. They will set out what’s involved in a conventional degree course in engineering and what a sandwich course is like. Separate offerings are being put on for girls, by the women involved in MINT, an initiative to promote interest in mathematics, information science, natural sciences and technology and the careers opportunities this opens up. “In this way we address every schoolboy and every schoolgirl, regardless of whether they are thinking of hands-on training in industry or interested in an academic course of study,” explained Mr Schmid.

VDMA has considerably extended its information offering to teachers ahead of bauma. Together with publishers Klett, a teacher’s guide has been produced that prepares the teaching staff better for ‘THINK BIG! Live at bauma’, informing them of what’s on offer there. A study brochure has also been produced for secondary-school pupils, entitled “Zukunft Bauen – Mit MINT und modernen Maschinen”, which contains content from the fields of mathematics, technology, chemistry and physics, as applicable to the field of construction and construction machinery.



Left and right: With a total exhibition space of 605,000 sq m, bauma is also believed to be the largest trade show in the world.



The ‘THINK BIG!’ initiative, launched at bauma 2013, features an extensive and interactive programme focusing on technical training, educational and career opportunities in the construction and building materials machinery industry.



Indonesia was the partner country of bauma 2013.

In addition, VDMA has commissioned a training institute, the Institut für Talententwicklung (IFT) in Munich, to promote the 'THINK BIG!' initiative to schools, to brief the teachers and the schoolchildren and to organise travel to the show. For its part Messe München, as part of its cooperation with the VDMA, is giving free entry to 'THINK BIG!' and to bauma for schoolchildren who have registered via the IFT.

The premiere of 'THINK BIG!' in 2013 attracted over 14,000 schoolchildren. The organisers are expecting this figure to be exceeded at bauma 2016.

bauma Innovation Award

The nominations for the bauma Innovation Award 2016 have now been made. The winners will be honoured on the evening before bauma starts, in a ceremony at the Allerheiligen Hofkirche (Court Church of All Saints) in the Munich Residenz.

The Innovation Award will be presented for the 11th time. The competition is a joint project held under the auspices of VDMA, the German Construction Industry Association (HDB – Hauptverband der Deutschen Bauindustrie eV), the Central Association of the German Construction Industry (ZDB – Zentralverband des deutschen

Baugewerbes eV), the German Building Materials Association (BBS - Bundesverband Baustoffe - Steine und Erden eV) and bauma.

The Innovation Award is presented in five categories: Machinery; Components; Construction Process/Construction Work; Research; and Design. A total of 118 applications were received from Germany and abroad. The jury has now selected three new developments in each category to go forward to the final round. All of the nominated



The indoor exhibition area.



Top and above: The last bauma in 2013 attracted 3,421 exhibitors from 57 countries, and 535,065 visitors from over 200 countries.



The fairground map for bauma 2016.

innovations offer significant practical benefit and economic potential; they are sustainable and make a contribution towards energy- and resource-efficiency and/or towards the humanisation of the workplace.

The nominated companies for the bauma Innovation Award 2016 are as follows:

Category 1: Machinery

- The Kramer 5055e, Kramer-Werke GmbH
- Autonomous Vibratory Plate, Ammann Schweiz AG
- Mobile Battery Mould, Weckenmann Anlagentechnik GmbH & Co KG

Category 2: Components

- SONO Water-Cement Analyser, Imko GmbH
- Intelligent Crane Fibre Rope, Teufelberger Seil GmbH
- Liebherr Energy Storage, Liebherr Components Biberach GmbH

Category 3: Construction Process/Construction Work

- Reinforcement of a steel bridge, Leonhard Weiss GmbH Co KG
- Pipe-laying equipment RVG 1.0, Harald Gollwitzer Spezialtiefbau GmbH
- Building (yard) logistics 4.0 for SMEs, Johann Augel Bauunternehmung GmbH

Category 4: Research

- Concrete-3D-Printing Technology, TU Dresden, Dept. of Construction Machinery Technology
- STEAM Hybrid Excavator, RWTH Aachen in cooperation with Volvo CE

- MIDOS for offshore foundations, Bauer Maschinen GmbH in cooperation with the University College of Dublin

Category 5: Design

- Concept Cab - The Future Genius, TU Dresden
- Mecalac MWR, Mecalac France
- Triple-Boom System, Tadano Faun GmbH

bauma Charity Alliance

Inspired by the 'Pilosio Building Peace Award', bauma has set up the bauma Charity Alliance. It aims to create a strong network and presentation platform to draw attention to social commitment by companies within the construction machinery industry. The network intends to promote dialog between members on the implementation of social projects and attract additional interested parties to become actively involved in the bauma Charity Alliance.

Applications are restricted to companies exhibiting at bauma 2016, who are carrying on projects in the fields of education, nutrition, health, social integration or the environment and which bring about a lasting improvement in the living conditions of people in need living in, or hailing from, crisis areas, emerging or developing countries. To date, Atlas Copco, AUMUND Fördertechnik, MAN, Pilosio, Terex Latin America, Wirtgen, Volvo Construction Equipment, Zeppelin Baumaschinen and ZF Friedrichshafen have notified their projects to the bauma Charity Alliance. ■

Website: www.bauma.de



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BOMAG

BOOTH: FS.1009

The new version of the Bomag BF 300-2 city paver, with its environment-friendly Tier IV/Stage 3B engine, is well equipped to meet the most stringent emission standards. There is also a version with a Tier III engine. The BF 300-2 is optionally supplied with a wheel drive (BF 300 P-2) or a chain drive (BF 300 C-2). With a laying capacity of 300 t per hour and a maximum laying width of 5 m (chain) or 4.40 m (wheel), it is extremely versatile. The paver is particularly suited to inner-city road reconstruction, but rural road construction or hard shoulder restoration in motorway construction are also typical areas of application.

One optional extra for the BF 300-2 is the hydraulic front flap of the hopper. Another option is the ventilation system. It sucks up the asphalt fumes directly above the auger and diverts them to above the paver roof. This is both a clean and comfortable solution for drivers and screed operators. Furthermore, optional LED headlights make for good vision even under adverse lighting conditions. For illuminating the area around the paver without glare during night shifts, it uses the 'Power Moon'.

The BF 300-2 also comes with Magmalife screed heating. The heating rods, which are directly cast into one aluminium block, take only 20 minutes to heat up due to the metal's high conductivity, making them some 60 percent faster than the screed heating on comparable machines on the market, said Bomag. The Ecomode regulates the hydraulics, engine speed and ventilation down as



The new Bomag BF 300-2 city paver.

required, which saves fuel and reduces noise. The screed extension works quickly and easily with the Bomag Quick Coupling attachment system. This reduces retooling times by up to 50 percent. ■

MTU

BOOTH: A4.314

Rolls-Royce will be presenting its MTU engines for the off-highway emission regulations expected to come into force as of 2019 to the construction industry. The company will be presenting engine systems for construction site vehicles, industrial and mining applications. The MTU brand is part of Rolls-Royce Power Systems.

MTU Series 1000 to 1500 engines are currently being further developed jointly by MTU and Daimler to meet EU Stage V regulations based on Daimler commercial vehicle engines. They are expected to be available in the 100 to 430 kW power range in good time for the planned introduction of the EU Stage V emission standards in 2019. The MTU engines meet the new emission limits for soot particles using advanced internal engine technology, an SCR system and an additional diesel particulate filter. Two six-cylinder Series 1000 and 1500 engines will be on display on the company's stand, in addition to the associated exhaust aftertreatment system.

MTU will also have two Series 1600 and 2000 12-cylinder engines on display for the power range beyond 500 kW. The Series 1600 engines are available for the 567 to 736 kW power range. Besides complying with the US EPA Tier 4 emission regulations, they are also designed to meet the future EU Stage V regulations using internal engine technology only. No exhaust aftertreatment is required. The MTU Series 2000 engines for installation in construction equipment cover a power range extending from 560 to 1,000 kW and are compliant with EPA Tier 4 emission regulations.



The MTU Series 2000 engines for installation in construction equipment cover a power range extending from 560 to 1,000 kW and are compliant with EPA Tier 4 emission regulations.

They also meet the US standards using internal engine technology only. ■

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SKYJACK

BOOTH: FS.1002/3

The new SJIII 4740 is the tallest DC electric scissor Skyjack has ever produced. With a maximum working height of 13.8 m and maximum weight capacity of 350 kg, this latest scissor opens up a new class for Skyjack, offering customers more choice.

In addition, the Skyjack SJ30 ARJE articulating boom with rotating jib features a working height of 11 m and a maximum weight capacity of 227 kg. It remains competitive against other models already in its class while offering customers the commonality of parts advantage. Skyjack's trademark numbered-and colour-coded wiring system, along with its easy-to-use, easy-to-maintain design makes the SJ30 ARJE stand out from the crowd.

Skyjack's full line up will include vertical mast lifts – SJ12 and SJ16; DC electric scissor lifts – SJIII 3219, SJIII 3226, SJIII 4626 and SJIII 4740; rough terrain scissor lifts – SJ6826 RT, SJ 6832 RTE, SJ8831 RT and SJ9250 RT; articulating boom lifts – SJ30 ARJE, SJ46 AJ and SJ63 AJ; and telescopic boom lift – SJ86 T. ■



Skyjack SJIII 4740 electric scissor lift.

BROKK

BOOTH: FM.613

The new Brokk 120 Diesel is believed to be the world's smallest independently powered demolition machine. Its compact size (only 780 mm wide, 2,030 mm long and 1,250 mm high) enables it to enter through any standard door opening and makes it easy to manoeuvre in tight spaces. Meanwhile, its low weight of only approximately 1,200 kg gives it access to work even on weak floors and makes it easy to transport to and from work sites.

Powered by a compact but powerful diesel engine, the machine has a minimum of eight hours of operation without refuelling, making it truly independent from any power source for at least a full work shift. And all this flexibility comes without sacrificing any of the power and performance of its similar-sized electrical sibling Brokk 100. The Brokk 120 Diesel uses the same tools and attachments, and has the same hydraulic power. Its oil flow is 50 l/min and transport speed is 3.2 km/hr.

The Brokk 120 Diesel is designed for use in a variety of applications. In the rescue area (e.g. disaster response, explosive ordnance disposal (EOD) and firefighting) as well as in the nuclear area, there is a need for a compact independent ROV with power enough to carry out tough jobs. In the construction industry, there is a use of the flexibility of easy movement and relocation of the machine between work sites. And finally in the process and underground industries, there are areas where the use of a power cable could be an obstacle or where the needed electrical power simply is not available.

The Brokk 120 is the third, and by far the smallest, diesel-powered machine in Brokk's lineup. For several years, the Brokk 400 Diesel and Brokk 800 Diesel have been available in the market; but they are significantly larger machines – the Brokk 120 Diesel weighs less than one-fourth of the Brokk 400 D. As such, the Brokk 120 Diesel breaks new ground by establishing an entirely new segment: the compact diesel-powered demolition robot. ■



Brokk 120 Diesel demolition robot.



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KOBELCO

BOOTH: FN.817/3

Kobelco's Generation 10 excavators, including the SK210LC-10/SK210NLC-10, SK260LC-10/SK260NLC-10 and now the new SK350LC-10 and SK350NLC-10, feature increased power and greater fuel economy compared to the previous Generation 9 models. For example, the SK260LC-10 offers a 9 percent reduction in fuel consumption in Eco-mode, while the SK210LC-10 reduces fuel consumption by 6.1 percent. These efficiency improvements are further enhanced by respective 5 and 6.7 percent increases in productivity while operating in H-mode (Heavy Mode) at the same fuel consumption. In addition, the improved shovel load coupled with dynamic digging force helps contribute to a 7 percent greater digging volume.

Kobelco's Generation 10 machines are built to withstand the toughest terrain and working conditions. The quality of design and manufacture of the machines not only results in clean and powerful operating performance, but working hours and total working service life of the machine are significantly increased. The Generation 10 models also feature the latest engineering aspects in boom and arm design for maximum longevity. The new models benefit from revised structural sections, reinforcement points and pin bosses and the attachment point has been reinforced to handle a higher work volume with greater power.

In addition, Kobelco's Arm Interflow System (AIS) is a new hydraulic regenerative system that enables the boom to redistribute hydraulic fluid to the shovel arm during operation. This reduces the need of an external pump and results in less engine/hydraulic workload. For easy maintenance and servicing, the layout of the upper deck has been revised and decluttered, and its height has been lowered to provide an increase in overall maintenance space and to enable easy access to the engine and associated service areas. These improvements also mean that the operator has better



Kobelco SK210LC-10 excavator.

all-round visibility.

Other features (on key models) include a new compact and easily replaceable canister-type hydraulic oil return filter and a new specification air cleaner inner element, while the fuel tank has been relocated to the left side. In terms of safety, the operator can now access machine diagnostics via the multi-display cabin monitor assist, and the washer tank has been re-located inside the cabin, ensuring work continuity.

The Generation 10 FOPS II and ROPS-compliant safety cabins include control levers with a lighter-feel, a new 'lock' lever, control lever box and revised rear storage tray. Additional air conditioning vents are optimised for improved operator comfort and provide greater comfort in hot climates. ■

GOLDHOFER

BOOTH: FN.823/1

Goldhofer will showcase its modern and forward-looking transport technology in a variety of vehicle configurations. One of the highlights will be a Faktor 5 high girder bridge built for a customer in Mexico. It is configured with a PST/SL-E self-propelled module with hydrostatic drive. This colossus of a bridge is the eighth in the Faktor 5 series (100 t deadweight for a payload of 500 t).

As for trailers and semitrailers, Goldhofer's offering includes a three-axle low-bed trailer from the Expert series, a four-axle low-loader semitrailer with an intelligent wheel recess solution that makes it an allrounder for moving construction machinery, and a 10-axle combination from the STZ-P low-loader semitrailer series with pendular axle technology. The heavy-duty vehicle exhibits will include an FTV 300 blade transport device developed specially for transporting rotor blades for wind power plants, a 12-axle combination with various modules from the THP/SL family and a self-propelled module from the PST/ES-E series with hydraulic track width adjustment.

Another highlight will be the latest developments in the MPA system with its wide range of possible combinations. At bauma, Goldhofer will be showing vehicles with pendular axles and MPA axles. With these combinations, Goldhofer will be demonstrating fast



Goldhofer at bauma 2013.

and flexible configuration of an MPA-K vehicle for economical and versatile fleet operation. ■

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ANMOPYC

BOOTH: A1.218

ANMOPYC, the Spanish Manufacturers Association of Construction, Public Works and Mining Equipment, will be present at the show together with its members (more than 50 companies), occupying an exhibition area of 5,000 sq m.

ANMOPYC was founded in 1982 as the sole representative of the construction industry in Spain. Its main aim is to promote exports for its members worldwide, encourage them to manufacture safe machines and equipment, and strengthen R&D activities in the construction industry. Spanish equipment meets the European standards and has been used in a wide range of projects around the world.

The equipment manufactured by the ANMOPYC's member companies can be classified into several groups: road equipment; concrete; construction lifting, transport and handling equipment; quarries, mining and recycling; earthmoving; temporary works equipment; and auxiliary equipment for construction. ANMOPYC is currently made up of about 100 companies all over Spain.

Most of ANMOPYC members participating at bauma are listed in the following tables (below and right). ■

COMPANY	BOOTH	COMPANY	BOOTH
	A1, 214- FS, 1104 / 9		C1, 130
	B2, 538		B2, 112
	A2, 448		B2, 250
	FM, 808/2		C1, 311
	A4, 411		A6, 437
	A6, 148		C2, 231
	A6, 336		B2, 543

COMPANY	BOOTH	COMPANY	BOOTH
	FS, 1002/8		B1, 201
	B2, 539		B1, 312
	B2, 239		C1, 141
	B5, 226		C1, 304
	A5, 329		A5, 543
	B2, 244		B2, 246
	FK, 808 / 3		A1, 119
	FS, 902 A/2		FS, 1103/7
	A6, 536		A5, 228
	FS, 903 A/2		FN, 1023/3
	A3, 200		A1, 125
	A5, 110		A1, 220
	FS, 1003/8		C2, 412
	A2, 212		B2, 508
	FN, 623/11		EWE, 12
	FS, 1103/1		A5, 130
	A1, 115		B2, 324
	B2, 215		A1, 224
	C1, 283		

XCMG

BOOTH: FS.1005/3

Chinese manufacturer XCMG will be participating at bauma with nine products, including three loaders (LW1100KN, LW800KN and LW180K), two cranes (XCA100E and RT55U), two excavators (XE210C and XE35U), a truck-mounted crane (SQZ200K) and a rotary drilling rig (XR220D II). Three new models that will be launched at the show are the XCA100E, LW1100K and XE35U. ■



The W1100K wheel loader is one of XCMG's new products that will be introduced at bauma.

ROCKMORE

BOOTH: C2.327

After several years of intense research and development followed up with monitored field tests in various ground conditions, Rockmore International has developed a new thread design, XT, for the Vector Rod system. The new XT design incorporates revolutionary new guided cylindrical contact zones between the male and female thread joints. These guided surface features are located in the nose and rear of the thread connections and serve various benefits and improvements over traditional threads.

The XT thread profile is based on the traditional trapezoidal 'T' thread design and is therefore compatible with industry standard thread types such as T38, T45 and T51. Thus, one can interchange and connect standard 'T' style threaded components with the new XT thread, although the guiding advantages aforementioned would be neglected, according to Rockmore. For example, a T45 threaded bit or shank adapter can be connected to a XT45 threaded rod with full compatibility.

In order to achieve the full engineered benefits of the XT thread, however, one must consider the drill string as a system of connections between the shank adapter, rods and the bit in extension drilling applications, said Rockmore. Thus, the XT thread design employed in the Vector Rod system enables many performance and reliability benefits leading to major overall cost savings in the drilling cycle.

The dual cylindrical contact zones in the nose and rear of the XT threads significantly increase the lateral support between thread joints and stabilise the connections with more rigidity to provide better energy transfer. The enhanced thread support and geometry extends thread life and increases the overall component service life of the shank adapters, rods and bits with XT threads that comprise the Vector Rod system.

Because the XT thread guide feature improves thread alignment, the impact duration when 'rattling' rods, as required in uncoupling connections, is minimised. This leads to lower wasted energy transmission, cooler couplings on rods, and ultimately to longer rod life. Thread grease is also better retained on the thread pitches resulting from the new XT geometry, further increasing thread life in all XT components.

Another key advantage of this rod system over traditional threaded components is providing straighter holes and minimising its deviation, so inherently critical in modern drill and blast techniques, explained Rockmore. The guided XT thread feature increases the rigidity and stability of the connections between the shank adapters, rods and bits so significantly that overall rod bending is minimised and hole straightness improved. In fact, this improvement allows for larger and deeper blast holes to be achieved using existing rod diameters, but only by converting to XT threaded components. In underground mining long-hole and production applications where up to 30 rod connections are common, hole deviation can be reduced substantially by using Vector Rods.

The Vector Rod system is offered in multiple configurations of button bits, MF rods and shank adapters. These drill string components are available in XT38, XT45, XT51 and XT60 thread types, designed to improve drilling productivity and reduce extension drilling operating costs in surface and underground percussive drilling. ■



All images: Rockmore has developed a new thread design, XT, for the Vector Rod system.



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SDLG

BOOTH: FS.1105/7

SDLG's new E635F is a 3.5 t-rated crawler excavator with a standard bucket capacity of 0.11 cu m and an excavating force of 32 kN. Power for the unit comes from a Yanmar 4TNV88 engine and it includes the manufacturer's new E-series cab.

The new L948 wheel loader has a 4 t rating and is powered by a Yanmar SD60B Tier III engine, which drives a ZF 4WG158 automatic transmission. The unit has full hydraulic brakes and load-sensing capabilities, plus a large and comfortable cab, which includes a reversing camera for safer and more efficient site movements. Maximum breakout force is 125 kN and it has a standard bucket capacity of 2.3 cu m.

The G9190 motor grader is part of SDLG's broad range of road building equipment. The unit has a 15.8 t rating and can deliver a traction force of up to 82 kN. It is powered by a 148 kW Deutz engine.

Moreover, the LG959F offers a maximum breakout force of 152 kN and can also be fitted with a 3.1 cu m bucket for optimum material handling. The unit is an update to the LG958L CE-certified wheel loader.

Another highlight is the B877 backhoe loader. The machine's powerful turbo-charged 70 kW engine is low on emissions, and high on fuel economy and provides a torque reserve of 40 percent. With its hydraulic torque converter and synchronised four-speed transmission, the B877 can reach speeds of up to 40 km/hr. ■



The E635F excavator (above) and G9190 motor grader.



LINDEN COMANSA

BOOTH: FS.1103/1

Linden Comansa's LCL280 luffing-jib crane offers maximum capacities of 18, 12 and 24 t. It is one of the company's most popular luffing-jib models, especially in the UK, Southeast Asia and the Persian Gulf.

The 21LC750 flat-top crane, with maximum capacities of 24, 36 or 48 t, is suitable for use in industrial, infrastructure and mining projects. Launched in 2009, the crane has recently been revised and optimised. All of its features (ease of erection, high speed hoist engines, reliability, etc) make this crane a favourite among customers of Linden Comansa from around the world. The 21LC750 has been sold in Europe, North America, South America, Africa, Middle East, Asia and Oceania.

The 11LC160 flat-top crane, with a maximum capacity of 8 t, is part of the LC1100 series, which includes numerous improvements, including the frequency control on the slewing movement or the space optimisation on the slewing part. The crane is designed to deliver better performance in the construction of small-sized industrial and commercial projects, and is especially successful in Central Europe countries such as Germany, Switzerland and Austria. ■



Linden Comansa LCL280 luffing-jib crane.

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TEREX TRUCKS

BOOTH: FM.514

Terex Trucks will be unveiling its new Generation 10, 38 t articulated dump truck, the TA400. Featuring new livery and frontal design, the machine is the largest in the Terex Trucks articulated range.

To guarantee maximum uptime of the truck, investments have been made to ensure increased durability and protection of truck components, including upgraded hydraulic hoses, electrical interfaces, transmission mountings and brake pipes. In order to prolong hydraulic component lifecycles, Terex Trucks has introduced magnetic pressure filters that reduce the risk of contaminants entering the system, and improves the cleanliness of the hydraulic oil.

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

The engine and drivetrain is well matched, utilising automatic adaptive shifting and a pre-selected two-speed transfer box (drop box), providing good performance and productivity for all haul conditions. The new, generation 10 TA400 introduces the Stage IV compliant series of engines for the European market, which features the latest generation Selective Catalytic Reduction (SCR), combined with Exhaust Gas Regeneration (EGR) technology and a Variable Geometry Turbo (VGT).

Terex Trucks now offers fully compliant, cost-efficient haulers to all global markets, with the new European Stage IV system complimenting Terex Trucks' Tier 4 Final range of articulated



Terex Generation 9 TA400 articulated dump truck.

haulers for the North American market, and the Tier 2 range designed for the non-regulated markets across the world.

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

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

DOKA

BOOTH: FN.420

With the new d3 load-bearing tower, Doka has expanded its product portfolio for the Middle East and Southeast Asian markets. The d3 load-bearing tower is an update to a Doka load-bearing system and combines the benefits of existing systems. It is designed for particularly tall shoring heights and high loads, and is ideally suited for building construction or civil engineering. The system combines speed and efficiency and its flexibility makes it suitable for versatile applications.

The Doka OneGo monolithic formwork system allows walls and floors to be cast in a single pour. It is designed to meet customer demands in South America, Southeast Asia and the Middle East for creating cost-effective residential buildings in monolithic construction. The range of application spans from single family residences to apartment buildings through to residential highrises.

In addition, the Doka Concremote technology enables real-time online measurement of both concrete strength and temperature development. The concrete strength development, for example, enables users to calculate striking times, treatment times and prestress points. Measurement of thermal changes is important in order to monitor the stress caused by temperature differences in a component. This helps to prevent cracks and subsequent damage to



Doka d3 load-bearing tower.

the building. Concremote enables users to take the right steps on the basis of concrete strength measurements, and thus securing and accelerating the building process. ■

JLG

BOOTH: FS.904/5

Among JLG's display of equipment will be the 10RS scissor lift, which features an efficient operation with proportional electric drive and industry-leading duty cycles. With a machine width of 1.22 m and a platform height of 9.75 m, the 10RS is able to travel through doorways.

The JLG 2632ES scissor lift offers improved productivity, thanks to its proportional electric drive, reduced charging time and longer run times. The lift is rated for dual capacity. Moreover, the M4069LE versatile scissor lift with rugged terrain tyres and optional hydraulic levelling jacks is ideal for use in uneven terrain. JLG's reconditioned model will be showcased at the booth.

The 530LRT is the newest rough terrain scissor lift, offering excellent terrainability for tough jobsites thanks to a standard oscillating axle. With a platform height of 18.15 m and a platform capacity of 680 kg, the 530LRT also offers an optional 7.2 m Megadeck to handle more workers and materials.

In addition, the Toucan 12E Plus compact machine allows operators to access hard-to-reach areas, thanks to a versatile articulating jib that provides horizontal outreach and up-and-over height and a 345-degree rotating mast for unmatched positioning capabilities. The lift includes a platform capacity of 200 kg and a working height of 12.65 m. ■



JLG 10RS scissor lift.



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KOMATSU

BOOTH: FM.512 & B5

The Komatsu PC210LCi-10 excavator integrates Komatsu's intelligent Machine Control technology. At the show, the machine control and guidance features will be demonstrated together with a new Komatsu tilt bucket, which allows operators to change the bucket angle in real time to match the design surface during Semi-Auto function. The bucket uses integrated stroke sensing tilt cylinders to determine accurate positioning.

Operating weights of the PC210LCi-10 range from 22,620 to 23,480 kg, depending on the configuration, with a net 123 kW @ 2,000 rpm. Other specifications are identical to those of Komatsu PC210LC-10. The latest Komtrax telematics and Komatsu Care complimentary maintenance programme offer top fleet management and support, protect the machine against misuse and guarantee maximum efficiency and uptime.

With the intelligent Machine Control excavator, the bucket is automatically limited from digging beyond the target surface. The control function maintains grade automatically, with real-time bucket edge positioning in relation to the machine and the job surface. Status is instantly displayed on the full colour, multi-function 12.1-in control box monitor.

Komatsu's fully integrated intelligent Machine Control system includes stroke sensing hydraulic cylinders for the boom, arm and bucket, newly developed by Komatsu for precise real time bucket



Komatsu PC210LCi-10 excavator.

edge positioning. The IMU (Inertial Measuring Unit) gives precise machine orientation and determines machine angle from gyro and accelerometer data. High performance antennae send satellite signals to a GNSS receiver that processes them and provides real time position of the machine. ■

WECKENMANN

BOOTH: B1.225

The Mobile Battery Mould (MBM) is an innovative transportable formwork from Weckenmann Anlagentechnik GmbH & Co KG. It allows the production of flat precast concrete elements to be moved to wherever it is needed (the immediate vicinity of the construction site).

The MBM is ideally suited for the production of solid walls. The heavy and large main components, the fixed central part and the movable exterior components as well as the hydraulic and electrical equipment can be easily transported without exceeding both the maximum transport dimensions and the permissible axle load according to worldwide standards. A special feature of the MBM is the controllable trailer, which improves the trailer's manoeuvrability significantly.

The MBM offers the construction site all the advantages of the precast technology. At the same time, it meets the requirements of the construction site where restricted space conditions prevail, the number of qualified staff is limited and the environmental conditions always represent certain challenges.

The mobile field factory from Weckenmann can be an ideal solution for large building sites: its investment costs are manageable, it produces just in time and it is very flexible. Thanks to its compact design, it has a relatively small footprint and can be assembled or disassembled by a small number of people within a few working days. The production process is easy to handle and includes a highly effective compaction facility in order to compensate for any fluctuations in the concrete quality. In addition, the optimal use of the hydration heat for the curing process and the possibility to preheat the formwork make the MBM energy-efficient.



The Mobile Battery Mould from Weckenmann.

According to Weckenmann, a comparison of the environmental performance of a stationary precast plant in relation to the MBM yielded in annual fuel savings of 36,000 l of diesel – assuming that 50 m of concrete will be processed per day and the precast concrete plant is located 50 km away from the construction site. This corresponds to CO₂ savings of about 100 t. A further argument for the sustainability of the MBM represents the small energy requirements for the operation of the Battery Mould and the reusability of all components involved over many years. ■

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CHEMGROUT

BOOTH: C4.603/F

The ChemGrout Geotech Series pumps a wide variety of materials, including neat cement, high ratio sand/cement, bentonites and non-shrink grout. These simple, easy-to-use grout plants offer a balanced design and are ready for jobsite operation. Both mixer and pump feature centrally located, variable speed controls for quick adjustment. The mixer utilises specially designed blades and baffles that develop a high shearing action, ensuring a rapid and thorough mixing process.

The mixer, hopper and grout pump are a balanced system allowing the mixer to stay ahead of the pump to provide a continuous output of material. After mixing, the material is transferred to the lower hopper through a large slide gate designed to handle high ratio sand/cement, neat cement and non-shrink grout. This efficient use of a holding hopper enables a new batch to be mixed while the first is being pumped.

The Geotech Series features ChemGrout's CG-031 single acting variable speed piston pump, which easily handles materials ranging from fluid slurries to heavily sanded grouts. This versatile CG-031 piston pump is engineered for ease of operation and low cost of maintenance. The unique staple lock construction holds all working components together, allowing parts to be easily accessed for cleaning and maintenance. The pump can be completely disassembled and reassembled quickly by using only a hammer, said ChemGrout.

The compact skid mounted versions are available in air, hydraulic, gas/hydraulic electric/hydraulic and diesel/hydraulic. The trailer mounted CG555/GT is available in a single tank design and is a fully integrated system, combining mixer, pump and power system.

The Geotech Series is suitable for various applications, such as soil compaction, soil and rock grouting, void filling, soil anchors, contact grouting, marine/underwater, precast, machine base installation, rock bolts, self-levelling, slab undersealing, well casings, encasements, post tensioning, abandoned shafts and geothermal. ■



One of the models in the Geotech Series grout plants.

STAHLWERK ANNAHÜTTE

BOOTH: A2.303

The SAS thread bars from Stahlwerk Annahütte (SAH) feature various grades, up to prestressing steel quality, in a range of 12 to 75 mm. They are commonly used in geotechnical applications such as micro piles, bolts, soil nails, tie rods, etc, and also in post tensioning as tendons, anchors, etc. In addition, they are used for reinforcing concrete, especially in high strength reinforcement (very efficient for high rise buildings).

The SAS thread bars have been applied successfully in tunnelling and mining as well, such as bolts and rock anchors. The bars have been involved in many projects around the world - whether as stabilisers, gear shafts or chisels, in tunnels, airport runways, bridges and high rise towers. The SAS formwork tie rods are also supplied to major formwork companies all over the world.

In 2012 SAH established a sales office in Singapore, SAS Asia Bar Systems Pte Ltd, to manage sales and distribution of SAS thread bars in Asia. ■



Top and above: The SAS thread bars have been used in many projects around the world.

DOOSAN

BOOTH: FM.612/3

The new Doosan 5 t DX57W-5 wheel excavator incorporates many new features that increase performance, operator comfort, durability and fuel efficiency. The machine has increased power from the Doosan D24 four-cylinder engine (42.5 kW), which also offers convenience and lower costs by meeting Stage IIIB emission regulations without the need for a diesel particulate filter (DPF). Factory tests show a 15 percent increase in fuel efficiency, depending on the mode of operation and the work being done, according to Doosan.

In addition, Doosan's new Stage IV compliant DX140LC-5 14 t and DX140LCR-5 15 t crawler excavators set new benchmarks for this size of machine worldwide, providing greatly improved performance compared to the previous '3' Stage IIIB models. Both new excavators are powered by the Perkins 1204F engine, which combines reduced fuel consumption with the power and torque of larger engines with a smaller displacement.

Other highlights include Doosan's mid-size Stage IV compliant machines, such as the DX140W-5, DX165W-5 and DX190W-5 wheel excavators, as well as the DL200-5 and DL250-5 wheel loaders. ■

Right: Doosan DX57W-5 wheel excavator.



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GENIE

BOOTH: FM.711

Terex AWP will unveil four new products, including the new Genie GTH-3007 compact telehandler. The machine combines efficient, full-featured capabilities with the most compact dimensions and lightest machine weight in its category.

As the heavier lifting, higher reaching brother of the Genie GTH-2506 compact telehandler, at the low weight of 5,970 kg, the new GTH-3007 telehandler shares the same rugged durability common to all other six models of the Genie GTH telehandler family. Boasting a maximum lift capacity of 3,000 kg, a vertical reach capacity of 2,500 kg at a maximum height of 7 m, and a horizontal reach capacity of 1,000 kg at 4 m, this new unit is powered by a low-emissions 74-hp Deutz Stage IIIB (Tier IV Final) compliant engine.

The GTH-3007 is well suited to a wide variety of outdoor lifting, carrying, loading and placement duties in the general construction, waste-handling, recycling, materials-handling, demolition and farming sectors. With a high 45 cm ground clearance, its compact dimensions offer a machine length at front wheels of 4.06 m, a machine width of 2 m and a machine height of 2.07 m, making the GTH-3007 ideal for jobs on busy and congested sites in confined or difficult to access spaces. Optimising transport costs, the



combination of low weight and short machine length enable three units to be carried on one standard truck.

In addition, the GTH-3007 telehandler includes a rugged chassis, a two-stage boom with no chains or cables, durable heavy-duty steel fenders and Dana axles with full-time planetary four-wheel drive and four-wheel steer. Equipped with a variable speed hydrostat transmission for smooth powerful drive, this unit features a side-mounted engine cover with a comfortable opening angle for easy filter replacement, access to engine components and hydraulic test ports located at the front of the chassis. For attachment flexibility, the GTH-3007 comes with an optional auxiliary hydraulics Quick Attach carriage, a feature that the model shares with the GTH-2506 compact telehandler. ■

Left: Genie GTH-3007 compact telehandler.

IPAF

BOOTH: FN.1115/1

IPAF will highlight the safe loading and unloading of mobile elevating work platforms (MEWPs) as an essential part of site operations. In particular, the Federation will demonstrate how to load and unload MEWPs safely, share good practice and findings from its accident reporting project, and provide a meeting point for members to network and discuss issues affecting the industry.

Almost a third of MEWP-related incidents reported by rental companies involve delivery drivers while loading and unloading machines. This is one of the trends identified from IPAF's accident reporting project (www.ipaf.org/incident) and the Federation is working to make MEWP loading and unloading activities safe and effective.

The campaign highlights the importance of planning and management of the delivery and collection processes. It also clarifies the responsibilities of different parties (including end-users, contractors, rental companies, haulage companies and drivers) to communicate and cooperate to ensure the work is done safely and effectively.

"MEWPs are one of the safest tools to carry out temporary work at height, and IPAF wants to keep the industry safe by minimising the potential dangers associated with loading and unloading," said IPAF CEO Tim Whiteman. "The main causes of loading and unloading incidents have been traced to insecure loads and machines falling



IPAF will highlight the safe loading and unloading of MEWPs.

off between ramps. These risks can be prevented through proper training and management of the work."

IPAF has called on all its members exhibiting at bauma to observe safe loading and unloading practices in conformity with recommended guidelines. IPAF-approved training centres also offer a course on the loading and unloading of MEWPs, soon to be available in several languages. ■

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ELEMATIC

BOOTH: B1.323

Elematic's Acotec production lines produce light, non-load bearing, room-high precast partition wall panels. The lines feature three automation and capacity levels designed to meet various customer needs: Semi, Pro and Edge. They are all quick and simple to install, run and maintain and require only a limited land area.

The Semi line, with a production capacity of 80 sq m per hour, is the simplest of all. It features a smart combined restacker handler and automation only for the key processes. The Pro line has a higher capacity of 100 sq m per hour, with automated functions for all main processes: sawing, trimming, stacking, restacking, cleaning and oiling, plate handling and pallet circulation. The fully automatic Acotec Edge offers a top-rate capacity of 120 sq m per hour and needs only two operators to run.

The three lines feature a new advanced production control system. Thanks to the system, a simple, modern user interface shows detailed data on every function in the whole process. Various reports – on production rate, running hours and more – are generated automatically. Modular structure of the lines and their integrated electricity with Ethercat bus system guarantee short installation and start up time of all lines, and the line can also be installed in existing production facilities. The production process is environment-friendly as it is silent and non-vibrating, and the raw material can be recycled so no waste is created. Low energy consumption of the line keeps the production costs on a low level as well.

The Acotec wall panels are fast, easy and safe to install – building work proceeds up to six times faster when compared with traditional

brickwork and even two times faster than blockwork, according to Elematic. The panels have exact dimensions and completely even surface so no plastering is needed. In addition, their thin structure leaves more floor space for other purposes in a building. Despite the thinness, Acotec walls are strong and have been used in seismic areas. They are ideal for a wide variety of purposes such as bathrooms, kitchens and showers, thanks to the moisture resistance of the material. Acotec walls also offer excellent sound insulation, meaning that apartment buildings, schools and hotels benefit from this type of partition walls.

Furthermore, the new ATREX continuous crushing mixer, which was developed by Finnish technology and equipment provider Megatrex, will offer a solution for raw material procurement challenges. Thanks to it, lightweight aggregate up to grade 30 can now be used in Acotec panel production. Thus, there is no need for panel producers to buy specific grades or store several different aggregate grades anymore. This will bring considerable savings and simplify the production process.

Leca, a lightweight expanded clay aggregate used for cement mix, is manufactured worldwide from natural materials. Leca products may, therefore, vary individually from country to country. Leca particles are generally larger than what is needed for the fine-grained cement mix used in Acotec production.

Important advantages of ATREX compared to the conventional batch mixer are its continuous operation and its simultaneous crushing and mixing properties, said Elematic. ■



Left and right: Elematic's Acotec wall production lines produce light, non-load bearing, room-high precast partition wall panels.

VOLVO

BOOTH: C4.327 & FM.510

The new Volvo ECR35D and ECR40D short swing radius compact excavators are designed to work with power and precision in tight spaces. The more conventional EC35D features similar architecture and delivers high levels of comfort, performance and versatility.

Thanks to the short swing tail radius and positioning of the boom cylinder on the left below the cab, the ECR35D and ECR40D are ideal for tight working conditions and can be used on restricted jobsites, while reducing risk of damage to the machine and its surroundings. The swing post and cylinder stay within the tracks when in an offset position and the slew and offset movements are controlled simultaneously, for easy and fast positioning of the machine.

The EC35D combines a new D1.8A stage 3A Volvo engine with a hydraulic system that delivers high performance with smooth operation. The intuitive fingertip controls allows ease of operation, enabling operators to enjoy the high digging and lifting forces, or operate powerful hydraulic attachments with ease.

The new Volvo excavators have sturdy, spacious and comfortable cabs, which are FOPS, TOPS and ROPS enabled. The large door and three-point-access allows safe ingress and egress, particularly useful on these smaller machines where operators often need to get in and out of the cab regularly. Inside, the multi-adjustable seat and console are mounted on the same suspension and move in unison – providing shock and vibration absorption, reducing fatigue and aiding machine control regardless of ground condition.

Each machine is available with an electronic system that enables operators to fine tune functions and settings through a keypad and monitor. Up to three profiles can be saved in the system, adjusting machine behaviour to suit application/operator preferences. The system also includes four attachment-specific buttons that allow for precise adjustment of hydraulic flows from inside the cab; an ECO mode that reduces fuel consumption by up to 10 percent; two (user adjustable) pre-selected engine speeds, for applications such as grading or lifting; an auto idle system that reduces noise disturbance and decreases fuel consumption; the auto engine shut-down cuts engine hours, maintenance costs and machine depreciation; and service reminders.

For those preferring greater simplicity, the ECR35D, EC35D and ECR40D are also available in more traditional guise without this electronics package. Equipped with good tractive force and effective blade design, the new excavators deliver high performance when dozing. The float function of the blade also enables precise finish in grading applications, while the automatic two-speed travel reduces repositioning time. To reduce the risk of theft, an optional start prevention system is available.

In addition, to maximise uptime, these new compact excavators are designed to provide a low total cost of ownership. Wide-opening hoods allow good access to the filling points and daily checks, while at the rear the fuel and hydraulic filler pipes are well protected. The hydraulic oil check and fill is made through a transparent bowl, which allows early detection of contamination and acts as a filter when the tank is topped up. All filters are installed in-line for easy maintenance and service check points are accessible from ground level. Greasing intervals have been extended to 50 hours, minimising daily maintenance.

The new Volvo ECR35D, EC35D and ECR40D with Stage IIIA-compliant engines are available in EMEA (Europe, Middle East and Africa). ■



Volvo ECR35D short swing radius compact excavator.

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PERI

BOOTH: FN.719

Peri has developed a solution for the double-sided application of the SCS brackets. It includes the standardised use with anchored formwork for wall heights up to 6 m. Through the expanded application range, customers achieve higher material utilisation while simultaneously reducing the logistics involved.

Peri's ACS system is a self-climbing formwork for use in high-rise building cores with medium to large dimensions. It has a very high load-bearing capacity - even large placing boom masts can be climbed together with the formwork as well as being supported during operations, said Peri. Climbing hydraulic cylinders with a 40 t lifting capacity are used, which are powered by recently developed hydraulic units.

The Maximo, with its single-sided tie technology, is pretty much the centre of attention for wall formwork operations. The Maximo MXK bracket system provides maximum safety with minimum installation effort, and serves as a working platform for Maximo and Trio panel formwork. Compared to conventional solutions, the modular system provides pre-assembled individual components such as the MXK scaffold deck or the Prokit PMB side mesh barrier. These lightweight and manually assembled system components ensure safe and ergonomic work operations. New in the Maximo standard programme are panels with heights of 3 m and 3.60 m respectively.

Variokit is the engineering construction kit for tunnels and bridge building as well as for project-specific structures. In addition to standard solutions (e.g. for steel composite bridges and cantilevered

parapets), the system components are also used for project-specific tunnel formwork carriages or heavy-duty structural solutions. During the past three years, the application possibilities of the engineering construction kit have been optimised or new areas of application have been opened up. An important aspect of all Variokit developments is to maximise the percentage of rentable core components for the respective application. As a result, individual civil engineering structures can also be carried out cost-effectively.

In addition, Peri has developed cantilevered parapet solutions. The result is a lightweight console solution for bridges which, thanks to the low individual component weight of maximum 20 kg, can also be assembled by hand and is therefore predestined for use in refurbishment operations. The working platform and formwork unit are separated; the platform decking is thus free of openings and penetrations. The formwork unit can be adjusted from the working platform in order to match the parapet geometry.

The individual brackets consist of standards, cantilevered brackets, platform beams and spindles; depending on the parapet cross-section, they are attached to the bridge with the corresponding spacing. While anchors can be concreted in when constructing new bridges, anchoring during refurbishment work is much more difficult. For this, Peri has developed a type-tested bracket complete with perfectly coordinated components – a so-called closed solution. The refurbishment anchor used has a particularly high loading capacity so that the number of required anchoring points can be significantly reduced. ■



The lightweight V GK cantilevered parapet bracket comes with comparatively few anchor points.



Variokit arched formwork carriage with time-saving hydraulic operations.

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SENNEBOGEN

BOOTH: FM.712

The new Sennebogen 6300 duty cycle crawler crane features 12 m in length. The crawler tracks alone are 9.5 m long, with a track width of 6.8 m for stability and easy manoeuvrability. The green uppercarriage and solid counterweight plates bring the machine to an overall weight of 310 t. The uppercarriage weighs around 100 t.

The 300 t machine is able to work in demanding conditions under extreme loads, for example in dredging, mining and special underground engineering operations. The Sennebogen modular concept opens up versatile variants, such as an 80 m main boom that is available for use with lifting hooks. With hydraulic power up to 350 bar, a 2,000 l hydraulic tank and oversized hydraulic lines and valves, the 6300 is also suitable as a drive unit for hydraulic attachments.

In addition, Sennebogen's new 3300 crawler crane has a safe working load of 125 t and comes with a variety of attachments, the latest engine and a Star Lifter undercarriage.

The 186 kW diesel engine and the optimised multi-circuit hydraulic system power the 160 kN winch at rope speeds of up to 105 m/min with ease. Thanks to its robust Star Lifter crawler undercarriage, the machine is not only stable, but can also be conveniently driven under load. The crawler tracks can be easily removed for transport, after which the base machine, at just 3.2 m wide, can be easily transported.

The 3300 also has a self-assembly system. The lattice boom is available in numerous designs, from 13.1 to 94 m, thanks to

the Sennebogen modular system. Fly boom variants and other attachments, including auxiliary and luffing jibs, offer additional flexibility at the construction site.

The 3300 boasts high energy efficiency thanks to EcoMode and a Sencon control and diagnostics system. The modern Maxcab comfort cab provides a comfortable operating environment and an optimal overview of the work area. The cab can also be tilted by 20 degrees or elevated up to 2.7 m.

Furthermore, the SENtrack telemetry system now offers owners of Sennebogen material handlers and cranes a way to manage their machinery more easily and with all the key information. The web-based user interface provides a centralised overview of all machinery in use as well as their movements. At the same time, SENtrack is also a tool for maintenance planning and control. For example, live data such as fuel consumption, engine temperature, hydraulic pressure and utilisation rate can be determined wirelessly. The data can also be easily traced over longer periods and the exact position of the machines can be determined on a map via GPS.

In terms of hardware, the SENtrack module consists of a GSM and GPS antenna and a control unit in the uppercarriage of the machine that transmits the data via the cellular network. The user can conveniently access and analyse the data online. In the near future, new machines will have the option of being equipped with the system at the factory, while a retrofit kit is currently available from customer service for existing machines. ■



Sennebogen 6300 duty cycle crawler crane.



Sennebogen 3300 crawler crane.

ASTECC

BOOTH: FS.1111/3

Astec will display the 1/8 scale model of a complete Astec M-Pack relocatable asphalt facility and a 1/8 scale model of a complete Astec Six-Pack portable asphalt facility. In addition, a cut-away model of Astec's flagship Double Barrel drum dryer/mixer will also be exhibited.

The Double Barrel dryer/drum mixer combines the functions of a dryer and a continuous-process mixer in one compact, efficient system. Drying of the virgin aggregate is the first step in the process and takes place inside the inner drum. Mixing of aggregate and other ingredients follows, which happens in the outer chamber of the stationary shell. The cut-away configuration of this model makes it possible to view where each mixing step takes place.

Astec will also feature two compact, highly portable plants: a scale model of the Voyager 120 asphalt plant featuring a counter flow drum and an actual full-size, Astec Double Barrel drum dryer/mixer and cold feed load from a Double Barrel Express plant. The Voyager 120 offers a compact, highly portable design that is built around a counter flow drum featuring Astec v-flights. Both plants use v-flights in the drum to provide greater uniformity of the aggregate veil during the drying process, which results in better heat transfer, a reduction of fuel use and increased productivity. To enhance portability, the Voyager 120 has a hydraulically driven swing out drag and batcher that can be set up and ready to go in about 10 minutes. Thanks to



The Astec 1/8 scale plant models.

the Double Barrel drum, the Double Barrel Express is capable of producing mix with up to 50 percent RAP content. Each plant ships in two easy to move loads.

Furthermore, Astec's wood pellet plant will make its European debut. It features redundant, parallel production lines. Also making its debut is the Astec RAP pre-dryer, which uses excess heat from the Double Barrel drum to pre-dry RAP before it is introduced into the drum. With this configuration, an asphalt mixing plant can increase efficiency and RAP usage. ■



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ALIMAK HEK

BOOTH: FS.1102/10

Alimak Hek's new HEK MC 650 and HEK MC 450 mast climbing work platforms are designed to provide flexible access to facades, improved movement of goods and materials, and a stable and clear workspace. They are available in a single or twin configuration, and offer adjustable platform lengths and widths for excellent flexibility on site. The HEK MC 450 can carry loads of up to 4,500 kg and features platform lengths from 10 to 30 m. The HEK MC 650 will support an even higher capacity, with details to be announced at a later date, according to Alimak Hek.

The platforms' robust design and easy-to-use control system, combined with their ability to position materials and personnel at precision heights, make them an ideal facade access solution. Increased anchor distances and no interference from scaffolding poles and structures ensure a reliable, comfortable and open workspace for site personnel. Platform components are hot-dip galvanised in accordance with the latest international manufacturing standards.

Both the HEK MC 650 and MC 450 are compatible with 650



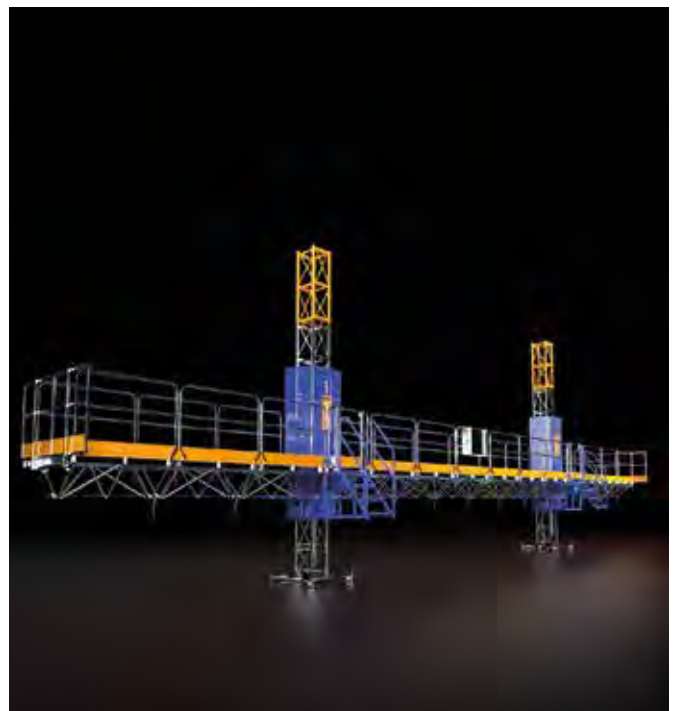
Alimak TCL tower crane lift.

and 450 masts and accessories respectively, allowing increased fleet owner utilisation of existing construction hoist, materials hoist and transport platforms components. What's more, quick installation and dismantle, minimal site interruption (compared to traditional scaffolding) and improved efficiency in the loading and unloading of materials ensure increased productivity and the resulting time and cost savings.

In addition, the new Alimak TCL tower crane lift is designed for installation on all existing tower cranes. It maximises crane utilisation by providing reliable and smooth crane cab access. The lift boasts a new design that offers fast external installation; this design allows for a greater tie distance, which can be adapted to the specific tower crane mast platform for a tailored installation. As a result, fewer ties are required, reducing the total lift assembly time and minimising potential crane downtime.

The Alimak TCL features a compact mast and rack made of durable galvanised steel. This flexible mast and rack system enables easy assembly with centering notches and captive bolts. Flexible and modular tie-ins are capable of fixing the lift car to all of the existing crane mast systems.

The new lift provides a fast, ergonomic and all-weather alternative to traditional crane ladders, with the ability to transport up to two passengers (200 kg) at a time. It has a lifting speed of 24 m/min, thus minimising travel time for crane operators and service personnel. With no modifications to crane masts required, the Alimak TCL can be retrofitted easily to existing tower crane systems and is fully compliant with 'EN 81-43: Lifts for Cranes' safety requirements. It also offers mechanical, electrical interlocked doors; a reversible cab enables these doors to be located on the left or right, to suit a variety of tower crane systems and site needs. ■



HEK MC 450 mast climbing work platform (twin configuration).

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JCB

BOOTH: FM.713/1

The new JCB 3CX Compact backhoe loader is ideal for road resurfacing and repair contractors, utilities, groundworkers and municipalities working in the confines of congested urban construction projects. Key features of the machine include compact dimensions - just 1.9 m wide and 2.74 m high; rapid travel - 40 km/hr hydrostatic transmission, 17 percent faster travel speed than the 2CX; total control - servo excavator levers and smooth hydraulics deliver 19 percent more flow; maximum manoeuvrability - 4WS provides a 5.8 m turning circle, within a carriageway; and highly versatile - a choice of 2CX and skid steer hitches plus an excavator quick-hitch.

The new 3CX Compact is powered by a low emission Tier 4 Final/Stage IIIB JCB Diesel by Kohler engine, delivering 74 hp. This highly efficient engine meets both US and European emissions standards without the need for a diesel particulate filter (DPF) or any exhaust after-treatment or exhaust fluid.

In addition, JCB will introduce its mid-range wheeled loader range, from the 457 wheeled loading shovel to the 427 and 437 models, along with the smaller 411 and 417 loaders.

Both the 411 and 417 wheeled loaders are powered by the company's own EcoMax Tier 4 Final/Stage IV compliant diesel engines, delivering 108 hp in the 411 and 125 hp in the 417. The larger 427 and 437 loaders operate with a Tier 4 Final/Stage IV Cummins diesel engine, offering 179 and 183 hp respectively. In line with JCB's overall emissions policy, both of these engines meet the latest emissions standards without the use of DPF. All Tier 4 Final loaders now feature a single-piece engine hood that can be electrically or manually raised to provide improved service access to the engine and cooling pack. The machines drive through automatic powershift transmissions for maximum productivity and efficiency.

Four of these new wheeled loaders will use the JCB CommandPlus cab, first seen in 2015 on the larger 457. This new ROPS structure has B pillars that have been moved out to the same width as the rear of the cab, providing a larger interior with a panoramic front windscreen. The machines feature JCB's Command Driving Position, with revised pedals, an adjustable steering column and seat-mounted hydraulic controls. Switches and auxiliary controls have been repositioned on the right hand B pillar, providing the operator with a simplified interior and easy access to all machine controls.

JCB's CommandPlus Control system allows the operator to adjust auxiliary flow rates on the main screen. It is also possible to use the monitor to adjust SRS boom suspension engagement speeds where fitted, and the timing of cooling fan reversal to clean out the cooling pack cores. The screen also offers an operator help system, which lists switch functions if required.

The cab benefits from increased internal space, as the heating, ventilation and air conditioning system has been repositioned outside the main cab structure. This provides additional storage for the operator, both behind the seat and in pockets in the front and side consoles. The new cab, in combination with on-demand cooling fans and the Tier 4 Final engines contribute to a cut in noise and vibration, reducing operator fatigue and boosting productivity.

Operators benefit from a range of seat and control options, with electro-hydraulic proportional auxiliary controls now fitted as standard. An electric parking brake is standard on the 427 and 437 and available as an option on the smaller models. The exhaust silencers, and air pre-cleaners are all situated below the bonnet to provide maximum visibility for the operator.



JCB 3CX Compact backhoe loader.



JCB 411 wheel loader.

Moreover, JCB is launching a comprehensive range of site dumpers ranging in size from 1 to 10 t to the German market. Compact 1 t and 2 t machines have been designed primarily for house building and landscaping contractors, while 3-3.5 t models will suit general construction and rental businesses. At the heavier end, both 6 t and 9-10 t dumpers offer excellent carrying capacity for larger earthmoving projects.

High-tip, forward tip and swivel skip models will be offered, catering for rental market and contracting requirements in a wide variety of jobsite applications. Engine outputs range from 20 to 120 hp and both synchro-shuttle and hydrostatic transmissions are available to deliver ease of use and maximum travel speeds.

Heavy-duty articulating and oscillating chassis frames provide maximum durability and strength. JCB site dumper skips are constructed using thick steel sidewalls and heavy-duty steel front and base plates, for increased reliability and longevity. Folding ROPS protection ensures operator safety and large axle oscillation angles provide excellent traction and stability on the rough. ■



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WIRTGEN

BOOTH: FS.1011

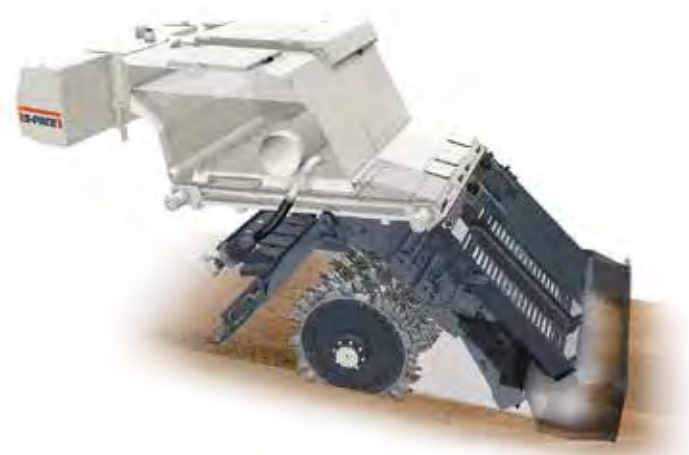
Wirtgen will introduce the 'S-Pack' (spreader pack) for its WR 240/WR 240i/WR 250 recyclers and soil stabilisers. This new solution allows binding agent to be spread without generating clouds of dust.

Using the integrated spreader module, a WR with 'S-Pack' spreads the binding agent directly in front of the milling and mixing rotor, which immediately mixes it into the soil. The closed drum housing and an additional double curtain of rubber matting prevents the formation of dust clouds and ensures that the material is exclusively spread inside the milled cut.

Thanks to the integrated spreader module, binding agent can now be spread regardless of wind and weather and without drifting or displacement due to vehicles driving ahead or passing by. Materials such as cement or lime must be spread safely and precisely and processed without emissions. This is particularly true in sensitive areas, such as industrial estates that are subject to restrictions on account of food production facilities or areas near airports. This also applies especially to motorways, where drifting must be avoided in order to avoid endangering the flow of traffic.

Wirtgen's WR 240/WR 240i and WR 250 models are predominantly used on rough ground and soils with insufficient bearing capacity. Wherever other machines come up against their limits, the two recyclers and soil stabilisers bring their tremendous off-road mobility into play, and they now can also be used in combination with the integrated spreader module. As a result, jobs can be completed rapidly, utilising a minimum of machinery and personnel and thus minimising transport costs, too.

Spreading is optimised by a number of sophisticated technical features. Metering cells ensure that the binding agent is applied in precisely metered volumetric quantities, and equally precise, continuous control of the spreading quantity is assured by microprocessor-controlled processes. A two-part transverse auger is continuously supplied with binding agent by a conveyor unit and ensures that the material is uniformly applied over the complete working width of 2.40 m. In addition, the maximum spreading width can be incrementally adjusted to 1.60 m and 80 cm by individually switching the 80-cm-wide flaps in or out. Depending



Above and below: The new 'S-Pack' (spreader pack) for Wirtgen's WR 240/WR 240i/WR 250 recyclers and soil stabilisers allows binding agent to be spread without generating clouds of dust. The S-Pack is predominantly used on small areas subject to special restrictions or on remote, rough ground.



The binding agent tank is located directly above the milling and mixing rotor of the Wirtgen WR; the diesel tank is over the rear wheels.

on the application concerned, the spreader can deliver between 1.5 and 40 kg/sq m.

The level in the binding agent tank (which has a maximum gross capacity of 5.5 cu m) is monitored at various points by extremely sensitive sensors and precisely indicated on the control display at all times. The spreading quantity is simultaneously calibrated via the display when the bulk density of the binding agent is entered. Moreover, 10 exhaust air filters with automatic self-cleaning function not only ensure effective purification of the exhaust air through the high air flow rate, but also allow the binding agent tank to be filled completely in less than five minutes thanks to the readily accessible filler port.

Operation of the integrated spreading system and diagnosis of the work process are extremely simple intuitive actions effected via the control display in the driver's cabin. The machine operator is in control of the mixing process at all times and can adapt the metered quantity to the current situation. ■



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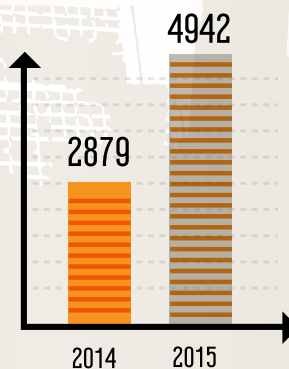
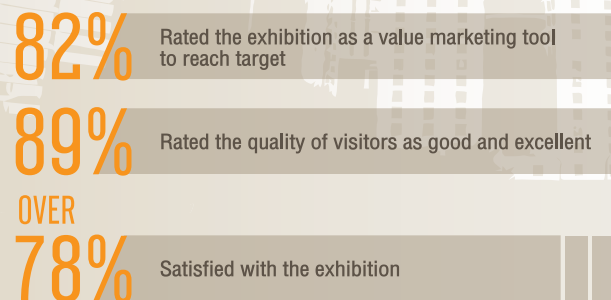


Fast Facts

- FDI projection was US\$ 5 Billion for 2014-2015 but was easily surpassed to US\$8.1 Billion.
- Estimated population of around 60 million offers huge potential market for import.
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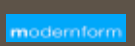
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MANITOWOC

BOOTH: FS.1202

The Grove GRT8100 rough-terrain crane is a generational update to the RT890E model. The 90 t GRT8100 features excellent reach with its 47 m boom that has a maximum tip height of 49 m. With a full complement of boom extension and insert options, the crane can also reach up to 77 m. The boom is lighter and longer than its predecessor, but has the ability to lift heavier loads throughout the load chart.

With increased capacity at mid range and maximum radii, the GRT8100 is more versatile than competitors' cranes, said Manitowoc. It boasts up to 16 percent greater capacity at full radius, 13 percent greater capacity in mid-range applications and 27 percent greater capacity at close radii. The bi-fold hydraulic boom extension can be configured to 10-17 m lengths. Other optional boom extensions for the GRT8100 include a 10-17 m manual offsettable bi-fold boom extension with fixed offsets at 0, 20 and 40 degrees as well as a heavy-duty 3 m jib that is offsettable to 40 degrees.

A new boom extension stowage system for both the GRT8100's hydraulic and offsettable jib options decreases erection and stowage time by 60 percent when compared with previous generation Grove cranes. This enables operators to set up and disassemble the crane in less time. Moreover, the GRT8100 has line pulls at 7,883 kg on both the main and the auxiliary hoists. The stronger pull results in fewer parts of line being needed to lift loads, which will lead to increased productivity on the job site.

The GRT8100 is equipped with Manitowoc's crane control system (CCS). The standardised CCS features in the cab and is a user-friendly interface that Manitowoc is introducing on all new rough-terrain crane models, as well as crawler cranes, all-terrain cranes, boom trucks and tower cranes. An updated cab also features a new ergonomic jog dial and new joysticks. The intuitive nature of CCS enables operators to more quickly set up their cranes and get to work. The system also offers the new ECO mode feature to improve fuel efficiency and decrease wear and tear on the powertrain and hydraulic systems.

In addition, the Potain MDT 389 is the largest in the new line of topless cranes from Potain, all of which are equipped with Manitowoc's CCS. It is well-suited to crowded job sites where space is tight and multiple cranes are needed, as their design allows more cranes to over-swing in smaller areas. The MDT 389 is equipped with Manitowoc's CraneSTAR set-up, a GSM data transfer system



Grove GRT8100 rough-terrain crane.



Grove GMK4100L-1 all-terrain mobile crane.



Potain MDT 389 tower crane.

that provides information on crane location and operation, supporting fleet management. There are two versions of the Potain MDT 389, one with a 12 t maximum capacity and the other with a 16 t maximum capacity. Both have up to 75 m of jib available, and the 12 t version can lift 3.4 t at its jib end, while the 16 t version can handle 3.3 t. The 16 t version will be shown at bauma 2016

Another highlight will be the new Grove GMK4100L-1 all-terrain crane, with deliveries expected to start shortly after the show. The crane is an upgrade from the 100 t GMK4100L with some notable improvements. First, the use of a single engine versus the previous two-engine design means the crane is able to carry more counterweight, delivering superior lifting ability. In fact, the GMK4100L-1 offers the best load charts in this class when configured both with its full complement of counterweight, or when configured in its most common road travelling configuration with a gross vehicle weight of less than 12 t per axle (a common axle load limit in many countries), explained Manitowoc.

The new GMK4100L-1 is also more compact than its predecessor, boasting a 2.55 m width versus the 2.75 m of the GMK4100L, and overall it is also 0.5 m shorter, making it more manoeuvrable on congested job sites. Life is also made easier for the operator with Manitowoc's new CCS. ■



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AMMANN

BOOTH: FS.909

Ammann will unveil a prototype of its new, autonomous vibratory plate. It is easy to use, with the operator setting the boundaries by remotely navigating the plate around the jobsite perimeter. The number of vertices is not limited and the machine automatically detects the closed border. Next a working strategy is calculated and the field is compacted strip by strip. A highly accurate GPS system is supported by an electronic compass and collision detection. The plate is designed to provide outstanding compaction performance and thorough coverage while reducing labour and fuel costs, as well as CO₂ emissions. It believed to be the first autonomous plate compactor on the market.

The wheeled and tracked versions of the Ammann pavers have been updated to meet all emission regulations worldwide. The tracked versions – the AFT 350-2 and AFT 500-2 – provide improved traction in challenging underfoot conditions. The wheeled AFW 350-2 and AFW 500-2 are an excellent choice when mobility is essential.

Ammann's ARS 200 T4f and ARS 220 T4f single-drum soil compactors feature newly designed cabs and intuitive controls. The optional Ammann Compaction Expert (ACE) systems provide quality control, reducing machine wear and cost savings. The ARS compactors also incorporate popular existing features, including a no-rear-axle concept with fully hydrostatic drive and the powerful Ammann dual vibratory and amplitude systems that are key tools in providing industry-leading compaction output.

The new Ammann ART 240 T4f pneumatic-tyred roller provides productivity-improving operator comfort and an engine that meets Tier 4 Final emissions standards. Intuitive controls make operation easy. The spacious cabin features two working stations, while the multifunctional operator display provides instant feedback. The ART 240 utilises a front isostatic oscillating axle and a rear-drive propulsion system that provides the necessary power, regardless of tyre pressures or ballast weight.

The new ARR 1575 Tier 4f roller utilises a Yanmar engine that meets the strictest emissions requirements in Europe and the US. The engine also provides excellent power and features reductions in noise and vibration. Productivity can be improved with easy-to-install extension kits that stretch drum widths from 640 to 850 mm. The ARR 1585 Tier 4f is the skid-steered version of Amman trench roller and extends the portfolio to cover all customer needs and applications.

Ammann's Prime asphalt plant line has been expanded. The Prime 100 offers a capacity of 100 t/hr and is a smaller, highly mobile version of the popular Prime 140. In addition to its exceptional mobility, the Prime 100 is very compact when assembled. Despite its smaller size, the plant still utilises high-quality Ammann core components for optimal performance and output.

The new Ammann SolidBatch plants are built for flexibility, customisation and reliability. The SolidBatch 140 and SolidBatch 180, with capacities of 140 t/hr and 180 t/hr respectively, are highly standardised and the base model features few 'extras.' Instead, customers select the standard SolidBatch model and then choose from a variety of options.

The new QuickBatch container plant is engineered for easy, cost-effective transportation and installation while still offering benefits typically associated with stationary facilities – including high-

production capacity. QuickBatch was designed for international transporting efficiencies and 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 certified transport containers. When it's time to move, the components are simply loaded onto the transport vehicle. ■



Ammann AFT 500-2 asphalt paver.



Ammann will unveil a prototype of its autonomous vibratory plate.



Ammann's Prime 100 asphalt plant.

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BAUER

BOOTH: FN.520

Bauer's PremiumLine rigs are multifunctional machines for different uses in specialist foundation engineering, while the ValueLine is optimised for kelly drilling.

The PremiumLine models include BG 24 H, BG 28 H, BG 39 and BG 46, which are fitted with different extensions and tools. Performance-increasing improvements have also been made to all machines; they are now equipped with the Bauer EEP, the Energy Efficiency Package.

The BG 24 H will be presented with the new BT 75 base carrier, with significant safety-relevant developments. There is an integrated service platform for easy, convenient and secure access for maintenance work. The practical service platform can be pulled out like a drawer, so the motor panelling automatically becomes the fall protection. The BG 46 rotary drilling rig puts the focus on heavy-duty casing work without a casing oscillator and is optimally prepared for deep drilling in a kelly system.

The ValueLine drilling rigs are a medium-sized platform range that is designed for bored piles with a diameter of up to 2.5 m and a drilling depth of up to 70 m. This medium-sized platform range includes the Bauer BG 26 as the lowest priced-model and – in the larger version – the BG 30.

The core element of the medium-sized platform range is the joint BT base carrier, which was designed and constructed by Bauer. The machine can also be equipped with a 298 kW Cat C 9.3 motor, which fulfills the most recent emission standard according to Tier 4 final. Large cross-sections in the hydraulic pipes and a degree

of optimal motor efficiency guarantee economic fuel consumption. For difficult ground conditions, a BTM torque converter or a casing oscillator can be attached.

There are also numerous developments on the ValueLine series that make maintenance work, assembly and dismantling of the machine easier. An integrated service platform allows for easy, convenient and secure access for all types of maintenance work on the uppercarriage. For this, a step that is connected with a part of the lateral panelling is pulled out of the uppercarriage. The lateral panelling then acts as fall protection.

In addition, the MC crane series from Bauer has been upgraded for more construction methods. The modern winch system with automatic control allows the MC cranes to be used for dynamic soil compaction. Moreover, Bauer now offers an orange peel grab for MC cranes for material handling work. On this track, a further upgrade of the range of application is planned for 2016 e.g. as a lifting care with auxiliary jib.

The MC cranes offer a significant expansion for use in diaphragm wall technology. Bauer has elaborated the HDS hose drum system: with HDS-T on the mast head - exhibited on the Bauer MC 96 duty-cycle crane - the cutter can be turned together with the hose bracket. Cutting depths of up to 120 m are possible with this design. ■



Bauer BG 30 ValueLine drilling rig.



Bauer MC duty-cycle cranes.



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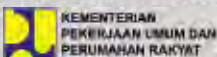
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SOUTH EAST ASIA
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HAULOTTE

BOOTH: FS.903/5

Haulotte's new HTL 5210 telehandler offers one of the best load ratings for the 10 m segment with a lift capacity of 5.2 t up to a height of 10 m, representing a maximum forward reach at 3.5 t to 5.8 m with the stabiliser. The machine is suitable for all types of applications in the heavy construction, mining, oil, port cargo handling and recycling sectors.

The stabilisers, included in the standard configuration, ensure an excellent horizontal outreach, and the rear axle locking system of the HTL range provides greater lateral stability for a very high load rating performance for the upper section. Easy to operate on non-stabilised surfaces, the HTL 5210 is a four-wheel drive and steer all-terrain telehandler. This model is equipped with a hydrostatic transmission for high precision movements and an inching pedal system for a smooth and easy approach.

The HTL 5210 is powered by a 113 hp Tier 4i/Stage IIIB-compliant Perkins engine for Europe, and a 95 hp Tier 3-compliant Perkins engine for Latin America, North America, Asia Pacific, Russia and the Middle East.

Haulotte's new STAR 6 vertical mast features a working height of 5.80 m, with 3.80 m for the platform. The machine is ideal for both indoor and outdoor applications (for indoor jobs, it can accommodate two people). The new asynchronous motors deliver exceptional torque; this means the operators have better proportional control capabilities for precise, smooth and incremental driving to access the most difficult areas. The fast and responsive lifting and lowering movements also offer high precision capabilities when approaching the work area.

The inside platform width has been increased by +0.1 m to provide more space for the workers. Ergonomics is improved with a double entry-gate. A platform extension is available as an option (+0.4 m), raising the work height for higher comfort and productivity. Equipped with mobile potholes protection, the STAR 6 can overcome small obstacles.

The chassis has been designed to permit the passage of forks to lift STAR 6 along the width, in total security. In addition, this new fork-lifting feature allows the machines to be easily loaded and transported in a standard truck bed. This represents an added value for rental companies and a way to reduce transport time.

The chassis has also been redesigned to enable easy slinging and stowage of the machine. The reverse caisson with three-stage cylinders has no chain and no cable; this means the operator benefits from a rigid and safe machine requiring less maintenance.

Furthermore, an anti-slip step has been integrated to provide greater security, a walkable protection plinth provides safer access to the platform, and durability is enhanced by robust tyres and a limited number of flexible hoses (only five).

With no brushes to change, no hydraulic drive and less mechanical parts for the on-wheel axis, the STAR 6 basically requires no maintenance. Direct access to control points means checks can be performed more quickly. The tilt sensor is now placed just under the platform, with direct vision and access inside the mast while two swing-out trays facilitate inspection of the batteries and charger and the hydraulic system.

The STAR 6 has also incorporated the new on-board diagnostic tool, Haulotte Activ' screen, providing access to full information on the cause of failure, the components to check, their location and the actions to be taken, making troubleshooting easy. ■



Haulotte HTL 5210 telehandler.



Haulotte STAR 6 vertical mast.

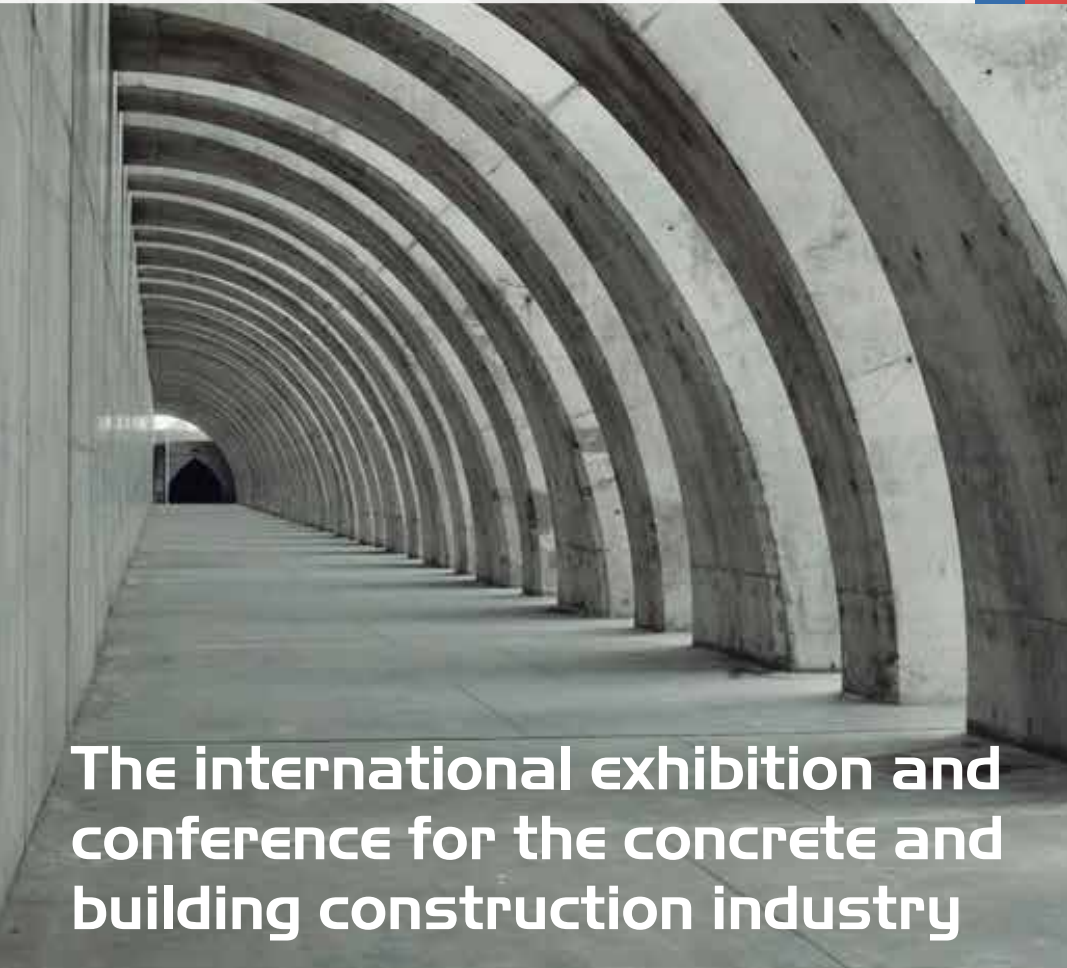


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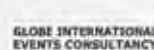
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DRESSTA

BOOTH: FM.417

Dressta will launch its new line of hydrostatic compact crawler dozers – the TD-8S and TD-9S – in the first quarter of 2016 and each will be showcased at bauma for the first time.

The new S-series dozers are equipped with Rexroth dual path hydrostatic drive systems, which transmit full power to both tracks in all conditions to ensure smooth speed changes, pivot turns and counter rotation – making each job safer and more operator friendly, even when working on confined jobsites. All these features combine to ensure optimised productivity and ease of operation.

The TD-8S and TD-9S are powered by environment-friendly QSF 3.8 Tier IV Final Turbo-charged Cummins engines, meeting EU Stage IV and US EPA Tier 4 Final emission regulations. The engine combines electronic controls with impressive reliability and durability that ensure long maintenance intervals, and is equipped with a DEF after-treatment systems and a waste gate controlled by ECM.

The new compact crawler dozers inherit a number of Dressta's established design features. A strong 6-way C-frame is complemented by a robust undercarriage that is available in two options: the standard LT (Long Track) version for better stability during forward driving and levelling, and the LGP (Low Ground Pressure) version for use in swampy and muddy terrain.

Undercarriages feature a standard lubricated track system (LTS) and split link track chains to reduce installation and removal times. Both models feature pivot shaft installed suspension for final drive protection and hydraulic track adjusters for extending track chain life.

The dozers are also equipped with 6-way (PAT) blades designed for ultimate performance in both heavy-duty and final grade applications; TD-8S with a 1.84 cu m (LT) or 2 cu m (LGP) blade capacity, and the TD-9S with a 2.2 cu m (LT) or 2.4 cu m (LGP). Multi-shank (5/3) parallelogram rippers enable these models to achieve the ripping performance of much larger models – 378 mm for the TD-8S, and 500 mm for the TD-9S.

In addition, the dozers have been designed to ensure the operator can maximise productivity. For optimal visibility, enlarged side door windows and a sloped engine hood allows for a better view of the blade front and corners. Tinted glazing reduces glare, and the machines feature a sun visor, and both an inside rear view mirror and external side mirrors to provide all round visibility of the machine. An all-new cab is designed to provide 30 percent more space, and FOPS and 2-post ROPS ensure maximum safety.

Numerous features within the dozers mean the operator is able to perform efficiently and effectively. A new high-resolution 16-in LCD display screen provides real-time system values for temperatures, pressures and forward/reverse direction shift & ground-speed ranges. Two ergonomic joysticks ensure smooth controllability: a left-hand joystick with control buttons and switches for steering, and a right-hand joystick for mounted equipment. An eco-mode feature enhances fuel efficiency without sacrificing productivity. The S-series dozers are available with integrated technology options, such as Trimble Ready base and full Trimble 3D control systems. ■



Dressta TD-8S.



Dressta TD-9S.

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HYUNDAI

BOOTH: FM.813A

The new Hyundai HL970 is well suited to the quarrying, mining, construction and material handling sectors. This 23.5 t wheel loader has a 3.6–4.2 cu m bucket capacity. Its high-strength design structure and robust system has been proven by rigorous road tests at various work sites, according to Hyundai. The durability of the hydraulic hoses and attachments has been improved significantly compared to the previous generation of Dash 9A series.

The HL970 is powered by a Scania DC09 085A stage IV engine boasting a gross 311 hp. Hyundai has opted for a combined solution of EGR and SCR technologies, without the need for an additional DPF. The new machine is up to 10 percent more fuel-efficient in truck-loading than its predecessor, depending on the application, and has a travel speed of up to 40 km/hr.

Apart from its fuel efficiency, the HL970 also benefits from an ECO Pedal, which when the operator uses the accelerator pedal, he/she is able to distinguish between economical operation and power operation. In addition, the ECO Gauge enables the economic operation of the machine. The gauge level changes colour with the engine torque and fuel efficiency level. It can also provide the status of fuel consumption, such as the average rate and total amount of fuel consumed. Hourly and daily based fuel consumption can be checked in detail, which helps the operator run the machine more economically and efficiently.

Hyundai's HL-series of wheel loaders has a function that turns the machine off when it enters an 'idling' state, thus minimising unnecessary fuel consumption and emissions. Operators can select operating mode depending on work environments. The 5 Speed transmission with lock-up clutch on this machine also aids fuel consumption depending on the working conditions.

The HL-series improves work precision with additional accuracy. The automatic/manual cumulative weighing function greatly improves operating efficiency. Icons displaying weighing errors and the two-colour weight value indicator on the monitor enable accurate weighing to support efficient production management.

Hyundai has also redesigned the wheel loader buckets on the HL-series and they now have a better fill factor and an additional spill guard to minimise spillage of loaded materials. The HL970 boasts up to 5 percent greater productivity in comparison to the Dash 9A series. The boom and bucket are both controlled by either the joystick or fingertip system.

The cabins on the new HL machines have been designed with operator safety and comfort in mind. As well as more space in the cabin with up to 10 percent more leg room, there is a bigger and more comfortable seat with an adjustable arm rest with integrated control levers for attachments. The electro-hydraulic control allows the joystick to move along with the seat when being repositioned. For ease of access and egress the cabin door now turns in the opposite direction with the hinges located on the front-side.

The cabin is also fully soundproofed and ensures maximum silence (72 dB) when working in noisy environments, such as quarries or waste handling depots – the new HL machines benefit from a 2dB reduction in cabin noise over the Dash 9A series. A new air conditioning system maximises heating and cooling by optimising airflow. The capacity of the inner filter was increased and the material changed for first-class filtering performance.

The 7-in-wide touchscreen monitor is similar to a smart phone display and is larger than the previous models. The audio system has



Hyundai HL970 wheel loader.

an integrated Bluetooth hands free feature, and a built in microphone allowing the operator to take and make calls when in the cab. The 'infotainment' system also allows the operator to enjoy the Miracast system, which works via the WiFi of the operator's smart phone and enables easy use of the smart phones features on the big screen including navigation, web surfing, watching videos and listening to music.

Touchscreen monitor and electro-hydraulic controls allow several (new) features like 'soft end stop' to be controlled through the touchscreen. The 'soft end stop' delivers - when an attachment reaches the end of a stroke - a 'shock free' operation by reducing the speed of the attachment near the end stroke. This function can be disabled through the monitor should the operator not want to use this function.

The HL-series has a large-volume air cleaner, an automatic dust ejector and a three-stage air pre-cleaner, as an option, to improve the replacement cycle and durability of supplies. The machine also has a fully sealed engine room, designed to prevent the possibility of fire caused by the inflow of 'foreign materials'. A flick of a switch is all that it takes to access the engine compartment of the new HL-series of wheel loaders. The electronically operated fully retractable engine hood allows easy cleaning and maintenance. The initial replacement cycle of oil and filter is extended to 250 hours to further reduce the maintenance costs.

The new wheel loader is also available in XT version (larger dumping height). ■

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LIEBHERR

BOOTH: FM.809-813 & A4.213

Liebherr will present its innovative crawler crane concept for the 100-t class, the LR 1100. It is fitted with a 230 kW diesel engine complying with the exhaust emission standards stage IV/Tier 4f; for countries with other regulations, Liebherr can provide engines without exhaust aftertreatment. The crane will be available worldwide from mid 2016, said the company.

The newly designed steel fabrication of this crane resembles a tubular structure, allowing for optimum force transmission over short distances. This results in excellent lifting capacities, even compared to the predecessor model in this class. These can be further enhanced by approximately 20 percent using a swinging counterweight, which is available as an option.

The LR 1100 is easy to transport and set up. The catwalks next to cabin and service areas are simply folded down for transportation instead of being laboriously dismantled. Boom foot and crawlers also remain on the crane during transportation.

Another highlight is the boom foot manipulator, making it easy for haulage contractors to move the crane. Starting at the boom foot a rope is guided to a short auxiliary A-frame. Another rope leads from the A-frame to the counterweight cylinder. When this cylinder is extended, the counterweight leaves its stationary position and moves upwards. Thus, there is no need for the big A-frame to be erected. In order to get the crawler crane ready for operation it is sufficient to mount the boom.

The position of the cab at a height of 2.3 m provides the operator with an excellent overview of the complete jobsite. Moreover, orthopaedic operator seats as well as a modern climate control system contribute to increased comfort. A new operating concept facilitates intuitive and ergonomic work – in the cabin the operator can adapt the working position of the seat, the air conditioning as well as lighting to his/her individual needs.

In addition, compared to the predecessor model GRP doors on the uppercarriage are no longer required. This facilitates optimum access for service personnel both from the ground and from the roof of the basic machine.

The LR 1100 is equipped with the Litronic control system of the latest generation, which is based on CAN-bus technology. The load moment limitation included in the system automatically calculates the lifting capacities during operation and guarantees optimum use of the machine.

There are also two new assistance systems. The Vertical Line Finder ensures that the load on the rope is hoisted with perfect verticality. This prevents diagonal pull caused by the long distance between crane operator and load. Furthermore, this prevents asymmetric centres of gravity. The other system, the Horizontal Load Path allows loads to be moved to the projected position more precisely and efficiently following a horizontal line.

Liebherr's LRB 355 piling and drilling rig, with its robust undercarriage, guarantees a high level of stability. Thanks to the parallel kinematics, the machine has a large operating area. 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 LRB 355 has been specially designed for drilling with full displacement tool and achieves a torque of 450 kNm in this application. The rig can, however, be used for numerous other applications including drilling with Kelly equipment, double rotary

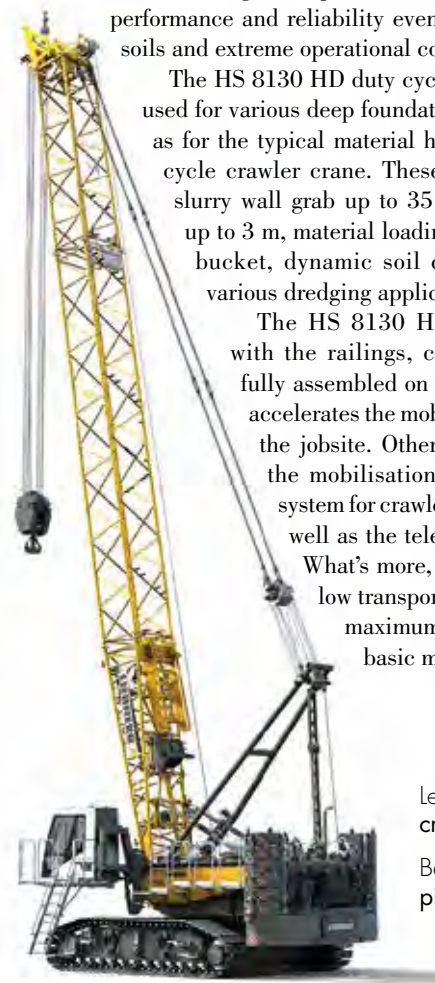
head and continuous flight auger, soil mixing as well as piling jobs with vibrator and hydraulic hammer.

The LB 36 rotary drilling rig is fitted with the BAT rotary drive. It offers a torque of 410 kNm and can be individually configured depending on the type of application. The machine weighs 115 t and has been designed for drilling diameters of up to 3 m and drilling depths of maximum 88 m. The powerful Kelly winch with 40 t line pull and the rope crowd system with 40 t pull force offer a significant technical advantage. This provides the operator with maximum performance and reliability even with the most difficult soils and extreme operational conditions.

The HS 8130 HD duty cycle crawler crane can be used for various deep foundation applications as well as for the 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 dragline bucket, dynamic soil compaction as well as various dredging applications.

The HS 8130 HD can be transported with the railings, catwalks and pedestals fully assembled on the uppercarriage. This accelerates the mobilisation of the crane on the jobsite. Other features that facilitate the mobilisation are the self-assembly system for crawlers and counterweight as well as the telescopic jack-up system.

What's more, the HS 8130 HD has a low transport weight of 50 t and the maximum transport width of the basic machine is only 3.5 m. ■



Left: Liebherr LR 1100 crawler crane.

Below: Liebherr LRB 355 piling and drilling rig.



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LiuGong will put its full Tier IV E-series excavator range on display, which will include the 915EIV, 925EIV, 933EIV and 939EIV – all of them are fully compliant with European emissions regulations. The 9035EIII, 922EIIIB and 950EIIIA will also be exhibited to round off this product line.

Every E-series excavator comes equipped with a fuel-efficient Cummins engine, which is further complemented by a Cummins turbocharger. This varies airflow to precisely match engine and load demand, resulting in optimal performance. The low speed, high output torque engines are specially designed for the E-series excavator to ensure their efficient operation. Proven negative flow hydraulics optimise the main control valve, improving the speed of the cylinders' front end while decreasing the hydraulic system's damper loss, leading to enhanced working efficiency. The pilot valves match up with the main control valve to offer more precise control.

The E-series also makes use of the advanced IPC (Intelligent Power Control) system – LiuGong's own new-generation, computer-aided power control system. Not only does it maximise the engine's low oil consumption, it also integrates the mechanical, electrical and hydraulic systems, thus achieving high all-round efficiency, economical fuel consumption and improved control. There are six selectable working modes - power, economy, fine, lifting, breaker and attachment – to optimise performance and fuel consumption in every situation. Moreover, the automatic speed reduction in neutral gear reduces fuel consumption and noise.

For added durability, the E-series excavators are constructed with thick plates of high tensile strength steel, as well as internal baffle and stress-relieved plates. The boom and arm support structures are designed with large cross-sectional areas and one-piece steel castings to guarantee their long-term durability and high resistance to bending and torsional stress. Standard rock guard plates and vertical guards protect the arm in rocky digging conditions or other similarly rough environments. Finally, ultrasound inspections are carried out to reduce defects and ensure the quality and reliability of these machines.

An H-beam structure is used in the high cross section of the main platform, which is also welded to the collision protection structure to improve its strength, rigidity and service life. The undercarriages of the E-series excavators are built with the mature



LiuGong 925E.



LiuGong 939E.



LiuGong 950E.

technology of the X-type reinforced walking frames. They also use the long track beam and crawler system, which provides greater stability and reliability.

In comparison with the D-series, the cab space of the E-series has been increased by 8.5 percent, the skylight area by 28.5 percent, height of vision by 15 percent and the area of glass on the right-hand side by 10 percent. These modifications come together to produce a large cab with a wide skylight and broad field of vision.

The E-series excavators also feature a reinforced bridge frame that increases the overall strength of the machine, as well as its impact resistance. The ROPS cabs meet the ISO 12117-2 safety standard, which means that they are fully prepared to handle the unlikely event of a machine rollover. The pressurised cabin has been adopted to prevent dust from entering the cab. When the air conditioning (external air import) is in use, customers can increase the internal pressure to prevent the entry of dirt and other irritants.

The engine oil and fuel filters are integrated at the right rear side of the machines, while the pilot hydraulic filter is located beside the hydraulic tank, providing easy access and maintenance for customers. In addition, both the interior and exterior portions of the air filters can be conveniently removed for cleaning at ground level. ■



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