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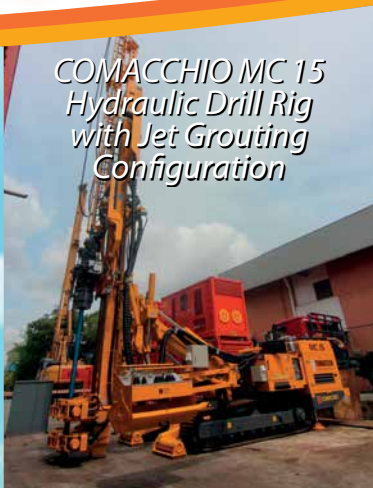


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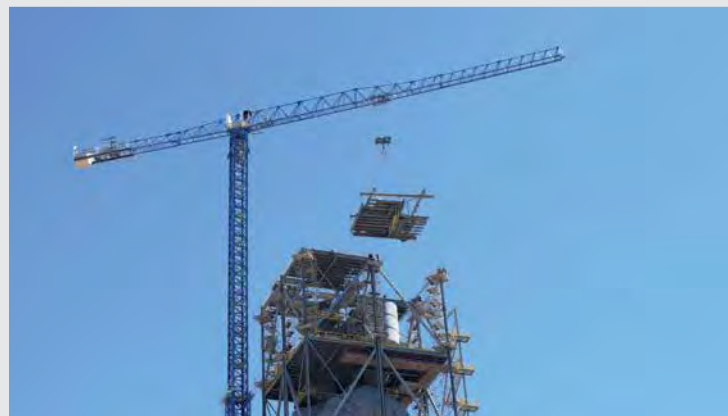
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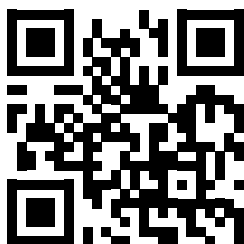
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Correction: For the news 'JP Nelson opens new facility in Malaysia and becomes Sinoboom distributor', published on page 26 of the Jan/Feb 2019 issue, we note the following correction. The second sentence of the second paragraph (line 4-9) should have stated: 'JP Nelson Equipment (KL) Sdn Bhd supplies foundation equipment and lifting cranes; while Kanamoto & JP Nelson Equipment (M) Sdn Bhd offers power generators, air compressors, boom lifts and scissor lifts, among others.'

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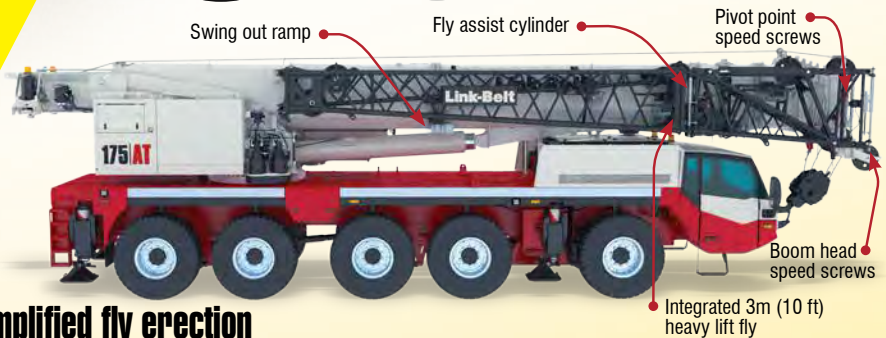
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Singapore to build 'longest fully underground MRT line'

Singapore will be building its eighth Mass Rapid Transit (MRT) line, named the Cross Island Line (CRL), as announced by the Land Transport Authority (LTA). It will also be the country's longest fully underground line.

When completed, the CRL will serve existing and future developments in the eastern, western and north-eastern corridors of Singapore, linking major hubs such as Jurong Lake District, Punggol Digital District and Changi region. The projected daily ridership of the entire line is expected to be more than 600,000 in the initial years, increasing to over 1 million in the longer term.

The project will be built in three phases. The first phase (CRL1) is 29 km long and comprises 12 stations from Aviation Park



Construction of CRL1 is expected to commence in 2020 and be completed by 2029.

to Bright Hill. This will serve residential and industrial areas such as Loyang, Tampines, Pasir Ris, Defu, Hougang, Serangoon North and Ang Mo Kio. More than 100,000 households will benefit from CRL1, said

LTA, and common recreational spaces such as Changi Beach Park and Bishan-Ang Mo Kio Park will also become more accessible by public transport. Construction of CRL1 is scheduled to commence in 2020 and be completed by 2029.

According to LTA, engineering studies are still being conducted for the other phases of the CRL, including the two underground alignment options in the vicinity of the Central Catchment Nature Reserve.

CRL1 will connect to the East-West Line at Pasir Ris Station, North-East Line at Hougang Station, North-South Line at Ang Mo Kio Station, and the upcoming Thomson-East Coast Line at Bright Hill Station. ■

Work commences on new industrial park in Vietnam

Construction of Song Khoai Industrial Park in north of Vietnam has recently started. With a total investment of VND 3,535 billion, the project has a total area of 714 ha in Quang Yen Town, a part of the new Amata City Halong development in Quang Ninh province.

The new industrial park is expected to accommodate its first customer by 2020, putting the first phase into operation with an area of 123 ha. Developed by Thailand-based company Amata, the project aims to uplift the economic development of the province through attracting investment projects, especially those of large multinational firms, as well as ensuring social balance and environmental protection.

"In developing each project, we adhere to Amata Group's core values - to create a non-polluted industrial city with high technology and environment-friendly (features) together with the development of residential area with complete high-quality standard utilities, facilities and services to support the need of



The groundbreaking ceremony for the new Song Khoai Industrial Park.

people working and living in our Amata Cities," said Mrs Somhatai, director and CEO of Amata VN Public Company Limited. ■

Dressta expands footprint in Indonesia

Dressta's exclusive dealer for Indonesia, Intraco Penta Prima Servis, is expanding its presence in the country with the opening of a new branch office in Surabaya. "This marked our return to Java, the most populated island that represents more than 60% of Indonesia's GDP, after an eight-year hiatus," said George Setiadi, managing director of Intraco Penta Prima Servis.

"Over a time span of 48 years, Intraco Penta has invested in its infrastructure to be able to offer a full suite of solutions that include financing of equipment, rental & used equipment and various soft

products through its extensive network of over 40 outlets and project sites across the archipelago of 16,000 islands in Indonesia," added Mr Setiadi. "Dressta bulldozers fit perfectly in our product offering and with the support from Dressta, we are confident it will command a respectable share in the market in the coming years."

Dressta highlighted that one of its objectives, together with Intraco Penta, is to provide world-class service through comprehensive parts availability and extensive after-sales support wherever its customers are located in Indonesia. ■



Intraco Penta Prima Servis has established a new branch office in the city of Surabaya to expand its presence in Indonesia.



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South Korea to have ‘world’s largest surfing lagoon’

Wavegarden, a Spain-based engineering company specialising in surfing lagoons, and Daewon Plus Construction, one of South Korea’s largest real estate and theme park developers, have signed an agreement to build the world’s largest man-made surf park in Turtle Island, located in Siheung in the Gyeonggi province of South Korea. The development is scheduled to open in 2020.

Constructed on a land reclaimed from the ocean, Turtle Island is set to be a new international waterfront destination with various facilities such as hotels, convention centres and marinas. It will also have a beach spanning almost 1 km.

The highlight of the €2.1 billion mixed-use development will be the Wavegarden Cove surfing lagoon. It is capable of producing up to 1,000 ocean-like waves per hour, which unfurl across a range of different surfing areas, said Wavegarden. Each area offers waves of different size and power specifically designed to provide ideal conditions for everyone, from professional surfers to beginners.

According to Wavegarden, there will be some challenges faced by the project, including specialised technological solutions for wave generation, water treatment and civil works. For this, the company will use state-of-the-art machinery to produce millions of waves per year and it is also designed to recover part of the energy used in the wave generation process to attain the lowest possible energy consumption. The innovative water treatment system, developed specifically for wave lagoons, will keep the water transparent and clean throughout the year. Its intelligent design uses the energy of the waves to acquire the highest level of energy efficiency available nowadays for large recreational water bodies. ■



ABOVE AND LEFT: Wavegarden and Daewon Plus Construction have signed a contract to develop the world’s largest man-made surf park in Turtle Island, South Korea.

Arup unveils Future Cities Hub to drive innovation and growth in SE Asia

Global engineering company Arup has launched its first Arup Future Cities Hub in Singapore. Supported by the Singapore Economic Development Board (EDB), the facility will serve as a focal point for Arup’s consulting expertise in advisory, planning and design across Southeast Asia.

“Singapore is the home to the best talent, underpinned by high quality infrastructure and regional connectivity. With EDB’s support, we are excited to launch the Arup Future Cities Hub on our 50th anniversary in Singapore,” said Tan Yoong Heng, office leader of Arup Singapore.

With Singapore as a springboard, Arup will be working with public agencies and private sector entities on urban development, transport, social and infrastructure in the region. “Arup’s vision to shape a better world is closely aligned with Singapore’s economic transformation ambitions from a trade hub to innovation hub,” added Mr Tan. “We aim to bring the same bold, progressive and innovative city planning vision and goal to our clients. Our ambition is to bring the design leadership that we have established in Singapore to the future developments in cities across Southeast Asia.”

“Arup has been instrumental in developing many high-profile infrastructure projects that we recognise in the Singapore skyline today,” said Dawn Lim, deputy director of commercial and professional services at EDB. “The Future Cities Hub, a first for the company, is testament to 50 years of strong partnership between Arup and Singapore. By bringing together Singaporean talent and leading infrastructure and urban solutions professionals around

the world, the Hub will accelerate infrastructure innovation and strengthen our position as a reference city in Southeast Asia and beyond.”

Southeast Asia is undergoing a process of hyper urbanisation and with the urban populations expected to grow by another 100 million to reach 373 million people in 2030, urban infrastructure planning has become more critical than ever before. Cities in the region will need to address urbanisation challenges and plan for sustainable and resource-efficient infrastructures.

Over the next five years, the Arup Future Cities Hub will focus on strengthening its advisory, planning, design and specialist consulting capabilities to address critical needs. Arup also aims to grow its offerings in digital, advisory, urban mobility, infrastructure masterplanning, resilience and sustainability consulting.

The Future Cities team will be expected to increase to more than 60 staff, with a balanced, diverse and quality team that combines local knowledge and understanding with a broad range of international expertise by 2023.

“Singapore is a natural choice to build Arup’s Future Cities Hub. The nation has a strong ambition to develop its highly skilled workforce and economic leadership in the region – and we are excited to contribute to nurturing designers, planners, engineers and strategists of the future,” said Neil Walmsley, Arup’s cities and planning leader. “The goal for our Future Cities team is to help Singapore develop a resilient, sustainable and smart future, while exporting best practices to the region.” ■



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Megawide wins Mandani Bay Quay Phase 2 in Philippines

Megawide Construction Corporation has won the EPC (engineering, procurement and construction) contract for the Mandani Bay Quay Phase 2, a waterfront development in Mandaue City, Cebu, the Philippines. The project was awarded by HTLand, a joint venture company of Hongkong Land and Taft Properties.

Edgar Saavedra, Megawide's chairman and CEO, confirmed that the company has exceeded its Php 24 billion target in new contracts for 2018 with the signing of the Php 10.1 billion Mandani Bay project. "It is the largest contract for our construction segment that we have booked so far (in 2018)," he said.

Megawide previously reported that new contracts awarded in the first nine months of 2018 amounted to Php 16.8 billion, 55% more than new contracts secured for the full year of 2017. "Our prospects in the EPC business remain very bullish as we continue to expand our order book levels and ensure revenue visibility for the next two to three years," said Mr Saavedra.

According to Mr Saavedra, Megawide will also be expanding the scale of its construction operations in Cebu with the construction of Mandani Bay. "We are further strengthening our operational efficiency in the region. It will be a good complement to our airport operations and our other ongoing EPC projects in the area."

Mandani Bay Quay phase 2 has a construction floor area of 328,000 sq m. The development will include three 40-storey residential towers, one 30-storey office building, an amenities floor, two commercial levels and four floors of podium parking. Construction was expected to begin in 2018 with the first tower, together with the amenities area, commercial spaces and parking levels, targeted for completion by the end 2021. The succeeding residential towers are targeted for delivery within the first half of 2022 and first quarter of 2023 respectively, while the office tower is scheduled for completion by the fourth quarter of 2022 ■.

Case appoints new distributor in Indonesia

Strengthening its presence in Indonesia, Case Construction Equipment - a brand of CNH Industrial - has expanded its distributor network in the country with the recent appointment of PT. Altrak 1978 for its heavy line of construction equipment.

PT. Altrak 1978 has established a well-known presence and 40 years' worth of experience in Indonesia, first as distributor for CNH Industrial's agricultural brand, New Holland Agriculture, and now also supporting the Case Construction Equipment brand. The company's teams of experienced sales people and service technicians based at its 40 branches across the country will be able to provide mining and heavy construction operations with the high productivity, efficiency, fuel economy and cost effectiveness of Case equipment and technologies.

"Case is proud to announce the expansion of its network in Indonesia and its aim to establish a strong partnership with PT. Altrak 1978. Their team is highly professional and trained to give our Case customers advice on the best models and specifications as well as on financing and planned maintenance packages that they need for their businesses and operations," said Alvin Lim, Case's business director for Southeast Asia, Pakistan and Japan.



The signing ceremony for the appointment of PT. Altrak 1978 as an additional distributor for Case Construction Equipment in Indonesia.

"The appointment of PT. Altrak 1978 as an additional distributor for our Case heavy equipment, enables Case to provide even more dedicated professional support for its customers in the growing mining and heavy construction sectors." ■

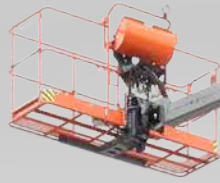
Ascendas-Singbridge to develop new IT Park in India

Ascendas-Singbridge Group has acquired a 12.20-acre land parcel in Chennai, India, which is planned to be developed into an IT park with supporting amenities. The first phase will offer approximately 1.10 mil sq ft of Grade A business space, with construction expected to commence soon based on approvals.

Providing a total development potential of 2.30 mil sq ft, the land parcel is strategically located on Pallavaram - Thoraipakkam Road (also known as Radial Road), an upcoming IT corridor that is connected to Old Mahabalipuram Road and Grand Southern

Trunk Road, the two existing major IT corridors in Chennai.

The development will be named International Tech Park Chennai (ITPC) – Radial Road, after the flagship ITPC – Taramani. This will be the Group's sixth property in Chennai, and will add to its current Chennai portfolio that comprises two IT parks (ITPC – Taramani & CyberVale), an integrated industrial development (OneHub Chennai), and two logistics and warehouse facilities at Oragadam and Periyapalayam by Ascendas-Firstspace. ■



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Subversive Performance(Compared with the same model in the industry)

The maximum working height heights have been increased by more than 2m to 30m on the telescopic Boom Lifts is 30m and 28m the Articulating Boom Lifts. Both models can be loaded into a standard container.

Maximum SWL increased by more than 30% to 450kg on telescopic booms and 320Kg on articulating Boom Lifts.

Maximum Horizontal Reach is increased by more than 1m.

Maximum gradeability is 50%, an increase of more than 20%.

The weight of the whole machine will also be 1 ton lighter.

Subversive Maintenance(Low maintenance costs)

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Telescopic Boom Lifts

BT24RT(24m) **BT26RT**(26m)

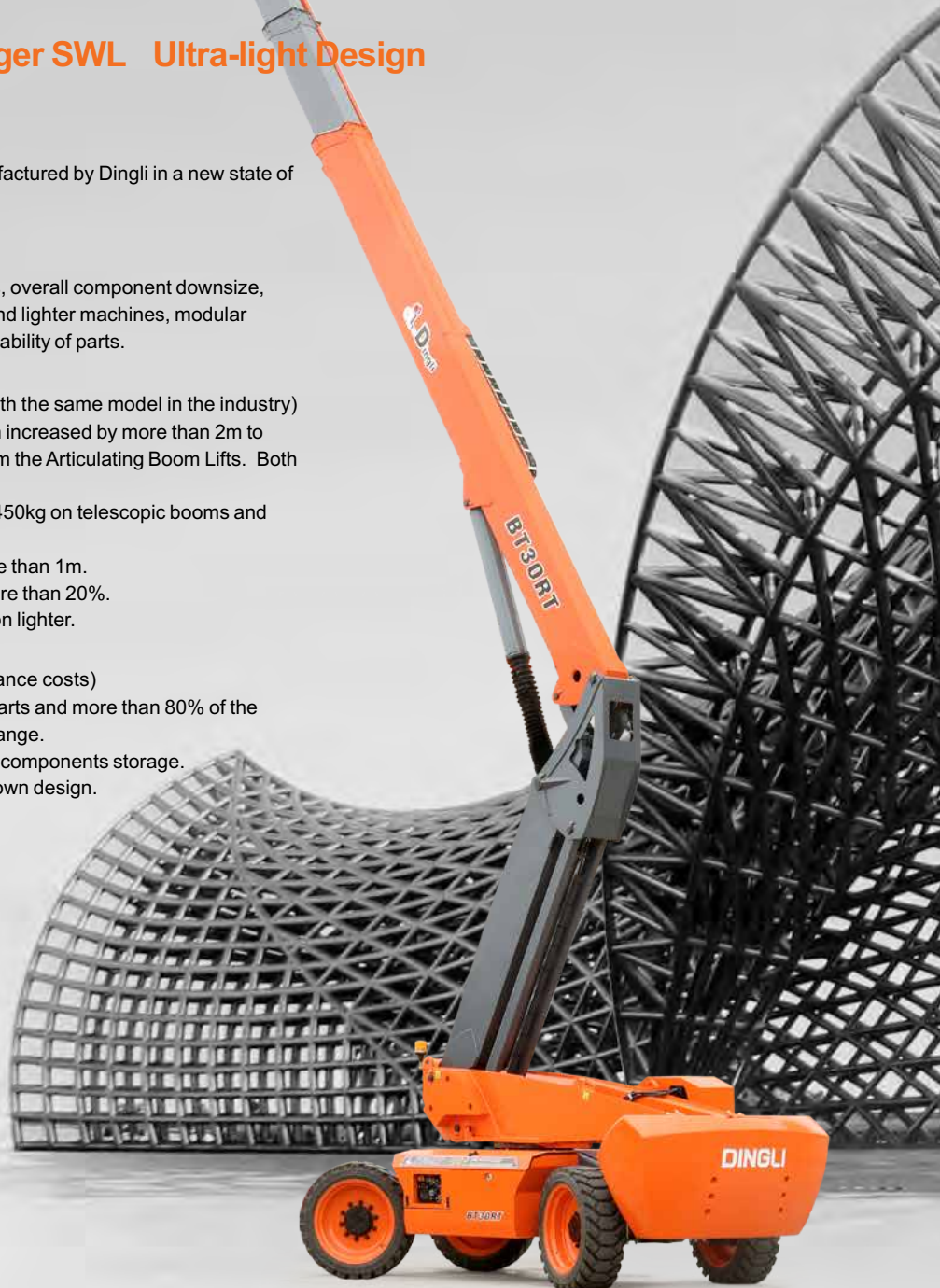
BT28RT(28m) **BT30RT**(30m)

Articulating Boom Lifts

BA24RT(24m) **BA28RT**(28m)

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Construction demand in Singapore ‘to remain strong’

The Building and Construction Authority (BCA) projects the total construction demand in Singapore this year - which is the value of construction contracts to be awarded - to range between S\$27 billion and S\$32 billion, comparable to the estimated S\$30.5 billion awarded in 2018.

The projected outlook for 2019 is due to sustained public sector construction demand, said BCA, which is anticipated to reach between S\$16.5 billion and S\$19.5 billion, contributing to about 60% of the projected demand. Public construction demand is expected to be boosted by major infrastructure projects and a pipeline of major industrial building projects.

The private sector’s construction demand is expected to remain steady at between S\$10.5 billion and S\$12.5 billion in 2019, supported by projects including the redevelopment of past en-bloc sales sites concluded prior to the second half of 2018 and new industrial developments.

According to BCA, total construction demand in 2018 was within forecast due to strong demand from institutional building and civil engineering projects, demonstrating a continued positive growth in the manufacturing sector and more private residential redevelopment projects from en-bloc sales in 2017 and the first half of 2018. Total preliminary construction demand in 2018 for the public and private sector was S\$18.4 billion and S\$12.1 billion respectively.

2020 to 2023

BCA expects a steady improvement in construction demand over the medium term. Demand is forecast to reach between S\$27 billion and S\$34 billion per year for 2020 and 2021, and could increase to between S\$28 billion and S\$35 billion per year for 2022 and 2023.

The public sector is expected to contribute S\$16 billion to S\$20 billion per year from 2020 to 2023, with similar proportions of demand coming from building projects and civil engineering works. Besides public residential developments, public sector construction demand over the medium term will continue to be supported by big infrastructure projects such as the Cross Island Line, developments at Jurong Lake District and Changi Airport Terminal 5.

BCA also expects private sector construction demand to gradually increase in the medium term, enhanced by further growth in the other economic sectors.

In addition, based on the contracts awarded in the past few years and the construction demand forecast for 2019, total nominal construction output in 2019 is projected to increase to between S\$28 billion and S\$30 billion, compared to the estimated S\$27 billion in 2018. This is supported by the improved construction demand in 2018 following the 2015-2017 slowdown.

As Singapore continues to push for the adoption of advanced construction methods in both public and private sector projects, which is to improve productivity and enhance infrastructure sustainability and maintainability, companies are encouraged to invest in technology and innovation that will enable them seize future opportunities.

To help companies do so, BCA said it will expand the Building Innovation Panel (BIP) – an inter-agency platform aimed to accelerate the regulatory clearance of technologies that improve construction productivity – to cover any type of innovation that can improve Singapore’s built environment. Such innovations can include advanced and sustainable building materials, technologies for green buildings and automation for construction. The enhanced BIP is planned to be implemented in February 2019. ■

Skyjack SJIII 3219 scissor lifts enter Beijing

Skyjack has delivered a fleet of its top selling scissor lift, the SJIII 3219, to Zhongjian Huijin in Beijing, China. “The feedback from our initial order (in 2018) was so positive from our customers, we knew we would have no issue renting out more of these 19-ft scissor lifts,” said Lu Lei, owner of Zhongjian Huijin. The company has been helping its customers in northern China to work safely at height since 2014.

“We’re happy about the decision to bring more Skyjacks into our fleet and look forward to continuing a relationship with a company who truly is easy to do business with,” added Mr Lu. The orders were placed in two stages throughout the third and fourth quarters of 2018, and Skyjack delivered the scissor lifts in the fourth quarter.

According to Skyjack, this class of scissor lift is historically the most popular within this region, and the SJIII 3219 is one of the company’s best selling products. With a working height of 7.62 m and stowed height of 1.99 m, this DC electric scissor lift is ideal for a wide number of jobsites.

“We have been hard at work since our official entrance into the Asian market and the relationships we’ve been building have really paid off for Skyjack,” explained Jack Dai, Skyjack’s account manager for sales in China. “This delivery helps solidify Skyjack’s foothold within the northern provinces.”



Skyjack recently delivered its SJIII 3219 electric scissor lifts to Zhongjian Huijin in Beijing, China. The model is one of the company’s best selling products, offering a working height of 7.62 m and stowed height of 1.99 m.

Mr Dai continued, “Our team has built up a large network within the China region and we’re happy that more and more companies are choosing our simply reliable products for their access needs.” ■

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Gammon secures luxury residential project in HK

Gammon Construction - the Far East joint venture of Balfour Beatty - has been awarded the Homantin luxury residential contract by Gold Topmont Limited. The HK\$2.9 billion project is set to become an iconic landmark in the prestigious Homantin residential area in Kowloon, Hong Kong, and is slated for completion in 2020. It involves the construction of six residential towers, a clubhouse, an outdoor swimming pool, and a two-level basement with carpark spaces.

To ensure the project's safe and efficient delivery, Gammon said it will deploy a wide range of innovative technologies including 3D scanning for data collection, which will ensure an accurate and swift survey process, as well as defect management tools such as drones and infrared cameras. The wellbeing of the workforce will also be safeguarded by the use of exoskeletons for manual handling, to reduce physical strain and enhance productivity for repetitive tasks.

Gammon has been working on the foundations of the project since 2017. A workforce of 1,100 is expected to be employed during peak construction. ■



An artist's impression of Homantin luxury residential project in Hong Kong. It will feature six residential towers, a clubhouse, an outdoor swimming pool, and a two-level basement with carpark areas.

Demag AC 130-5 all-terrain cranes go to Japan

The first two Demag AC 130-5 all-terrain cranes for Japan were recently delivered to the local company Kurokawa Heavy Equipment in Kawasaki. The cranes use the model designation AC 150-5J, which is used exclusively in the country.

In addition to the high quality of Demag cranes, the compact design behind this specific model is said to be a crucial factor in the company's purchase decision. The AC 150-5J is also believed to be the biggest crane that can travel on public roads in Japan while still having its main boom in place. This was especially important for Kurokawa, since the company will be using its new cranes for all kinds of construction projects, so travelling on public roads on a regular basis will be unavoidable. Such a benefit, combined with the fact that the main boom does not need to be removed before starting a trip and then reinstalled at the work site, means that the two Demag AC 150-5J cranes will be particularly cost-effective for Kurokawa. ■

RIGHT: Two units of Demag AC 150-5J (original name AC 130-5) have been delivered to Japanese company Kurokawa Heavy Equipment.



Keppel Land and Metland team up for new residential project in Indonesia

Keppel Land, through its wholly-owned subsidiary PT Sukses Manis Indonesia, has entered into an agreement with Indonesian property developer PT Metropolitan Land Tbk (Metland) to jointly develop a 12-ha residential site in the Metland Menteng township in East Jakarta, Indonesia.

Keppel Land will hold a 50% stake in the joint operation, which will provide approximately 500 landed homes with ancillary shophouses for sale. The partners will jointly manage

the project, and it will be developed in phases.

This partnership follows the agreement signed earlier between Keppel Land and Metland to collaborate on residential projects owned and occupied by Metland in Greater Jakarta. It is also Keppel Land and Metland's second joint operation project after The Riviera at Puri, a gated riverfront landed estate in Tangerang, Greater Jakarta, comprising about 500 landed homes. ■

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Aurecon delivers EDF microgrid on Semakau Island

In 2016, Nanyang Technological University (NTU) launched the Renewable Energy Integration Demonstrator – Singapore (REIDS) project to build eight hybrid microgrids that will be used for studying, testing and demonstrating the integration of solar, wind, diesel, storage, waste-to-energy and power-to-gas technologies. The initiative, which is set to be the largest multi-microgrid test and research platform in Southeast Asia, aims to address the need for better and more affordable energy access that is suitable for the region's tropical climate.

French utility company Electricite de France (EDF) partnered with NTU to set up a research department on Semakau Island, Singapore, and build one of the four microgrids that will also be hosted in the area. The facilities were built and located offshore to minimise the hazards and risks of being in the highly populated areas of Singapore's mainland.

As NTU had already appointed Aurecon to develop the overall microgrid infrastructure on the island, EDF further commissioned Aurecon to deliver the mechanical and electrical design services for its microgrid. This microgrid will serve as a test bed for renewable energy that combines solar photovoltaic (PV) panels, wind turbines, and other new



Completed in October 2018, the EDF's microgrid on Semakau Island will serve as a test bed for renewable energy that combines solar photovoltaic (PV) panels, wind turbines, and other new sophisticated technologies.

sophisticated technologies.

According to Aurecon, it was a challenge to deliver the complex design of the microgrid within an accelerated timeframe, in time for EDF to showcase its technologies and equipment at the Singapore International Energy Week (SIEW) in 2018. The company said that unlike other facilities that are connected to one central power source, EDF's microgrid will be generating power from different renewable sources and thus, required a comprehensive design that would ensure the safety of the people and the facility.

To achieve this, Aurecon closely collaborated with EDF and NTU to develop

a power system with a bi-directional setup, which would enable the microgrid to work on its own and function as a larger interoperable resource simultaneously. In addition, the project team collaborated closely with EDF, ensuring their design complied with local codes and regulations in Singapore; in addition to regular inspections, testing and commissioning.

Completed in October 2018, the EDF's microgrid joins REIDS' network of microgrids on Semakau Island - an innovation that, once proven successful, can be adopted by other archipelagic countries in Southeast Asia as an alternative mode of energy. ■

Haulotte receives new orders in India

Mumbai-based Shakti Equipments has bought two units of Haulotte HA20 LE Pro, which are said to be the first ones in India. This model is part of the new full electric rough terrain boom lifts that Haulotte recently launched, the Pulseo Generation.

"It's a long term relationship with Shakti Equipments, and we are pleased to increase it with the new booms from the Pulseo generation," said Alexandre Saubot, CEO of Haulotte.

Another company, Rentease International based in Mumbai and Bangalore, has also bought 101 units from Haulotte, comprising a mix of electric scissor and boom lifts. "Following the first order of 52 machines and a second one of 30, a few months ago, we are really pleased to have a consolidated position in the rental fleet of Rentease. Again, this new



Haulotte held key handover ceremonies for Shakti Equipments (right) and Rentease International at the bauma Conexpo India in December 2018.

order emphasises the strong partnership between Haulotte and this new player in India," said Souma Ray, general manager of Haulotte India. ■



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Surbana Jurong builds global HQ in Singapore

Surbana Jurong (SJ), one of the largest Asia-based urban and infrastructure consulting firms, recently held the groundbreaking ceremony for its new campus in Singapore, which will also house its global headquarters. Located at Jurong Innovation District (JID), the new facility can accommodate up to 4,000 employees and is expected to be completed by 2021.

Named Surbana Jurong Campus, the 68,915 sq m development will support the company's rapid growth by facilitating stronger teamwork and knowledge sharing among its local and global talents. It will also serve as the nerve centre for research and development of innovation for the built environment, as SJ transitions to applied research to create and bring practical and viable solutions to the industry and community.

Designed by Safdie Surbana Jurong, a collaboration between Safdie Architects and Surbana Jurong established in 2017, the campus features a sustainable, people-centric and future-ready workplace. The design embodies the character of Singapore as a Garden City by integrating the structure harmoniously with the natural landscape.

According to SJ, the campus will push the boundaries of sustainable design in both construction and operation. The company's multi-disciplinary team of experts will undertake the entire development from start to end. This encompasses consultancy solutions from project funding, architecture and landscaping, engineering, workplace strategy, cost and project management, through to integrated facilities management and security services.

SJ further pointed out that Early Contractor Involvement approach has been adopted, where contractors are engaged early during the design stage to facilitate the integration of design and construction process. Boustead Singapore has been appointed as main contractor on the project.

Digitalisation and sustainability

The construction of Surbana Jurong Campus will embrace the use of digital technologies to scale up productivity and efficiency, and is well aligned with Singapore's push to transform the built environment sector, said SJ. The project intends to demonstrate the company's leadership in leveraging Building Information Modelling (BIM) and extending it to a comprehensive Integrated Digital



Both artists' impressions © Safdie Surbana Jurong



ABOVE AND LEFT: The Surbana Jurong Campus is expected to be completed by 2021. The new 68,915 sq m facility will house the company's global headquarters.

BELOW LEFT: The groundbreaking ceremony for the project recently took place in January 2019.



Delivery (IDD). It will use technologies such as smartboards, drones, flipboards and collaborative software to support virtual design, construction and collaboration, as well as computational methods to optimise design.

The construction work will utilise the Design for Manufacturing and Assembly (DfMA) method with the use of precast materials (precast walls, columns, beams and plans), plus prefabricated mechanical, electrical and plumbing (MEP) systems like pumps, compressors and services distribution. In addition, SJ will apply its proprietary solutions such as BIM:FM technology to the facilities management process, in order to increase productivity and achieve cost savings for long-term building maintenance and operational cycle.

To drive innovation, the campus will be a living lab with dedicated spaces for research and test-bedding of new

ideas, including test-bedding future-ready solutions developed by the SJ-NTU Corporate Lab, a joint corporate laboratory set up by SJ, Nanyang Technological University, Singapore (NTU) and the National Research Foundation Singapore.

The campus is also designed to meet Singapore's Building and Construction Authority's (BCA) Green Mark Platinum Certification for Super Low Energy Building. It utilises solar photovoltaic technology that aims to yield around 340 MWh of renewable energy annually, and integrates features such as rain gardens and bio-swale to enhance water sustenance. It also boasts many other green technologies, including smart lighting control, underfloor air-distribution system, and predictive smart building control systems such as live energy and water management dashboards.

SJ has chosen a 'develop and lease' model to fund the project. It is being developed by Surbana Jurong Capital, the investment arm of SJ, which secured 100% funding for the development of the property and subsequent lease agreement for the entire land lease tenure from M&G Real Estate, one of the world's leading financial solutions providers for real estate investors. This arrangement is said to have provided SJ with a compelling, long-term and cost-effective solution in developing the property for its use. ■

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Black & Veatch plays major role in Hong Kong projects

Black & Veatch has been appointed by the Drainage Services Department (DSD) of Hong Kong to formulate and design a barrage scheme aimed to improve flood protection levels in the low-lying town of Yuen Long. This barrage scheme is part of DSD's strategy to provide world-class wastewater and stormwater drainage services to enable the sustainable development of Hong Kong.

Black & Veatch optimised the original flood alleviation scheme and identified a favourable site for the stormwater infrastructure. "The barrage scheme will be the first of its kind in Hong Kong that utilises a series of large-capacity pumps and tidal barrier for flood protection. We are committed to supporting our clients with leading-edge solutions that are versatile, cost-effective, resilient and environmentally sustainable," said Andy Kwok, managing director of Black & Veatch Hong Kong.

The barrage scheme will comprise a tidal barrier that prevents backflow of seawater from Deep Bay to the Yuen Long town centre during high tides. It will also feature a pumping station that conveys stormwater from upstream of the barrage to Shan Pui River for discharge during high tides and high intensity rainstorm events. The tidal barrier can be raised to cater for rise in sea levels to safeguard the low-lying areas from flooding.

The benefits of the barrage scheme include improving the drainage performance of Yuen Long Nullah – an open concrete stormwater channel – through downstream pumping during severe rainstorm events. Designing the scheme at a downstream location away from the town will greatly reduce disruption to communities and traffic.

Black & Veatch will design the barrage scheme to align with DSD's revitalisation of more than 2 km of the nullah by incorporating a green environment, and promoting biodiversity, beautification and water-friendly activities.

In addition, Black & Veatch has been involved in a trenchless pipeline installation project at the Hong Kong International Airport (HKIA). This project recently received the 2018 No-Dig Award in the Project Award category from the International Society for Trenchless Technology (ISTT).

HKIA selected a project team with international, mainland China and Hong Kong experience to excel in the science and technology innovation. Black & Veatch served as the contractor's designer for the non-dredged installation.

"Our global experience with complex projects enhanced our collaboration with the cross-cultural project team to identify optimal solutions that meet HKIA's requirements. These solutions include co-developing a method for long-distance drilling; designing a set of tailor-made drill pipes to support drilling to a distance of 5.2 km; and developing a suitable drilling fluid and proper coating system to provide a 50-year life expectancy for the pipeline," explained Mr Kwok.

The two existing aviation fuel pipelines are laid 10 m below the seabed. As parts of them lie within the land formation footprint of the airport's future three-runway system, a section had to be diverted to ensure the continuous supply of fuel to the airport will not be affected by reclamation works.

HKIA chose the horizontal directional drilling (HDD) method to install two new 500-mm-diameter aviation fuel pipelines in the rock stratum at 100-m below seabed to replace the existing pipelines. This method met the requirements for an environment-friendly design that would minimise disturbance to the marine environment.

Deploying the intersection construction method for long-distance drilling allowed Black & Veatch and the project team to shorten the drilling length, which effectively reduced both construction and environmental risks. ■

Yongmao and Tiong Woon sign agreement on flat-top tower cranes

Tiong Woon Tower Crane Pte Ltd (TWTC), a subsidiary of Tiong Woon Corporation Holding Ltd, and Yongmao Machinery Pte Ltd (YMM), a subsidiary of Yongmao Holdings Ltd, have recently signed a Memorandum of Understanding (MOU). The agreement saw TWTC buy a total of 20 Yongmao flat-top tower cranes, comprising 17 units of STT1330 and three units of STT1830, which are expected to be delivered throughout the first half of 2019.

According to Yongmao, as the first STT1330 tower crane user in Singapore, TWTC has influenced the market to adopt this model for use in PPVC construction. Yongmao said that the other model, the STT1830, will be the largest flat-top tower crane being used in Singapore residential construction projects, offering a maximum jib length of 80 m with an 18-t tip load. For a 50-m jib length, the tip load can reach 35.60 t, making it suitable for PPVC construction.

With the Singapore Housing & Development Board (HDB) reportedly looking to increase the PPVC adoption rate to 35% in 2020 from the current 23%, the demand for high capacity tower cranes is also expected to rise. ■

RIGHT: TWTC has participated in many residential projects across Singapore. The company recently ordered 20 Yongmao flat-top tower cranes.



Chinese consortium gets contract for Dhaka Bypass

A consortium of companies from China - Sichuan Road and Bridge Group, Shamim Enterprise Ltd, and UDC Construction Limited - has signed a concession contract with the government of Bangladesh to upgrade the Dhaka Bypass under a public-private partnership (PPP) arrangement. The Asian Development Bank (ADB) acted as financial advisor on the transaction to the Public-Private Partnership Authority (PPPA) of Bangladesh.

"This project brings a new dimension to public service delivery in Bangladesh. It is the first access-controlled expressway in the country," said Syed Afsor H. Uddin, CEO of PPPA. "This landmark transaction will pave the way for a pipeline of national expressways across Bangladesh."

"ADB aims to accelerate road development in Bangladesh while minimising the financing and operational burden and bringing in a diverse set of internationally renowned infrastructure developers, operators and financial institutions," said Yoji Morishita, head of ADB's Office of Public-Private Partnership (OPPP). "The government of Bangladesh establishes the objectives of the infrastructure as well as some credit supports to tackle the traffic challenge, while the private sector takes responsibility for meeting the objectives. The Dhaka Bypass is the first step in our strategy to bring Bangladesh roads to the global market based on the PPP model."

ADB's OPPP also provided legal support for this transaction and helped to develop a concession contract template for road PPPs through the Asia Pacific Project Preparation Facility (AP3F), a multi-donor trust fund managed by ADB.

Under the contract, a four-lane tollway and a two-lane service road will be added to the Joydevpur-Debogam-Bhulta-Madanpur Road (N-105) section of the expressway. The 48-km project will provide a major arterial connection between the industrial zone northeast of Dhaka and national highway N1 connecting to the port city of Chattogram, as well as to N2, N3 and N4 highways leading to other major cities. The consortium will design, build, finance, operate and maintain the tolled expressway over a 25-year concession period. ■



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Global sales of construction equipment 'to stabilise'

Global construction equipment sales are expected to stabilise in 2019, following two years of strong growth, according to Off-Highway Research. Worldwide equipment demand grew by 27% in 2017, following a period of decline that had run from 2012 to 2016. Further double-digit growth in 2018 took the global market to 1 million unit sales with a retail value of almost US\$100 billion. Demand of this magnitude is on a par with previous recent highs in the market, which were seen in 2011 and 2007.

While the volume achieved in 2018 is expected to represent the peak of the current cycle, equipment sales in 2019 are forecast to remain close to last year's. "After two years of solid and largely synchronised growth, the picture for the world's major equipment markets is now looking more mixed," said Chris Sleight, managing director of Off-Highway Research. "There will be moderate declines in a number of key markets in 2019, but the falls are not expected to be steep and will be partially offset by continued growth elsewhere. As a result, sales will remain above 900,000 units per year over the medium term, with a value in the region of US\$100 billion." ■

XCMG reinforces commitment to Panama



XCMG showcased its various products at the China (Panama) Commercial Exhibition in Altapa. The event was held to promote partnerships between the two countries.

Strengthening its presence in Panama, XCMG recently debuted a wide range of new products for the market, including heavy trucks, excavators and loaders. Among them were the XE215 excavator, reportedly featuring the company's LSHT engine and new control system, resulting in reduced fuel consumption and improved efficiency; and the XC870K backhoe loader, which is suitable for use in infrastructure projects worldwide.

The products were introduced in December 2018 at the China (Panama) Commercial Exhibition in Altapa, Panama City. The event is believed to be the largest economic and trade exhibition that China has hosted in Panama since the two countries established diplomatic relations in 2017.

"XCMG is committed to supporting Panama's railway, bridge, road and harbour construction alongside other Chinese companies under the guidance of the Belt and Road Initiative. We follow the strictest quality standards and are focused on solving our clients' needs," said Wang Min, chairman and president of XCMG. ■

Lars Engström to leave Sandvik



Sandvik Group has announced that Lars Engström (left), president of Sandvik Mining and Rock Technology, will leave this year after the appointment of a successor.

Mr Engström has been a member of the Group's executive management since 2016 and headed up the Sandvik Mining and Rock Technology business area. During his tenure, Mr Engström has successfully improved the performance of the business area and its divisions in accordance with the Group's strategy to ensure stability, profitability and growth.

With Mr Engström's leadership, Sandvik Mining and Rock Technology has grown from about 30 to 44 billion SEK in revenues and the operating margin has improved from 10% in the beginning of 2016 to 19% in the fourth quarter 2018.

"I'm very grateful for Lars Engström's contributions to the Group. He has built a successful decentralised organisation and significantly strengthened the results of Sandvik Mining and Rock Technology's divisions. However, we have now together reached the conclusion that it's time for a new leadership. We have a lot of good talent in Sandvik so I feel confident that we will have several interested and motivated candidates for the job. At the same time, I'm pleased that Lars will stay onboard to ensure a successful transition before leaving," said Björn Rosengren, president and CEO of Sandvik.

The recruitment process for a new president of Sandvik Mining and Rock Technology is now being carried out and the appointment of Mr Engström's successor will be announced as soon as it is finalised. ■

Alan Belfield to head Arup



As of 1 April 2019, Dr Alan Belfield (left) will be new chairman of Arup. Leading a 15,000-strong team, he will oversee a global business with turnover in excess of £1.6 billion across advisory, planning, engineering, design and management services in the cities, energy, transport and water markets.

Currently serving as chief operating officer for the firm, Dr Belfield brings with him a wealth of experience in technology, engineering and advisory services. He previously led Arup's operations across the UK, Middle East and Africa.

Dr Belfield is said to be passionate about Arup's aim for 'social usefulness' and is a strong advocate of the firm's diversity and inclusion strategy. He is a Fellow of the Royal Academy of Engineering and a member of the UK Government's Professional and Business Services Council.

Dr Belfield succeeds Gregory Hodkinson who completes his five-year term on 31 March 2019, the maximum tenure for chairman of Arup. Dr Belfield will be joined by deputy chairman, Tristram Carfrae who has been reappointed in that role for a further three-year term. ■

Terex sells Demag Mobile Cranes business to Tadano

Terex Corporation has agreed to sell its Demag Mobile Cranes business to Tadano Ltd. The sale, which is subject to government regulatory approvals and other customary closing conditions, is targeted to close in mid-2019.

The Demag Mobile Cranes business manufactures and sells all-terrain cranes and large crawler cranes. Included in the transaction are the manufacturing facilities in Zweibrucken, Germany and multiple sales and service locations.

“The Demag Mobile Cranes business has been part of our company for almost two decades and produces world class products,” said John L. Garrison, chairman and CEO of Terex. “The dedicated Demag Mobile Cranes team members have made significant contributions to Terex and to the crane industry. The sale is based on strong industrial logic, as the Demag Mobile Cranes business will become part of a global crane company with complementary products and capabilities. We are pleased to have entered into this agreement with Tadano, a strategic buyer who values the Demag Mobile Cranes brand, technology, distribution network and team members.”

Commenting on the rationale of the deal, Koichi Tadano, Tadano’s representative director, president and CEO said, “This is a strategic acquisition that offers Tadano considerable scope for growth. The addition of the well-respected Demag brand of all-terrain cranes and large crawler cranes range extends our product lines and options for customers. The addition of the Demag branded mobile crane product lines will enhance our

global position in this segment. We believe that the Zweibrucken facilities and its global team members, as well as the current distribution partners, are valuable to the future success of the business.”

Mr Garrison further highlighted, “In addition to selling the Demag Mobile Cranes business, Terex will exit the North American mobile crane product lines manufactured in our Oklahoma City facility. These changes will simplify our Oklahoma City operation, which will continue to produce telehandlers and re-manufactured units for our Aerial Work Platforms segment and various products for our Materials Processing segment.”

Although Terex is exiting the OKC-based mobile cranes products, Mr Garrison asserted that the company will keep selling parts as well as offering service and support to its customers.

Terex will continue to manufacture Terex Utilities products at its Watertown, South Dakota facilities; Terex rough terrain cranes for the global market in Crespellano, Italy; Terex tower cranes in Fontanafredda, Italy; and Terex pick and carry cranes in Brisbane, Australia. “These are strong businesses that will continue to be an important part of Terex,” said Mr Garrison.

“During these transitions, our global team is committed to providing exceptional service to all of our global customers, including those affected by these changes.” ■



ABOVE AND LEFT: Terex Corporation has agreed to sell its Demag Mobile Cranes business - which manufactures all-terrain cranes and large crawler cranes - to Tadano Ltd. The sale is expected to close in mid-2019. Two of Demag all-terrain models can be seen here, the AC 55-3 (above) and AC 220-5.



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Lintec & Linnhoff reveals new brand identity

Lintec & Linnhoff Holdings Pte Ltd, a global manufacturer of asphalt and concrete batching plants, has reinforced its position as a major player in the industry with the launch of a new brand identity. This move allows the company to integrate its three brands - Lintec, Linnhoff and Eurotec - under one roof, offering a single source of solutions for its customers worldwide.

A key element of the company's new brand identity is its new logo. The design fuses two letter Ls to represent the union of the two German brands, Lintec and Linnhoff. The first letter L, in black, denotes the natural material colour of asphalt while the latter L, in grey, references the colour of concrete - given asphalt and concrete are the company's primary business.

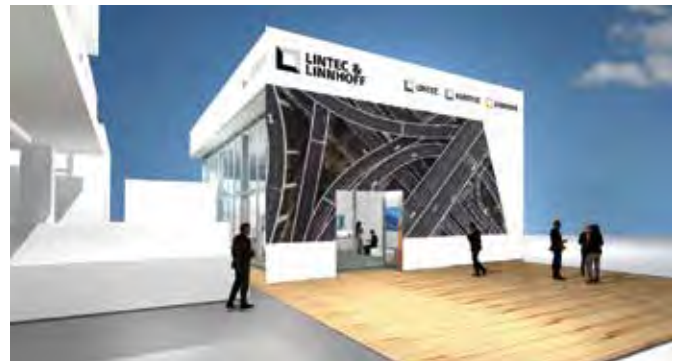
Headquartered in Singapore, Lintec & Linnhoff provides innovative solutions for the production of concrete and asphalt materials. These include asphalt batching plants, concrete batching plants, pavement related technologies and machinery and specialist concrete cooling solutions that meet or support industry standards for environmental impact, recyclability and reusability.

"This is an exciting time for Lintec & Linnhoff Group. The rebranding effort builds on many improvements we have made to our business in recent years. We believe this continuing evolution will build an impactful global brand," said Daniel Chan Tien Lok, chairman of Lintec & Linnhoff Holdings Pte Ltd.

As part of the rebranding effort, the company's subsidiaries have also had their business names changed to precede with 'Lintec & Linnhoff'. These consist of: Lintec & Linnhoff Concrete Pte Ltd (previously Lintec Concrete Technologies Pte Ltd); Lintec & Linnhoff Asphalt Pte Ltd (previously Linnhoff Technologies Pte Ltd); Lintec & Linnhoff China Limited (previously Lintec China Limited); Lintec & Linnhoff Germany GmbH; and Lintec & Linnhoff Maschinen Pte Ltd.

With this change, Mr Chan said, "We aim to further develop our global footprint and thus welcome potential distributors to approach us."

Lintec & Linnhoff will celebrate its new brand identity and 100 years of business operation (the company was founded in 1919 by Eduard Linnhoff) at the upcoming bauma exhibition in Germany (see page 78 for details on the company's products at the show). ■



Lintec & Linnhoff will celebrate its new brand identity at the upcoming bauma 2019 exhibition. Here is an artist's impression of the company's booth, which incorporates its new logo.



The new logo fuses two letter Ls to represent the union of the two German brands (Lintec and Linnhoff); and both colours symbolise the company's primary business - asphalt (black) and concrete (grey).



ABOVE, BELOW AND BELOW LEFT: With its recent rebranding, Lintec & Linnhoff has integrated its three brands - Lintec (above), Linnhoff (below) and Eurotec (below left) - under one roof, offering a single source for asphalt and concrete production requirements.





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Date	Events in Asia	Organiser & Contact
19 to 21 Mar 2019	Ecobuild Southeast Asia 2019 Malaysia International Trade and Exhibition Centre Kuala Lumpur Malaysia	United Business Media (M) Sdn Bhd Tel: +603 2176 8788, Fax: +603 2164 8786 Email: ecobuild-sea@ubm.com Website: www.ecobuildsea.com
16 to 18 May 2019	Concrete Show India 2019 Bombay Convention and Exhibition Centre Goregaon, Mumbai India	UBM India Pvt Ltd Tel: +91 22 61727000 Email: shannon.andrade@ubm.com Website: www.concreteshowindia.com
17 to 18 May 2019	BuildTech Yangon 2019 Myanmar Expo, Fortune Plaza Yangon Myanmar	Sphere Exhibits Tel: +65 6319 4035 Email: mjaneb@sph.com.sg Website: www.btyangon.com
20 to 22 June 2019	Laobuild 2019 National Convention Centre Vientiane Laos	AMB Tarsus Events Group Tel: +603 2692 6888 Email: rina@ambtarsus.com Website: www.laobuild.com
17 to 18 Jul 2019	Trenchless Asia 2019 Jakarta International Expo Jakarta Indonesia	Westrade Group Ltd Tel: +44 1923 723990 Email: pharwood@westrade.co.uk Website: www.trenchlessasia.com
17 to 18 Jul 2019	IPAF Asia Conference & Showcase 2019 Hangzhou China	IPAF Tel: +65 9686 4191 Email: raymond.wat@ipaf.org Website: www.ipaf.org/asiaconference
4 to 7 Sept 2019	BICES 2019 New Beijing International Exhibition Center Beijing China	CCMA, CNCMC & CCPIT-MSC Tel: +86 10 52220946, Fax: +86 10 51183612 Email: info@e-bices.org Website: www.e-bices.org
5 to 7 Sept 2019	Intermat ASEAN & Concrete Asia 2019 Impact Exhibition & Convention Centre Bangkok Thailand	Impact Exhibition Management Tel: +662 833 5315 Email: info@asean.intermatconstruction.com Website: www.asean.intermatconstruction.com
18 to 20 Sept 2019	Cambuild 2019 Diamond Island Exhibition & Convention Centre Phnom Penh Cambodia	AMB Tarsus Events Group Tel: +603 2692 6888 Email: richard@ambtarsus.com Website: www.cambuildexpo.com
21 to 23 Nov 2019	Myanbuild 2019 MEP Mindama Yangon Myanmar	AMB Tarsus Events Group Tel: +603 2692 6888 Email: rina@ambtarsus.com Website: www.myanbuild.net
Date	Events outside Asia	Organiser & Contact
8 to 14 Apr 2019	Bauma 2019 Munich Trade Fair Centre Munich Germany	Messe München Tel: +49 89 949 11348, Fax: +49 89 949 11349 Email: info@bauma.de Website: www.bauma.de
4 to 7 Feb 2020	World of Concrete 2020 Las Vegas Convention Centre Las Vegas, Nevada USA	Informa Exhibitions Tel: +1 972 536 6379 Email: info@worldofconcrete.com Website: www.worldofconcrete.com
10 to 14 Mar 2020	Conexpo-Con/Agg 2020 Las Vegas Convention Centre Las Vegas, Nevada USA	Association of Equipment Manufacturers Tel: +1 414 298 4167, Fax: +1 414 272 2672 Email: international@conexpoconagg.com Website: www.conexpoconagg.com



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IPAF signs agreement with Indian safety body

The International Powered Access Federation (IPAF) has signed a Memorandum of Understanding (MoU) with the Occupational Health, Safety & Sustainability Association of India (OHSSAI) to establish close co-operation. This move is believed to be the first of its kind in the country, where IPAF has several member companies delivering IPAF-accredited training.

The Mobile Elevating Work Platform (MEWP) industry in India is starting to grow rapidly, said IPAF, creating huge demand for safety and technical advice, accredited operator and supervisor training, and assistance in developing and implementing safe-use regulations and best practice guidance in line with international standards.

“The timing of the signing of this historic agreement is perfect, and will



The agreement between IPAF and OHSSAI was signed at the OSH India safety event in Mumbai in late November 2018.

afford members of OHSSAI specialist assistance from qualified and experience powered access professionals to develop industry knowledge about using this type of equipment and training the complete

workforce. Our joint strategy planning and implementation will start in early 2019,” said Jason Woods, IPAF’s representative for India and Middle East.

Avdesh Malaiya, chairman of OHSSAI commented, “MEWPs are meant for safe working at height and in India, the use of MEWPs is just beginning to develop. India is on a strong development path; MEWP use is likely to grow steadily in India in future. However, if this equipment is not used safely, this can lead to incidents causing injury, loss of life and property.

“OHSSAI is looking to future requirements and feels that this is the right time when awareness about MEWP safety and training needs to be increased across all industries and agencies using this equipment. Signing this MOU with IPAF is our first major step towards achieving this vision.” ■

Expo 2020 in Dubai ‘will require PAL cards’

Robert Munn, health & safety director of Expo 2020 construction project has told the fourth IPAF Middle East Convention that “everyone using a MEWP at Expo 2020 Dubai must have a PAL card from IPAF.” The world fair is scheduled to open on 20 October 2020.

The fourth IPAF Middle East Convention took place in November 2018 at the Meydan Hotel in Dubai, attended by around 220 delegates. Besides Mr Munn’s



resounding endorsement of IPAF training, the event also heard from Engr. Ahmed Khalil Abdul Kareem of the Dubai Municipality Health & Safety Department, who supported IPAF’s Plan Ahead safety campaign.

In addition, Dr Rehab Faraj Al Ameri (left), director of National Accreditation Systems for ENAS at the Emirate Authority for Standardisation and Metrology (ESMA) - with whom IPAF has been working closely to assist, train and evaluate MEWP inspectors in the

region - told delegates that it was a key aim to improve the quality of infrastructure and provide a safe working environment. “Everything needs to be done correctly, with stable regulations,” she said, adding that one of the many initiatives ESMA is leading on is creating a better record of accidents relating to lifting equipment:

“IPAF works constantly in the region to deliver training, help governments and contractors develop, implement and adapt to new MEWP safety standards, reaching out to all stakeholders with our Andy Access safety campaign and offering training and technical advice in multiple languages to assist in the operation of safer construction sites and maintenance work in this burgeoning sector,” said Jason Woods, IPAF’s representative for India and Middle East. “This event sends a positive message to all operators in the region that safety must always come first.” ■

IPAF to launch 2019 global safety campaign at bauma

IPAF is set to officially launch its 2019 global safety campaign at bauma. The IPAF booth is located at C4.711 and will provide a chance for visitors to review the updated IPAF MEWPs for Managers course, which is available for the first time as eLearning. Plus, there will be a MEWP simulator to help showcase some of the recommendations of the recently published IPAF eXtended Reality (XR) Strategy document.

In addition, IPAF will offer updated safety and technical guidance, a selection of Andy Access safety posters and accompanying Toolbox Talks. Visitors will be able to pick up copies of the latest IPAF magazines for 2019 in English, German and Italian, and also pre-order the 2019 IPAF Global Powered Access Rental Market reports.

The IPAF 2019 safety campaign has been created to address the increase in accidents while operating a MEWP alongside or on roadways. This trend has been identified through IPAF’s accident reporting project, and is a significant cause of work at height accidents in Europe. Based on real-world incidents, the campaign will emphasise the effectiveness of planning and traffic management to reduce the danger of operating near pedestrians and vehicle traffic. ■

Website: www.ipaf.org/safe

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WSHAsia and Work Safe Asia 2019 form partnership

World Safety & Health Asia (WSHAsia) and Work Safe Asia 2019 have formed a strategic partnership, which allows exhibitors of Work Safe Asia 2019 and the sponsors of WSHAsia to embark on both online and offline presence for the cost of one or at a single price point.

The online presence is provided 24/7 by WSHAsia, while the offline platform - Work Safe Asia 2019 - is a three-day exhibition to be held from 1 to 3 October 2019 at the Singapore Marina Bay Sands.

WSHAsia provides a complimentary online platform with the objective of sharing safety and health solutions in Asia. Its sponsors support the platform through their featured products, featured courses and banner advertisement sponsorships.

Work Safe Asia 2019, organised by Conference & Exhibition Management Services Pte Ltd (CEMS), aims to bring together the talent and expertise to give its exhibitors and visitors the tools for creating an optimal safe workplace. Through a showcase of the latest developments in relevant technologies and equipment, participants are thus able to leverage on this sharing platform to further their knowledge and build positive business relationships.

The partnership between WSHAsia and Work Safe Asia 2019 is designed to offer safety and health vendors several opportunities, including: a 9 sq m panel booth at Work Safe Asia 2019 in October; 365 days of featured product listing on the online WSHAsia Marketplace (up to three products/categories); both online and offline marketing exposure; a chance to connect with more than 10,300 visitors at Work Safe Asia 2019; and a 24/7 international market coverage on WSHAsia's online platform.



WSHAsia and Work Safe Asia 2019 have established a partnership, which allows exhibitors of Work Safe Asia 2019 and the sponsors of WSHAsia to get more exposure from both online and offline platforms.

Raymond Wat, founder of WSHAsia commented, "This partnership combines both online and offline presence. Vendors may now not only present their products and services during the exhibition, but are also able to showcase their products and services 24/7 on WSHAsia's online marketplace, internationally. This is the first of its kind collaboration." ■

Website: www.wshasia.com / www.worksafeasia.com.sg

bauma Conexpo India 2018 reports growth

bauma Conexpo India 2018, which took place in December at the Huda Ground in Gurgaon, Delhi, successfully closed with 700 exhibitors from 26 countries and 39,173 visitors. According to the organiser, the number of visitors grew by 20% compared with the last edition in 2016, and the show recorded an increase of 30% in the exhibition space.

For the first time, bauma Conexpo India featured a Buyer Seller Forum, offering visitors an additional opportunity to network with potential business partners. In addition to India, there were reportedly buyer delegations from Bangladesh, Bhutan, Nepal, Sri Lanka and other countries in the region. The initiative is said to be a success and brought together technology providers and buyers in 3,023 meetings.

By 2025, India is expected to become the third largest market for the global construction industry. This growth is mainly due to large infrastructure projects. Over the next nine years, analysts project an average growth of 6.2% per year. Based on the forecasts, bulldozers, backhoe loaders and crawler excavators are going to see a massive increase in sales over the next five years.

The next bauma Conexpo India is scheduled to take place in 2020 in Delhi. ■

Website: www.bcindia.com



BOTH IMAGES: The recent bauma Conexpo India took place in December 2018, drawing 700 exhibitors from 26 countries and 39,173 visitors.

BICES returns in September 2019

This year's BICES (Beijing International Construction Machinery, Building Material Machines and Mining Machines Exhibition & Seminar) will be held at the China International Exhibition Centre New Venue in Beijing from 4 to 7 September. The show is organised by China Construction Machinery Association (CCMA), China Construction Machinery Co Ltd (CNCMC), and China Council for the Promotion of International Trade - Machinery Sub-Council (CCPIT - MSC). It is also supported by various local and international associations and organisations.

As of November 2018, the organisers said the statistics show that the number of exhibitors - who have applied to join BICES 2019 - has increased tenfold compared with the same period in 2017 (previous edition), and the largest exhibitor's space has reached 5,000 sq m. China is also celebrating its 70th anniversary this year and for this reason, a series of theme exhibition areas will be set up.

BICES 2019 will take place in conjunction with the China International Commercial Vehicle Exhibition, China International Emergency Rescue Equipment Exhibition and China International Parking Equipment and Facilities Exhibition.

The last edition of BICES in 2017 attracted more than 100,000 visitors from over 70 countries and regions - 90% of which were



The opening ceremony of BICES 2017.

domestic visitors, with nearly half of them coming from East China. The show drew 1,051 exhibitors from over 20 countries, occupying an exhibition space of 150,000 sq m. ■

Website: www.e-bices.org

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Sandvik offers non-cabin Ranger DXR surface drill rigs

Sandvik Mining and Rock Technology has expanded its Ranger DX series of surface top hammer drill rigs - suited for construction applications, quarries and open pit mines - with two new non-cabin models, the Ranger DX600R and DX800. They are designed based on the Ranger DX600 and DX800 respectively.

The new Ranger DXR drill rigs can reach places that are off-limits to operators and where other drills fail to operate, said Sandvik. The machines offer the characteristic of conventional Ranger DX series drill rigs, reliability and large drilling coverage area from the standard 17.6 sq m to an optional 26.4 sq m in a lighter and more mobile package – an ideal solution for hazardous conditions where safe and productive drilling requires advanced radio remote control capabilities.

The new Ranger DXR drill rigs flourish on unstable benches and deep cuts typical to applications such as road and railroad construction, foundation drilling, trenching and pipeline contracts. The most hazardous of these extremely demanding jobs can be downright impossible without efficient remote radio control, which allows the operator to always choose the best position in terms of safety and visibility. The remote control panel also includes tramming control functionalities for fast hole-to-hole movements and precise hole spotting.

The revolving superstructure offers excellent drilling coverage and stability, thanks to the innovative counterweight solution, and also provides a solid foundation for drilling even on extreme terrain. In terms of productivity, the revolving superstructure enables up to 60% more holes to be drilled per set-up compared to conventional top hammer drill rigs, according to Sandvik.

The new Ranger DXR series drill rigs are designed for 64- to 127-mm hole size range, with drill rod sizes between 38 mm and 51 mm. The standard configuration of the machine can be further boosted with more than 30 useful options, including extended superstructure turning radius, advanced measurement systems and upgraded dust control. There is also Noise Guard, a simple and rugged cover structure offering a total noise reduction of more than 10dB, which is perfect for contractors working in urban areas.

New carbide grades

Sandvik has also added two new carbide grades to the PowerCarbide family. The company said these new grades extend grinding intervals and service life by up to 30% compared with standard carbides.

The new PowerCarbide grades, GC80 (Gradient Carbide) and SH70 (Self-Hardening) give users several other benefits, such as



ABOVE AND LEFT: The new non-cabin Ranger DXR drill rigs flourish on unstable benches and deep cuts typical to applications such as road and railroad construction, foundation drilling, trenching and pipeline contracts.

BELOW: The new PowerCarbide grades provide many benefits, including lower cost per drilled meter, less time for changing bits and improved safety.

lower cost per drilled meter, less time for changing bits and improved safety.

The GC80 is developed for abrasive ground conditions with high silica levels in the rock. A new, innovative method makes it possible to produce buttons that are wear-resistant on the outside, while the centre provides a toughness that pushes the service life and grinding intervals even further.

The SH70, which is developed for hard, competent ground, is a grade with homogeneous properties throughout the material. SH70 is called 'self-hardening' because the enhanced deformation hardening makes it more wear resistant as users drill with it. The surface hardness is continuously 'refilled', which means that the hard top never wears off. ■

Website: www.rocktechnology.sandvik



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From scrap tyres to sustainable construction material

Evonik Industries is pursuing a sustainable and cost-effective approach to road construction with Vestenamer, the company's process additive for the rubber industry. It makes it feasible to process rubber powder from scrap tyres to generate asphalt with rubber content. The recycled material is mixed into road construction bitumen or asphalt to improve the quality of the mixtures and to extend the service life of road surfaces.

In the US, asphalt mixtures containing rubber have been used for decades, said Evonik, and long-term studies have demonstrated a significant improvement in road durability. The company pointed out that market for elastomer-modified, i.e. rubber-containing, road surfaces has also been growing in Europe over the past years, and positive properties are obvious since the material significantly reduces cracking, ruts and potholes in the road surface, which in turn extends road service life.

Rubber-modified bitumen presents another advantage, added Evonik. The rubber powder is frequently used in porous asphalt – also known as low-noise asphalt – that cuts down on traffic noise. Scientific studies have documented that using larger shares of rubber powder in road surfaces can result in a noise reduction of one to two decibels. This is considered highly significant because in human perception, a reduction by 3 dB is comparable to cutting the traffic volume in half.

Evonik further highlighted that every year, a waste volume of some 19.3 mil t of scrap tyres is produced worldwide, including over 3.6 mil t in Europe. Twenty years ago, over half of all scrap tyres were incinerated to generate energy in Germany alone, while only every tenth scrap tyre was processed into granulate. By now, the volume of the latter has caught up with energy-related processing.

Recycling scrap tyres definitely makes environmental sense, asserted Evonik. Tyres are not classified as waste, but are regarded as a valuable material, which may not be disposed of in landfills. So instead of incinerating the tyres, they could have another life stage in road traffic, in the form of an elastomer or rubber powder in the road surface.

Evonik shared that as part of a test track in the German town of Paderborn, the local road Detmolder Strasse was resurfaced in 2012 in compliance with the objectives of the EU Waste Directive. Fifty percent of the new asphalt mixture consisted of milled material – asphalt granulate – from the old road. The new mixture formulation also included rubber powder and Vestenamer. For every 100 m of track, some 80 scrap tyres were turned into an elastomer-modified road surface, along with recycling the old asphalt.

In addition, a study by the Institute for Energy and Environmental Research in Heidelberg (ifeu) provides further information about the eco-balance, revealed Evonik. Each metric ton of recycled rubber powder saves some 2.7 t of carbon dioxide, which would otherwise be generated during the incineration process.

Evonik added that the emissions of volatile and semi-volatile compounds, including hydrocarbons and sulfur compounds, are also much lower in road surfaces containing rubber than in conventional, polymer-modified asphalt types.

Furthermore, Evonik's process additive reduces the migration of organic compounds that are washed out by rain and reach the groundwater. As a study conducted by FABES Forschungs-GmbH on behalf of Evonik has documented, the use of Vestenamer reduces the overall groundwater burden.



ABOVE AND BELOW: Vestenamer by Evonik makes it feasible to process rubber powder from scrap tyres to generate asphalt with rubber content. The recycled material is mixed into road construction bitumen or asphalt to improve the quality of the mixtures and to extend the service life of road surfaces.



Detmolder Strasse in Paderborn, Germany, as seen in 2018. The road was resurfaced in 2012, which also included rubber powder and Vestenamer.

According to Evonik, in early 2013, the Road and Transportation Research Association added rubber-modified bitumen and asphalt types to German regulations for road construction.

Vestenamer was developed in the late 1970s as a processing aid for the rubber industry. Polyoctenamer, which is produced in the Marl Chemical Park, resolves a number of challenges associated with compounding and processing rubber. It is reportedly used to this day due to its positive characteristics in the interaction with other rubbers. Since road transportation authorities have long been looking for an improved and more durable material, the High Performance Polymers Business Line of Evonik began to conduct extensive research in this area 10 years ago. Since then, Vestenamer has gradually become the unifying element of choice in rubber-modified asphalt. ■

Website: www.evonik.com

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Cat 950 GC wheel loader offers more options on jobsites

The Cat 950 GC wheel loader is ideal for stockpiling, load-and-carry, hopper charging and truck loading functions. On construction projects, the machine excels in site preparation, backfilling, general cleanup, medium-duty pipe handling and material handling with pallet forks or material handling arms. It is also suited to governmental applications, offering agencies a well-designed, durable machine that fits the budget.

The 950 GC shares the same long Z bar linkage design with the earlier 950H-series, ensuring the new loader delivers excellent digging capabilities and strong breakout forces particularly when using Cat Performance series buckets and load-sensing hydraulics. In addition, the clever load-sensing hydraulics meet on-demand hydraulic flow to the implement system in the volume and pressure necessary to perform the task at hand, which helps lower fuel consumption.

The 950 GC offers a hinge pin height of 4,188 mm and a 3,649 mm loader arm clearance for easy loading of high-sided trailers or charging of large-scale hoppers. The Performance series bucket range boasts a long floor, wide opening and curved side plates, which allows operators to comfortably achieve bucket fill factors 10% higher compared to the legacy designs and ultimately improves cycle times and reduces fuel consumption.

The Cat Fusion quick coupler and controls allows the 950 GC to use many Cat work tools across multiple applications for added versatility, with the availability of a variety of pin-on and coupler attachments.

The Cat C7.1 ACERT engine generates a maximum power rating of 171 kW (ISO 14396), meeting stage 3 emissions standard and featuring a new fuel injection system. The engine idle management system and on-demand, electronically controlled, hydraulically driven variable speed cooling fan further optimise fuel efficiency while lowering operating costs.

Developed by Caterpillar, the 4F/3R electronically controlled countershaft, power-shift transmission features high contact ratio gears ensuring long-life, complemented by heavy-duty bearings. This adds up to a transmission that is durable, fuel-efficient and produces low noise and vibration levels during operation. The transmission design incorporates an Electronic Long Range Transmission (ELRT)



ABOVE AND LEFT: The Cat 950 GC wheel loader has been designed to provide excellent digging capabilities and strong breakout forces, particularly when using Cat Performance series buckets and load-sensing hydraulics.

BELOW: The 950 GC controls are simple and easy to operate, and the cab offers good visibility and comfort.

control valve, which allows directional shift changes at full power.

Simple and easy to operate, the 950 GC controls have been designed with the operator in mind. The interface panel display, contains six analogue-like gauges, coloured indicator lights and an LCD screen, all within easy view of the operator for safe and ergonomic use. Low-effort, pilot-operated implement controls, along with an optional joystick implement control, feature an integrated kick-down switch and a remote directional shift switch for convenient use.

Ladders and integrated handrails are located on both sides of the machine, providing access to the spacious cab and for air filter servicing from the safety of a platform. A large roof-to-floor, distortion-free flat glass front windscreen, optional rear-view camera and exterior mirrors with integrated spot mirrors provide exceptional visibility for the 950 GC, while standard fitment air conditioning with 10 louvered vents maintains operator comfort.

Hydraulic and electrical service centres



provide ground-level access to grouped service points to reduce maintenance time. The large gull-wing side panels and a tilt-up rear grill provide unrestricted access to the radiators, filters and sampling ports and grease fittings for difficult-to-reach components are conveniently grouped for easy access.

The 950 GC can also be equipped with Cat Product Link telematics. It will help fleet owners track location, machine hours and fuel consumption, idle time, events and diagnostic codes by wirelessly reporting via the VisionLink user interface. ■

Website: www.cat.com

Astec satellite silo storage systems

The Astec satellite silo storage systems are stand-alone mix storage systems that allow operators to establish a retail location within a transportation radius of the parent plant. These storage systems enable users to expand into a location that does not yet justify a plant, while the smaller footprint of the silo system can accommodate installation at small sites that are not able to support a full plant.

Features of the satellite silo storage systems include: truck unloading hopper (to receive mix from the trucks in order to fill the silos), inclined drag conveyor, long-term storage silos with anti-segregation batchers, traverse conveyors to deliver mix into the selected silo, and controls. ■

Website: www.astecinc.com/satellitesilo



RIGHT: Astec satellite silo storage systems allow operators to establish a retail location within a transportation radius of the parent plant.

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Bauer completes taxiway expansion at Jakarta airport

The Soekarno-Hatta International Airport in Jakarta, Indonesia, is deemed one of the largest airports in Asia and 17th world's busiest airport with an annual passenger capacity of around 63 million (as of 2017). In order to deal with the increasing number of flights (now reportedly at over 447 thousand flight movements per year) and to optimise the time taken for ground handling of individual aircraft, a new connecting taxiway will be constructed to link the existing runways at the east side of the airport. Currently, there is only one connecting taxiway located at the west side of the airport that supported all aircraft movement.

PT. Bauer Pratama Indonesia, the local subsidiary of Bauer Spezialtiefbau GmbH, was commissioned by PT. Hutama Karya as main contractor for PT. Angkasa Pura II (Persero) – Indonesia's airport company and the biggest airport operator in the country – to carry out the ground improvement work for the construction of the new taxiway.

The East Connection Taxiway Phase 1 project included two main tasks: extensive ground improvement for the connection between the north and south runways, and foundation work for taxiway bridges over the airport's main access road. This project is a continuation of the previous Secondary Apron project that was completed in May 2017, located at the north side of the airport where Bauer also carried out ground improvement work on a 98,300 sq m area as initial part of East Cross Taxiway.

The ground improvement work is needed to increase the capacity of in-situ soil prior to pavement work. After improvement, the in-situ soil - which is dominantly soft to medium stiff silty clay - is expected to reach a CBR value (mechanical strength) of 6% under the pavement layer and the allowable settlement at a maximum of 100 mm in 10 years after construction.

The ground improvement was executed with 5- to 16-m-deep full displacement columns (FDC) over a total area of 199,000 sq m. And for foundation of the taxiway bridges, a total of 1,072 bored piles with a diameter of 1.2 m was drilled to a depth of up to 37 m. Three Bauer BG 14 drill rigs, one BG 22, one BG 28 and its accessories were in operation. The project commenced in February 2018 and was completed over a period of eight months in October 2018. ■

Website: www.bauer.de



To meet the increasing number of flights and to optimise the time taken for ground handling of individual aircraft, the Soekarno-Hatta International Airport is building a new taxiway to connect the existing runways at the east side of the airport.



ABOVE AND LEFT: PT. Bauer Pratama Indonesia was tasked to carry out ground improvement work for the construction of the new taxiway. The company used three Bauer BG 14 rigs, one BG 22 and one BG 28.

Yau Lee selects Potain MR 618 for HK project

A Potain MR 618 tower crane is currently helping to build a new private hospital in downtown Hong Kong. With space limitations in the area, main contractor Yau Lee Building Construction and Decoration opted for the Potain luffing jib, which has both the compact operating capabilities and capacity to handle the work.

Manta Engineering and Equipment rented the crane to the project. The company is a long-standing partner of Potain in Hong Kong and has provided cranes to many Yau Lee Building Construction and Decoration projects.

The Potain MR 618 was erected at an initial working height of 32.8 m and is expected to reach 101.8 m by the time the building is completed in September 2020. The 32-t-capacity crane is fitted with 40 m of its 60 m jib. Its biggest lifts so far were 28 t loads handled at a 16 m radius.

The new medical centre is located on Hong Kong Island and will be dedicated to cancer treatment. ■

Website: www.manitowoc.com



A Potain MR 618 tower crane helps to build a new private hospital in downtown Hong Kong.

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THE STEEL BELOW ZERO

SAS ASIA BAR SYSTEMS INTRODUCES ULTRA LOW TEMPERATURE STEEL (ULTS) FOR APPLICATIONS UNDER CRYOGENIC CONDITIONS (-165°C), SUCH AS THE CONSTRUCTION OF LNG TANKS. THE PRODUCT HAS BEEN DESIGNED TO OFFER EXCELLENT DUCTILITY, STRENGTH AND TOUGHNESS.

The SAS ULTS thread bars of grade 500/600 are manufactured in diameters between 12 mm and 32 mm, cross sections ranging from 113 sq mm to 804 sq mm, and yield loads of 57 kN to 402 kN. The high ductility of this thread bar exceeds the requirements of the standard for low temperature applications at -165°C (more than 3%), and it has the same ductility at -165°C as a standard reinforcement bar at ambient temperature.

According to SAS Asia, its ULTS fulfils all the requirements set in the DIN EN 14620-3: 2006, the internationally adapted standard for extreme low temperature material testing. The low temperature tests for the product were carried out by the Luxembourg Institute of Science and Technology, during which the thread bar proved that it could be used in a condition as low as -170°C.

“As many governments in Asia are finding alternative sources of energy to replace fossil fuels like coals, the demand for LNG tanks is expected to rise in the



LEFT: The SAS 500/600 ULTS has been developed for applications under cryogenic conditions (-165°C), especially for the construction of LNG tanks.

BELOW: The high ductility of SAS ULTS exceeds the requirements of the standard for low temperature applications at -165°C (more than 3%), and it has the same ductility at -165°C as a standard reinforcement bar at ambient temperature.



near future, along with other cleaner energy sources such as solar and wind power,” said Penny Lau, managing director at SAS Asia Bar Systems.

Mr Lau mentioned that the SAS ULTS has been successfully used in an LNG tank project in Russia. This product is the latest addition to the company’s portfolio, which is now being introduced to the global markets.

The SAS ULTS can be made available with its accessories, like nuts, lock nuts and couplers. SAS Asia said that cutting or extension with couplers is possible at any position of the bar. The SAS ULTS features a screwable coarse thread over the entire length of the bar with self-cleaning thread effect. This coarse thread ensures optimal bond behaviour with concrete.

Growth in Asia

The introduction of SAS ULTS in Asia signifies SAS Asia’s expansion into new applications and growth of the company in the region. Based in Singapore since 2012, SAS Asia has been focusing on high-rise building projects with its reinforcing steel of higher grade (600 and 670) and also its form ties, as well as civil engineering works with its post tensioning thread bars. In recent years, the company has been looking into geotechnical applications such as ground stabilisations, and special applications like construction of LNG tanks under cryogenic conditions.

“We’ve achieved a lot of successes on high-rise building projects and civil engineering works, especially in South Korea, which is our biggest market in Asia,”



ABOVE: The SAS ULTS are manufactured in diameters between 12 mm and 32 mm, cross sections ranging from 113 sq mm to 804 sq mm, and yield loads of 57 kN to 402 kN.



RIGHT: SAS Asia provides solutions for a wide range of applications, offering thread bars of various grades with diameters from 12 mm to 75 mm.



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ABOVE LEFT, ABOVE RIGHT AND MIDDLE RIGHT: Some of major projects where SAS Asia has been involved in the region include the construction of Lotte Tower in South Korea (above left), Deep Tunnel Sewerage System (DTSS) Phase 2 in Singapore (above right), and Jakarta – Cikampek 2 Toll Road in Indonesia (middle right).

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explained Günter Schierhuber, managing director at SAS Asia Bar Systems. “Our performance has been steady in countries like Singapore and Hong Kong, but we are experiencing growth in the developing markets such as Vietnam, Thailand, Indonesia and Malaysia - as these countries are boosting their infrastructure developments including roads and railways. Many geotechnical applications are also taking place in the entire region.”

Mr Schierhuber continued, “Within six years of our establishment, we have increased from less than 1,000 t of steel to around 3,500 t (as of 2018) – our growth is about 10-20% per year, with a rising number of customers, and we expect this trend to continue.”

Today, SAS Asia offers thread bars of various grades, up to prestressing steel quality, in a range of diameters from 12 mm to 75 mm. The company provides solutions for a wide variety of applications, including thread bar anchors for mining and tunnelling, reinforcement connections, form ties, tie rods, soil nails, micropiles, rock and soil anchors for geotechnical applications as well as prestressing tendons for post-tensioning. All of SAS Asia products are manufactured at its parent company’s plant, Stahlwerk Annahütte in Germany.

New leadership

With the company’s positive growth over the years, Mr Schierhuber said he is now ready to retire and plans to leave during 2019. Upon which, Mr Lau will take over the full leadership of the company.

“My goal was to establish the SAS brand in the Asian market,” said Mr Schierhuber, “and to make our customers aware that we are a global supplier with the capability to support them locally. Our efforts have certainly paid off.”

Mr Schierhuber relocated to Singapore in 2012 to set up SAS Asia Bar Systems, which serves all countries in the Asia region. The company has grown from strength to strength, starting with only three staff at a smaller office and now employing 14 staff occupying a new, bigger office, plus a 1,100 sq m warehouse that stores up to 1,000 t of SAS fully threaded bars and accessories of different grades and diameters.

In early 2018, Mr Lau joined SAS Asia as a new managing director, bringing with him more than 15 years of experience in



Penny Lau (left) and Günter Schierhuber, managing directors at SAS Asia Bar Systems. Mr Lau is set to take over the full leadership of the company from Mr Schierhuber, as the latter plans to retire.



Since its establishment in 2012, SAS Asia has grown from three staff to 14 and the company has also moved to a larger facility.

the building and construction industry. Prior to this, Mr Lau served as manager for Construction Innovation and Technology Application Centre at the Construction Industry Council (CIC) in Hong Kong. He had also worked for German manufacturer Herrenknecht for a number of years and French construction company Dragages. Mr Lau has lived and worked in the UK, China and Hong Kong before moving back to Singapore.

Commenting on his new role, Mr Lau reiterated, “SAS will continue building its brand awareness in Asia and maintaining its product quality. We will also be expanding our presence in new markets - for example, in Brunei, Laos and Myanmar - as well as developing new products for new sectors and applications. Our strategy is to take a proactive approach and enter the market early – we believe in first-mover advantage. Furthermore, we also need to enhance our technical support to keep up with the increasing demand.”

Regardless of what 2019 brings, SAS Asia looks set to embrace the future. As Mr Schierhuber put it, “The company is now in good hands and I can hand it over with peace of mind!” ■

Website: www.sas-asia.sg



SAS Asia warehouse in Singapore stores up to 1,000 t of SAS fully threaded bars and accessories of different grades and diameters.



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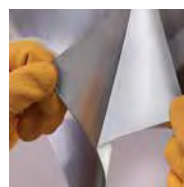
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YOGYAKARTA CALLING

THE NEW YOGYAKARTA INTERNATIONAL AIRPORT ON THE ISLAND OF JAVA, INDONESIA, IS BEING BUILT TO MEET THE CITY'S GROWING TOURISM AND ECONOMIC POTENTIAL. IT IS CONSIDERED THE FIRST PROJECT IN THE COUNTRY TO ADOPT A FULLY GPS-GUIDED AND SENSOR-CONTROLLED RAPID IMPULSE COMPACTION SYSTEM FOR GROUND STABILISATION, WHICH COULD PROTECT THE TERMINAL AREA AGAINST EARTHQUAKES AND TSUNAMIS.

The New Yogyakarta International Airport (NYIA) - also known as Kulon Progo Airport - is intended to replace the current Adisutjipto International Airport, which only has a 2,200-m runway, no parallel taxiway, and limited availability of land surrounding the airport. The NYIA project is led by the state-owned airport operator PT Angkasa Pura 1 (Persero), and will be developed in two phases.

In the first phase, Persero will build a 3,250 m x 45 m runway with a terminal area of 197,000 sq m and a capacity of 14 million passengers per year. In the second and final phase, the length of the runway will be extended to 3,600 m with an apron area designed for up to 45 parking stands. The airport terminal will be expanded to accommodate up to 25 million passengers per year.

Construction work on NYIA is being carried out by PT. PP as the main contractor. It commenced in 2018 and the first phase is expected to be completed in 2019, with operation scheduled for early 2020.

RIC technology for ground stabilisation

The new airport is located within an earthquake and tsunami-prone area and as a result, the ground has to be stabilised in order to mitigate liquefaction that occurs during such events. With that in mind, PT. PP opted for Rapid Impulse Compaction (RIC) technology to perform ground improvement work in the terminal area.

During the project meeting, several methods were said to have been evaluated and the RIC method was finally selected to address the soil liquefaction concerns based upon the specific site requirements. It was assessed that soil treatment with the RIC method would completely eliminate the liquefaction problems in the upper zone, and confine a limited thickness of liquefaction susceptible soils to the bottom of the lower zone. It is believed that such a result could not be achieved at this pace with any other method under these circumstances.

Impulse compaction refers to the methodology of hydraulically dropping a weight (hammer) from a controlled height onto a steel



The New Yogyakarta International Airport is currently under construction. The first phase of the project is expected to be completed this year, with operation scheduled for early 2020.

plate (compactor foot). The plate remains in constant contact with the ground, thus ensuring an efficient and safe transfer of energy.

In the case of NYIA, the RIC technology was provided by Vantage Group, offering a hammer weight of 9 t and it was dropped at a frequency of 40-60 blows per minute. The hammer drop height, number of blows, location, penetration per blow and total penetration are recorded by the Vantage-RIC data acquisition system.

“As with any good construction projects, design success starts from the ground up. The process of compaction gives the soil higher resistance and greater stability. It provides the necessary flat base to effectively support the terminal buildings, roads, runways, various construction foundations, and any other construction structures - which is especially necessary in an area prone to seismic events, such as the Indonesian archipelago,” explained Witold Nowak, CEO of Vantage Commerce Pte Ltd, part of the Vantage Group.

“In the event of an earthquake, the shear waves that propagate upward from the underlying bedrock induce the tendency for loose sandy soil to decrease in volume. If poor drainage conditions are assumed, an increase in pore-water pressure and an equal decrease in the

effective confining stress are required to keep the loose sandy soil at constant volume. The damage can be caused by seismic liquefaction from the earthquake.”

Based on the geotechnical analysis of the soil composition as well as on the requirements to prevent liquefaction due to seismic activity, the RIC grid on the NYIA project was applied in two stages. The primary stage was completed with 3.5 m spacing in triangular pattern, and the secondary stage placed RIC columns in the centre of each 3.5 m triangle. The final compaction configuration consisted of 1.5 m diameter columns with an overall spacing of 1.75 m. The ground improvement work was successfully completed in August 2018.

Fast and economical method

According to Mr Nowak, the Vantage-RIC method is suitable for ground improvement down to medium depths, which allows a wide variety of grounds to be quickly and economically compacted. In combination with a replacement base layer or stone columns, even the bearing capacities of cohesive soil can be improved significantly.

Locally, the depth of impact is often of the order of minimum 6 m, but depth of impact up to 9 m has been previously observed and was also achieved at NYIA,



In the first phase, the new airport will have a 3,250 m x 45 m runway with a terminal area of 197,000 sq m and a capacity of 14 million passengers per year. In the second and final phase, the length of the runway will be extended to 3,600 m with an apron area designed for up to 45 parking stands. The airport terminal will be expanded to accommodate up to 25 million passengers per year.



The new airport is located within an earthquake and tsunami-prone area and therefore the ground has to be stabilised. For this, the main contractor PT. PP opted for Rapid Impulse Compaction (RIC) technology, provided by Vantage Group, to perform ground improvement work in the terminal area.

said Mr Nowak. In contrast to vibroflotation with stone columns, the Vantage-RIC method can be around three to four times less expensive due to its high processing speed, he added. “Most importantly, Vantage-RIC technology is a good compromise between very high performance speed for shallow to medium depths grounds with low water content.”

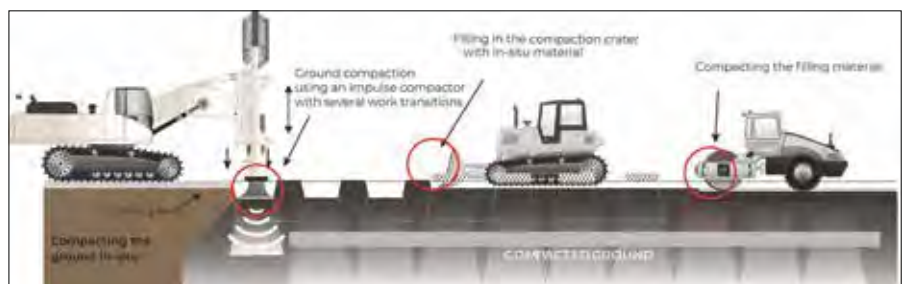
Mr Nowak further pointed out that Vantage geotechnical engineers design a compaction pattern in advance, based on the geotechnical analysis carried out prior to the compaction work. “Each individual compaction point is shown on a distribution plan and this is subsequently transferred into the on-board computer. With the sensor readings, we are able to optimise the on-the-fly grid and in turn save time and resources.”

The Vantage-RIC system uses a plethora of sensors to determine settlement and energy-distribution per recorded GPS-coordinate. This enables the operator, and ultimately the clients, to have full quality control and assurance as they know exactly how much force is applied (and thereby settlement induced) per GPS-logged compaction spot. Afterwards, the readings will be compared against the target parameters to ensure that the appropriate result is delivered.



ABOVE: The Vantage-RIC method on the NYIA project involved hydraulically dropping a 9 t hammer from a controlled height onto a steel plate (compactor foot). The plate remains in constant contact with the ground, thus ensuring an efficient and safe transfer of energy.

BELOW: The Vantage-RIC method is suitable for ground improvement down to medium depths, allowing a wide variety of grounds to be quickly and economically compacted.



“By using an array of sensors and measurement systems, we can provide a full documentation for all compaction points within a project, such as GPS coordinates, date, time, applied energy, number of impulses, settlement per impulse and total settlement,” said Mr Nowak. “Based on this data, the effect of the compaction can be holistically analysed for full quality control and assurance.”

The achieved compaction can be most effectively verified using dynamic probing or cone penetration test (CPT) before and after compaction, he said. The compaction depth effect depends on the type of soil and its layer composition, and it is possible to reach a compaction depth of up to 9 m.

‘New method for Indonesia’

Although RIC technology has been used in other countries, it is still considered new in Indonesia. Because of that, proposing it for a technically challenging and strategically important project like NYIA was undoubtedly not an easy task.

“As we were the first to introduce this technology to the Indonesian market, we have definitely faced a challenge in getting market acceptance,” revealed Mr Nowak. “But we’re convinced of the benefits of the technology, so we provided a free trial to the customer. In the end, we met the target criteria and the required performance speed, and therefore we were awarded the contract for the whole terminal area.”

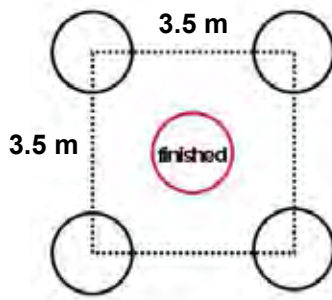
Mr Nowak also mentioned that during the ground improvement work, the RIC method was analysed by one of the leading geotechnical specialists in Indonesia and head of Indonesian Society for Geotechnical Engineering (HATTI), Prof. Dr. Ir. Masyhur Irsyam, who later confirmed that the method is able to perform effectively under the given circumstances.

“In recent years, we have witnessed megaproject owners in Indonesia placing more geotechnical consideration in ground improvement for earthquake-resistant design. One of the commonly used countermeasures for earthquake liquefaction hazard is via effective compaction,” said Mr Nowak. “We are now looking into similar project requirements and have already received a number of enquiries.”

Headquartered in Singapore, Vantage Group is comprised of four companies and two principal business units: soil improvement contracting and construction technology trade. The soil improvement business is regionally focused in Indonesia and applies the RIC technology in a



Vantage geotechnical engineers design a compaction pattern in advance, based on the geotechnical analysis carried out prior to the compaction work. Each individual compaction point is shown on a distribution plan and this is subsequently transferred into the on-board computer. With the sensor readings, the company is able to optimise the grid and in turn save time and resources.



LEFT: The RIC grid on the NYIA project was applied in two stages. The primary stage was completed with 3.5 m spacing in triangular pattern, and the secondary stage placed RIC columns in the centre of each 3.5 m triangle. The final compaction configuration consisted of 1.5 m diameter columns with an overall spacing of 1.75 m.

BELOW: Once completed, NYIA will replace the existing Adisutjipto International Airport. The new airport is said to be the first project in Indonesia that has adopted a fully GPS-guided and sensor-controlled RIC technology for ground improvement.



highly computerised and innovative configuration. The trading activities encompass nano-silane asphalt additives, construction vehicle automation systems, soil stabilisation chemicals as well as concrete batching and mixing equipment. The Group’s activities and strategies

are conceptualised around the idea that highly developed technologies and systems deliver a significant competitive advantage through sustainability, even in a rather traditional field as the construction industry. ■

Website: www.vantage-commerce.com



ON THE HIGH ROAD

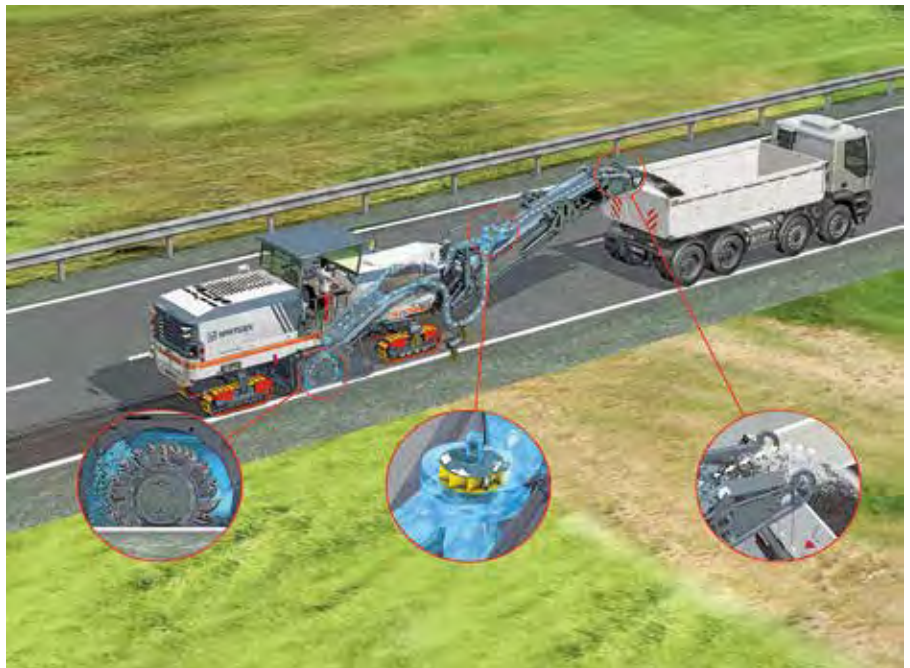
Unite Co Ltd was recently tasked to undertake a rehabilitation work on a section of the Jōban Expressway in Mito, about 140 km northeast of Tokyo in Japan. It covered an area of approximately 800 sq m, featuring 250 m in length and 3.425 m in width.

To help complete the job, the company chose a 2 m front-loading W 210 cold milling machine from Wirtgen. While traffic continued to flow on one lane, the 500-kW machine kept operating to remove the damaged sections.

“Our machine is equipped with the vacuum cutting system (VCS),” said Koji Yamada, the site manager on the project. Five years ago, the VCS system developed by Wirtgen was included in the New Technology Information System (NETIS) of the Japanese Ministry of Land, Infrastructure, Traffic and Tourism.

Intelligent milling

To repair cracks in the road pavement, the W 210 was equipped with a standard milling drum. After removal of the 10-cm-thick surface course, the machine milled the binder course to a depth of 15 cm in a second pass. Because the different types of mix were separated, it was possible to return both layers to the material cycle for reuse in line with their technical suitability and qualitative characteristics.



TOP: Unite Co Ltd has been commissioned to undertake a rehabilitation work on a section of the Jōban Expressway in Mito, Japan. It covered an area of approximately 800 sq m, featuring 250 m long and 3.425 m wide. To help complete the job, the company opted for a Wirtgen W 210 cold milling machine.

ABOVE: During the milling process, fine material particles and water vapour are produced in the milling drum aggregate. The vacuum cutting system (VCS) applies negative pressure to suck the particles and water vapour into the milling machine's short conveyor channel directly at the milling unit, which is additionally sealed. A suction hood located above the conveyor channel draws the particles into two hoses that lead directly to the long conveyor of the loading system.

Continued on page 56

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Continued from page 54

The selective reclaiming of the material clearly delivers ecological and economic benefits. Wirtgen added that when intelligent milling technology is factored in, its cold milling machines not only optimise the overall rehabilitation process, but also the cost-effective reuse of the RAP in the asphalt mixing plant.

Load-dependent water sprinkling plays a key role here. The water required for cooling the cutting tools is regulated in accordance with the engine load and milling speed. As the water system is automatically switched on when the milling drum is lowered into working position and automatically switched off when the milling work is stopped, water consumption can be cut considerably. In particular, up to 20% of the water can be saved, claimed Wirtgen.

As a result, the service life of the cutting tools is extended, the cold milling machine requires less frequent refills and the downtimes are shorter. In addition – and this is said to be decisive for materials processing – the residual moisture of the milled material is only 3–4% per tonne. According to Wirtgen, if its milling technology is not employed, the residual moisture is generally 5%.

The company further explained that when producing new asphalt, a simple equation applies to the drying process in the asphalt mixing plant: 1% drier source material saves 1 l of heating oil in the production of 1 t of asphalt. On top of this comes a



reduction in CO₂ emissions due to the lower energy requirements. With that in mind, when processing the milled material on the Jōban Expressway, a total of some 400 l of heating oil were saved – and in just two hours, as this was how fast Unite Co Ltd selectively and precisely removed the surface and binder courses with the W 210.

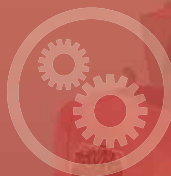
Mr Yamada commented, “The quality of the milled surface is flawless thanks to the Level Pro levelling system – it’s the perfect base for paving and compacting the new asphalt.” ■

Website: www.wirtgen.com

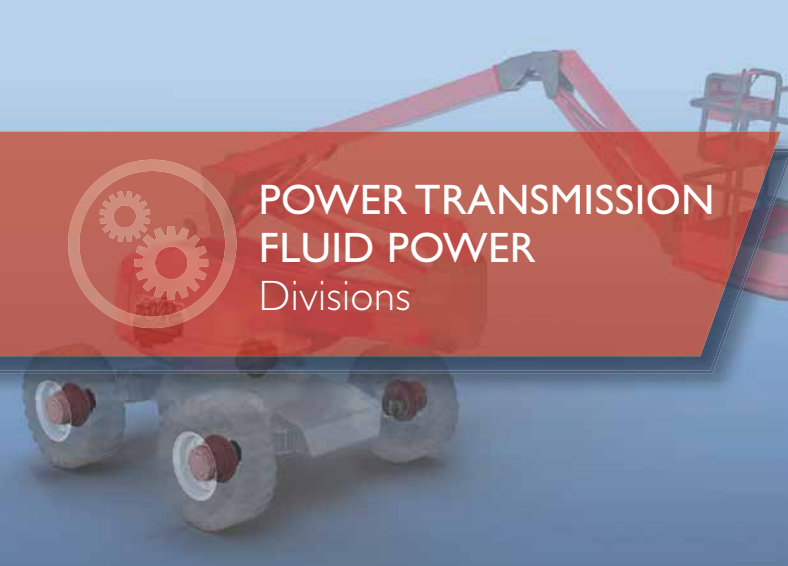


TOP: Kazunari Watanabe, milling machine operator at Unite Co Ltd.

ABOVE: With the help of modern machine technology, the surface, binder and base courses can be removed separately and also returned to the material cycle separately. This increases the sustainability of RAP recycling.



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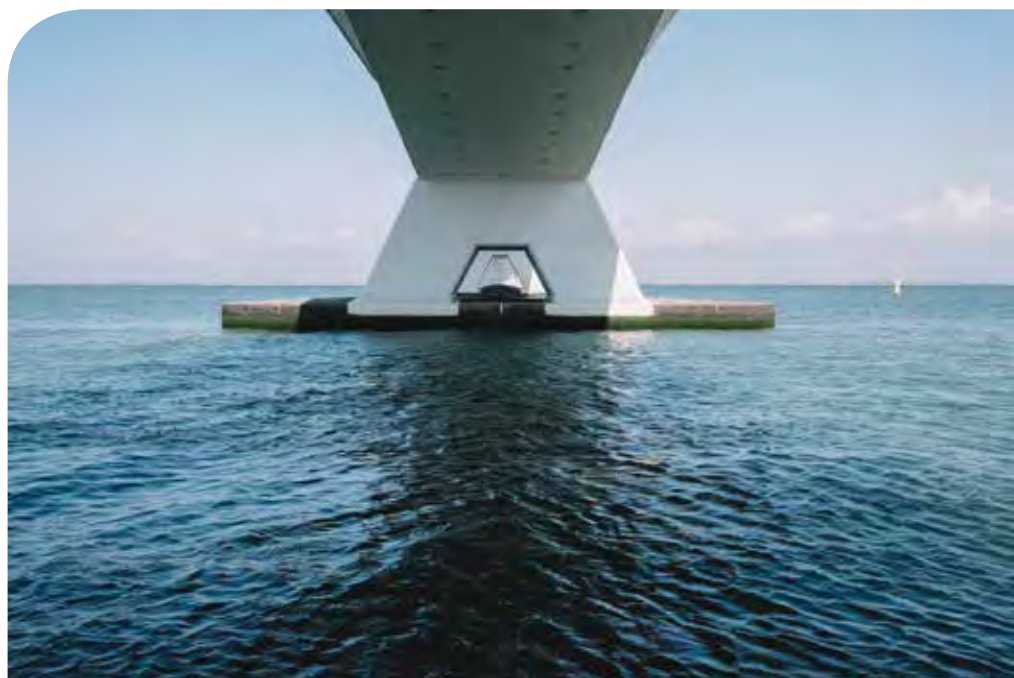
Upgrading ZEELAND BRIDGE

In 1962, the Netherlands' province of Zeeland built a bridge for a quick connection between the isles of Noord-Beverland and Schouwen-Duiveland with the industrial area around the city of Vlissingen-Oost, which was then undergoing a period of strong development. The inauguration of the bridge took place on 15 December 1965.

With a length of 5,002 m, the Zeeland Bridge had been the longest bridge in Europe until 1972, when it was surpassed by the Öland Bridge in Sweden at 6,072 m long. The Zeeland Bridge is currently still the longest bridge in the Netherlands, and it was declared a Monument of National Interest on 15 December 2015 by the Netherlands National Cultural Heritage Agency.

In 2000, the Zeeland Bridge received a major overhaul to make its road safer and bring it in line with the latest highway regulations. Work involved replacing the old guardrails on both sides of the road with concrete barriers and the introduction of a by-law that prohibited overtaking.

The bridge features 54 pillars and 52 spans of 95 m, with a 40-m-long mobile section. It comprises two car lanes and a cycle lane. It is suspended over the water and its entire length is supported by pillars in the form of an upside-down 'V', which is placed on reinforced concrete bases that



TOP: At 5,002 m long, the Zeeland Bridge is currently the longest bridge in the Netherlands. It provides a link between the isles of Noord-Beverland and Schouwen-Duiveland with the industrial area around the city of Vlissingen-Oost.

ABOVE: The bridge is suspended over the water and its entire length is supported by pillars in the form of an upside-down 'V', which is placed on reinforced concrete bases that sit on the seabed.

sit on the seabed. The bridge's reinforced concrete bases are of different lengths; where the water is particularly deep they are 60 m long, while in other areas they

are up to 30 m long. The bridge also has many different parts that are connected together by strong steel cables for a total length of 300 km.

Latest upgrading work

Being exposed all day and all night to the effects of the sun, winds and above all, the sea, plus carbon dioxide emissions from passing vehicles, the Zeeland Bridge needs to be constantly and methodically checked and maintained. New coloured coating is said to be applied on its pillars every 10 years and the products used are evaluated to check for their adhesion properties when applied to the substrate, their durability, the stability of their colour and their resistance to atmospheric agents.

In 2016, the Zeeland Bridge was being prepared for its next upgrading work. For this reason, the owners tested a number of products in advance to select those with the best performance characteristics in terms of adhesion, flexibility, resistance and colour maintenance. Products from Mapei were finally chosen and the company took part in the project between 2017 and 2018 by supplying its various systems, in order to protect the bridge's reinforcing rods, repair concrete as well as to protect and paint the pillars of the bridge.

The concrete on some of the pillars was found to be badly deteriorated. These damaged areas were removed until the reinforcing rods were exposed, and then two coats of Mapefer 1K one-component, protective mortar were applied on the reinforcing rods. Once Mapefer 1K had dried, the surface of the pillars was repaired with Planitop Smooth & Repair R4 structural, rapid-setting, shrinkage-compensated, thixotropic, fibre-reinforced mortar. The pillars were then finished off by applying two coats of Elastocolor Waterproof.

Mapei's Elastocolor Waterproof is a flexible, protective paint for outdoor applications made from acrylic resin in water dispersion. It offers excellent resistance to all types of climatic conditions, aggression from smog and sunlight and forms a hardwearing, protective layer on substrates that resists the rigors of time. It is designed to ensure a highly attractive, smooth finish. ■

Website: www.mapei.com.sg

TOP AND MIDDLE: The Zeeland Bridge recently underwent upgrading work. Mapei was involved in the project by supplying several of its systems, including Mapefer 1K for corrosion-inhibiting treatment on reinforcing rods and Planitop Smooth & Repair R4 for concrete repair.

BOTTOM: Mapei Elastocolor Waterproof was used to paint the bridge pillars.



The article courtesy of *Reacha Mapei International* no. 72

ALL EYES ON BAUMA



The world's largest trade show for construction machinery, building material machines, mining machines, construction vehicles and construction equipment, is set to open its door from 8 to 14 April 2019 at the Munich exhibition centre, Germany, covering an expanded exhibition space of 614,000 sq m (2016: 605,000 sq m) with 18 halls.

In 2016 bauma broke all previous records, attracting a total of 3,425 exhibitors from 58 countries and 583,736 visitors from 219 countries. This year, it is expected to be bigger. As of October 2018, the show organiser Messe München announced that bauma already drew more than 3,500 exhibitors from 55 countries, and 600,000-visitor mark is ready to be passed.

A highlight of each bauma is its partner country, and in 2019 a special focus will be put on Canada. According to Messe München, due to the recent free trade agreement (CETA - Comprehensive Economic and Trade Agreement) and large investments in infrastructure, the Canadian market offers plenty of opportunities for companies and investors from the construction and mining machinery market.

Industry report

In January 2019 during the bauma Media Dialogue, Messe



TOP AND ABOVE: bauma 2016 broke all previous records, attracting a total of 3,425 exhibitors and 583,736 visitors. This year, the show is expected to be bigger.

München shared the results of its exclusive study (bauma Industry Barometer) on the global construction machinery sector. This study polled approximately 10,000 industry experts over a period of two months (mid-June to mid-August 2018).

One of the findings is that the willingness to invest in the construction machinery industry is on a very high level globally and continues to be considered cautiously optimistic in the coming years. Forty four percent of the respondents are planning to increase the investment volume for their company in the future. In a regional/country comparison, Africa (68%) and Asia (67%) in particular, are optimistic about the investment trend. The figure for Europe is at 42%, while at 3%, Germany is a little more sceptical.

“During the bauma year 2019, the industry is doing brilliantly. The majority of the respondents assume that investments will remain at a high level. This illustrates the extraordinarily positive mood with regard to the economic development of the construction machinery industry. But it also shows that an above-average willingness to invest is necessary in order to remain competitive in the long term,” explained Klaus Dittrich, chairman and CEO of Messe München.

Based on the study, more than half of the respondents (58%) view that shortage of skilled workers is the greatest challenge for the industry. This is a major problem, especially for the traditional industrialised countries, but less so for populous countries such as China and India. Other key challenges include the increasing competitive and price pressure (31%), tighter environmental laws and regulations (24 %) and the digitisation of business processes (19%).

The study also finds that digitisation is increasingly finding its way into the construction machinery industry - although it is still in its infancy: Only 4% see themselves as leaders in terms of digitisation. More than half of the respondents have already digitised parts of their companies (28%) or at least started to do so (25%). However, 22% are still waiting to see what happens and 20% see no need for action at all. Besides electromobility, the industry’s most important fields of research are digital topics - from digital networking within and outside production to BIM to the Internet of Things (IoT).

It’s a digital world

Given the buzz around digitisation, it is most likely to be a hot topic at bauma. Already today, construction machines can be equipped with a wide range of sensors and communication interfaces, noted Messe München. The collected data can be used to monitor work performance, consumption and location, define predictive



TOP, MIDDLE AND ABOVE: Digitisation, electromobility and driverless vehicles, and sustainability are expected to be among the hot topics at bauma.



maintenance intervals or determine operating costs. Entire vehicle fleets can be managed by telematics.

For example, special sensors register the direction of rotation of concrete mixing vehicles and thus record the unloading process. Cranes at various locations can also be controlled remotely from a central control centre so that they can carry out their work 'driverlessly'.

At bauma, visitors will be provided with a digital experience in Hall B0, thanks to virtual and augmented reality (VR/AR). "With new virtual offerings, we're bringing the construction site into the trade fair and expanding our digital portfolio," said Mareile Kästner, bauma exhibition director. "We have created a platform that enables exhibitors' products to be experienced not only at the actual exhibition stand but in any location. We offer the virtual exhibition space within a VR Experience. For the first time, companies at bauma 2019 will be able to present themselves completely digitally."

One of the exhibitors, the global formwork manufacturer Doka, will be represented at the Messe München VR Experience. The company's highrise model embedded in VR will show what extensive know-how is required to make the construction process fast, safe and optimised. "Virtual reality allows visitors to understand the complex issues in the smallest of spaces," said Gottfried Bühringer, head of digital marketing at Doka.

Digital tools also help to automate workflows, which is becoming increasingly relevant, not least because of the shortage of skilled workers. Coordinating all the activities of several construction sites at the same time - sometimes located thousands of miles apart - is no longer a vision of the future. At present, cloud-based solutions enable projects like these. Planning, implementation, monitoring and optimisation of construction projects are consequently running fully digitised.

Electromobility and driverless vehicles

Ms Kästner further highlighted that "electromobility and driverless vehicles are two areas that are increasingly gaining traction with manufacturers and service providers in the construction machinery industry. As such, we intend to provide these hot topics with a platform at bauma 2019."

Producing cleaner, quieter and more efficient machines is the future aim of electrification, according to many manufacturers of construction machinery. In fact, more and more companies are upgrading smaller machines in the lower power range with electric drives. There is also growing interest in hybrid vehicles. As such, systems that can handle light work but then engage a combustion engine where maximum power is required, are reportedly under development.



FAR LEFT: Messe München offered a virtual experience during bauma Media Dialogue.

LEFT: Klaus Dittrich, chairman and CEO of Messe München, presented the results of bauma Industry Barometer.

BELOW: A panel of industry experts discussed the trends and challenges in the present and towards the future.



The demo area (above) and indoor display (below) at bauma 2016.



As for driverless machines, they already exist in the mining industry and other related sectors. They are particularly suitable for use in quarries as the same routes are always followed from the actual quarrying site to the processing area. There are also future plans for excavators, which, for instance, will allow them to dig excavation pits autonomously. Nevertheless, driverless machines in the construction industry are believed to be something that cannot be fully accomplished or implemented yet at the moment, due to the safety aspects involved at complex construction sites.

Within the bauma Forum in Hall C2 the thematic group 'Driverless Vehicles, Electromobility & Electric Drives and Zero Emissions' will focus primarily on aspects regarding autonomous driving.

Sustainability matters

The avoidance or reduction of emissions of all kinds remains a major playground for technical innovations and improvements in the construction industry. "This makes it all the more pleasing that many of the innovations presented at this year's bauma have effects in terms of sustainability, resource conservation and environmental protection," revealed Ms Kästner.

An example of this is the ion dust shield technology that aims to reduce the amounts of particulate matter, developed by road equipment manufacturer Bomag. The system is installed in a box attached to the conveyor belt of the milling machine. An extraction system sucks the dust particles through an electric field. They become positively charged and are attracted by the negatively charged housing. This causes the fine dust to clump together permanently into less hazardous coarser particles, which can be removed together with the milled material. With this environment-friendly solution, Bomag has been listed as a nominee for the bauma Innovation Award 2019.

TBM manufacturer Herrenknecht has also developed an economical and environment-friendly laying method. The modified E-Power Pipe drilling technology enables trenchless laying of cable conduits across comparatively long distances of more than 1 km close to the surface at a depth of 2 to 4 m. This minimises interference with the landscape. The jury found this solution worthy of a nomination for the bauma Innovation Award.

Another innovation that 'serves' all three traditional fields of sustainability - ecology, economy and society - is the mobile manufacturing of Max Bögl Wind. The company is known for the manufacture of hybrid towers made of concrete and steel elements for wind turbines with large hub heights. The new concept involves the production of the concrete elements in a temporary factory delivered in 262 containers close to the future location of the wind turbines - upon request to almost any place in the world. For example, 90 towers for a wind farm in Thailand were manufactured as part of the pilot project launched in August 2017. Local raw materials and manpower ensure local added value and increase the profitability of the project. At the same time, a



TOP AND ABOVE: **bauma 2019 will have an expanded exhibition space of 614,000 sq m, with 18 halls.**

reduction in the number of heavy-load transports contributes to the protection of infrastructure, climate and environment. This innovative manufacturing concept has also been nominated for the bauma Innovation Award.

Furthermore, the construction machinery industry is called upon to avoid emissions not only of dust, but also, and especially, of exhaust gases and noise. An increased use of electric drives can make an important contribution in this respect.

bauma Innovation Award 2019

The bauma Innovation Award will take place for the 12th time in five categories: Machine, Components/Digital Systems, Construction Work/Construction Method/Construction Process, Science/Research, and Design. A total of 138 nominations were submitted from Germany and abroad, and the five winners will be announced at the Court Church of All Saints in the Munich Residence on the evening before the start of bauma (7 April).

The nominees for the bauma Innovation Award 2019 are:

Category 1: Machine

- E-Power Pipe, Herrenknecht AG
- 370 EC-B Fibre, Liebherr-Werk Biberach GmbH
- Large milling machine with Mill Assist, Wirtgen GmbH

Category 2: Components/Digital Systems

- Bomag Ion Dust Shield, Bomag GmbH
- DokaXact positioning system, Doka GmbH
- Pave-TM layer thickness measuring system, Moba Mobile Automation AG

Category 3: Construction Work/Construction Method/Construction Process

- b-project, Bauer Spezialtiefbau GmbH
- Worldwide. Mobile manufacturing, Max Bögl Stiftung & Co KG
- Innovative building techniques for tomorrow's construction industry, Ed. Züblin AG, Directorate Stuttgart

Category 4: Science/Research

- Conti-E impulse comminution, Technical Mining Academy of Freiberg, Institute for Mineral Processing Machines
- Driver guidance 4.0, Technical University of Munich, Chair of Material Flow and Logistics
- Defined removal of highly reinforced concrete, Karlsruhe Institute for Technology (KIT)

Category 5: Design

- Intusi intuitive user interface, Liebherr-Hydraulikbagger GmbH
- Mecalac TV1200, Mecalac Construction Equipment
- Design HDD system drill 2019, Tracto-Technik GmbH & Co KG

Website: www.bauma.de



Site map of bauma 2019.

The following pages cover some of the exhibitors and their innovations that will be showcased at bauma 2019.

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GOLDHOFER

BOOTH: FN.823

Goldhofer will reveal a number of innovations at the show, along with its existing products such as the TU 4 four-axle trailer for transporting construction machines weighing up to 31.8 t, which has a new drawbar and improved ramp operation for enhanced safety and ease of use; the Allrounder with its flexible loading concept, making it a high-performance all-rounder for construction site operations; the Faktor 5.5 high girder bridge; and the STZ-PK 8 low-loader semitrailer, featuring an innovative steering system that combines friction-steered and forced-steered pendular axles.

The Venum is a fivefold extendible flatbed semitrailer with a maximum length of 72 m, targeted at the wind power sector. When combined with the Bladex blade tip lifting device, it offers a complete system that permits higher travel speeds even when transporting extremely long turbine blades and avoids time-consuming vehicle changes.

In addition, Goldhofer has upgraded some of its products. The MPA RM low-loader semitrailer – developed based on the MPA technology – is fitted with wheel recesses that combine virtually minimised loading height with optimum travel characteristics and a highly flexible deck for a wide variety of transport operations.



Goldhofer booth at bauma 2016.

There are also improved versions of THP modular heavy-duty trailers, the latest generation of PST self-propelled modules, and the ADDrive heavy-duty module. ■

Website: www.goldhofer.de

DOKA

BOOTH: FN.420/1

With Framini, Doka has extended its product portfolio in Latin America, Asia and the Middle East. This new framed formwork system can boost productivity on small and medium-sized construction sites, particularly when residential, commercial and infrastructure projects have to be built quickly and economically. Framini features low weight and optimised ergonomics, making it a fast and universally adaptable formwork system.

Doka's FreeFalcon is a mobile, personal fall-arrest system designed to protect workers where the risk of falling is most critical. The system significantly enhances user safety without sacrificing mobility, helping to minimise the risk of falling from height.

Dokaflex Xbrace is an improved version of Dokaflex timber-beam floor formwork that adds flexibility, universal usability and simplicity of use to contemporary safety aspects. According to Doka, all of its existing Dokaflex systems can be adapted to the new version.

DokaXlight framed formwork is another new product that also combines lightness with durability. It is now being used on construction sites across Europe. In future, it will be among the lightest framed formwork systems in the Doka range of products.

In addition, a cooperation with the Malaysian company MFE Formwork Technology Sdn Bhd, which specialises in monolithic formwork systems, has enabled Doka to extend its presence in Southeast Asia, Latin America and the Middle East. In the future, Doka plans to offer Doka Monolithic - a new solution for the monolithic formwork sector that enables walls, columns, downstand beams and slabs to be concreted in a single operation.

Doka will also exhibit its Concremote, a digital measuring and decision-supporting system used to measure concrete strength development on site and in real-time. ■

Website: www.doka.com



LEFT: Framini formwork system.

BELOW: Concremote measures concrete strength development on site and in real-time.



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RUBBLE MASTER

BOOTH: B2.236

Rubble Master will introduce a new RM 120GO! crusher as part of the company's latest development, the RM GO! Next. The new model features a fully integrated hybrid drive system, combining the advantages of diesel-driven and electric-powered crushers. This delivers excellent flexibility in the type of drive, maximum mobility, quiet operation, lower emission values, higher performance (as short-term overload operation is possible, said Rubble Master) and infinitely variable rotor speed over a wide range.

The new RM 120GO! will remain compact, affirmed Rubble Master. The base frame of the machine has only been slightly modified to make room for the electric motor, and it also boasts a more powerful generator and a 50% larger diesel tank.

According to Rubble Master, the new crusher will feature a new appearance based on a sophisticated lighting concept. The machine communicates with the operator by emitting light signals. The operator is able to stay outside the machine's danger area while it is processing, and can read the details about the performance of the crusher in real time using the RM GO! Smart app.

What is new here is that throughput data from several weighing points can also be integrated using belt scales, and these can be reset directly using the app, revealed the company. The total throughput and proportion of the screened aggregate serve as an indicator as to whether the crusher is operating at full capacity.



The RM 120GO! crusher on display at bauma 2016. This year, Rubble Master will present the new RM 120GO! with a fully integrated hybrid drive system.

Daily reports and error code routines are also included as part of the digital service. ■

Website: www.rubblemaster.com

TRADECC

BOOTH: C3.338

Tradecc will be showcasing its most recent innovations in construction chemicals for waterproofing, water sealing, tunnelling, structural repair and reinforcement and coatings. Among them is the PC 509 Rubber Acryl, a five-component acrylate injection liquid with excellent toughness, elasticity and physical properties. This CE marked resin is specifically developed for injecting structures in which waterproofing imposes strict requirements on the physical properties of the gel masses.

Another innovation is the PC Carbocomp Laminates, which are used to increase the bending strength and capacity of structural elements, and to decrease the deformation of a construction or internal steel tension. The carbon fibre laminates are applied for the structural reinforcement of concrete, steel, wood and masonry. They are said to be at least five times stronger than steel, have high acid and alkali resistance, and are easy to install. With its patented technology of multidirectional CFRP, Tradecc can offer an anchored system.

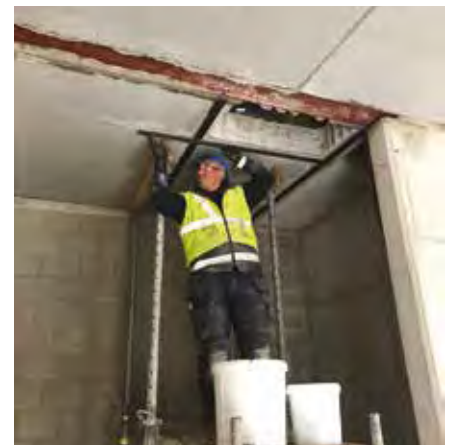
Founded in the 1990s, as part of the ECC Group, Tradecc nv is responsible for the worldwide sales of in-house developed innovative construction chemicals based

on PU, acrylic and epoxy for water sealing, tunnelling, concrete repair and coatings. Tradecc specialises in waterproofing of construction joints, resins for water sealing and soil stabilisation, repair mortars, carbon fibre materials for the reinforcement of structures and polyurea coatings. ■

Website: www.tradecc.com



ABOVE IMAGES: The PC 509 Rubber Acryl is a five-component acrylate injection liquid featuring excellent toughness, elasticity and physical properties.



ABOVE IMAGES: The PC Carbocomp Laminates are used to increase the bending strength and capacity of structural elements, and to decrease the deformation of a construction or internal steel tension.



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TEREX TRUCKS

BOOTH: FN.720/9

Terex Trucks has upgraded its TA300 articulated hauler, incorporating a new transmission that leads to a 5% improvement in fuel efficiency. The 28-t machine is ideal for quarries, construction sites and infrastructure developments. It offers a heaped capacity of 17.5 cu m and is powered by a Scania DC9 engine, which develops gross power of 276 kW and a maximum torque of 1,880 Nm.

The TA300's fuel efficient engine range is globally emissions compliant and meets the requirements of EU and North American legislation without the need for a diesel particulate filter (DPF). This is achieved via the latest generation selective catalytic reduction (SCR) technology, combined with exhaust gas regeneration (EGR) and a variable geometry turbo (VGT).

Since August 2018, the TA300 has been manufactured with the latest EP320 transmission. The updated machine now delivers a 5% improvement in fuel efficiency, a 5 km/h increase in speed to 55 km/h, an extended maintenance period and enhanced performance when compared with the previous model.

The TA300's new transmission comes with eight forward gears as well as four reverse gears, higher overall gear ratio spread, equal ratio steps between gears, and optimised gear shifting with partial load shifts. These features mean that the upgraded TA300 offers lower fuel consumption with smoother gear shifting and thereby higher levels of operator comfort. The machine also now comes with long life transmission fluid, increasing the length of time between oil maintenance intervals from 1,000 to 4,000 hours.

The TA300 is equipped with true independent front suspension as standard, further enhancing operator comfort and enabling excellent traction control and maximum productivity, even in challenging conditions. The machine also has fully enclosed, oil-

The upgraded TA300 articulated hauler has a new transmission.



cooled, multi-disc brakes at all six wheels. These are supported by both the engine brake and the transmission retarder, giving the operator superb control and increasing safety and stability while providing a low cost of operation.

Acoustic insulation helps to minimise noise levels inside the cab while a high performance and easily adjusted heating, ventilation and air conditioning (HVAC) system ensures a stable temperature. Other features include a tilt/telescopic steering wheel, an adaptive air suspension operator's seat with adjustable armrests, anti-vibration mounts for the engine and cab, and cushioned stops on the steering cylinders.

For safe and easy servicing, the TA300 has ground level test points, a fully tilting cab, an electronically raised hood and a full suite of on-dash diagnostic and machine health check readouts that help to maximise uptime. ■

Website: www.terextrucks.com

ALLU

BOOTH: FN.1021/2

The latest products and solutions from Allu consist of: new and upgraded Allu mobile app with new functions that help to improve work productivity and safety, whilst also providing enhanced customer service; Allu TS blade structure with two fragment sizes and a new blade thickness of 8 mm; and Allu TS doubling / tripling new blade variations for combinations of between 8 mm and 105 mm.

The TS blades are a modern development for the screener / crusher market, and Allu aims to deliver new levels of efficiency and productivity with the new blade variations. The Allu mobile app provides an intelligent digital solution for customers and operators to obtain accurate and timely operational information, thus maximising safe and productive use of Allu equipment. Through easier and improved contact functionality, customer support is also enhanced through the new features of the app.

The entire range of Transformer bucket models from the smallest DL series to the large M series will be exhibited, plus Allu 500 HD processor and a selection of Allu compacting plates. There will also be live demonstrations throughout the show with Allu Transformers and compactors. ■

Website: www.allu.com

RIGHT: Allu Transformer D-series bucket.





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SINOBOOM

BOOTH: FS.1001/2

Chinese aerial platform manufacturer Sinoboom plans to bring six electric-powered machines, comprising five scissor lifts and one articulating boom lift.

The Sinoboom GTZZ16EJ articulating boom lift has a platform height of 15.7 m, working height of 17.7 m and load capacity of 230 kg. Making a debut into the European market, the machine provides gradeability of 40% and a large operational range (the working height is complemented by a maximum horizontal reach of 9.3 m).

The GTJZ0407SE is the smallest scissor lift in the Sinoboom range, offering a platform height of 3.8 m, working height of 5.8 m and load capacity of 240 kg. Officially launched at bauma China in November 2018, it is ideally suited to indoor maintenance tasks, particularly in multi-storey facilities, as the compact design allows easy entry to most elevators. Sinoboom scissor lifts have been designed with a small turning circle, ease of operation, robust design and excellent stability. ■

Website: www.sinoboom.com



Sinoboom GTZZ16EJ articulating boom (far right) and GTJZ0407SE scissor lift (right).

UMDASCH GROUP VENTURES

BOOTH: FN.420/4

Umdasch Group Ventures will present the Neulandt 3P, a mobile precast factory specially designed to create social housing at low cost in large quantities. It can be operated worldwide at any project location (construction site), and according to the company, it can be up and running within four weeks. The technology combines the advantages of butterfly and battery formwork and enables industrial mass production of prefabricated elements.

Contact, the BIM-compatible software with mobile application, is used to plan and organise construction sites in terms of collaboration, construction process, tasks, materials and personnel. Such an optimised construction site management can lead to an increase in productivity and quality.

The construction site also becomes smart, thanks to sensors and real-time data on construction site status and progress. An innovative feature is the analysis of all construction site data and the application of artificial intelligence, which provides all parties involved with a sound database for calculation, preparatory work and decisions in future construction projects.

In addition, Contour Crafting offers 3D construction printing. The company holds over 100 relevant technological patents, two NASA awards and is also developing for the US Department of Defense. Umdasch Group Ventures holds 30% of Contour Crafting Corporation.

3D printing is ideal where fast and cost-effective construction process is required, for example in social housing or after natural disasters. The technology is also attractive for organic architectural solutions in order to create sophisticated and unusual wall geometries simply and cost-effectively. ■

Website: www.umdachgroup-ventures.com



TOP: Neulandt 3P mobile precast plant.
ABOVE: Contour Crafting 3D printer.

SOILMEC

BOOTH: FN.522

The new Tiger SC-135 hydromill from Soilmec can operate in a wide range of working radius and module rotations. The machine features several improvements, especially in terms of safety and oil contamination. One of the highlights is its hydraulic system dedicated for cutting module and base machines with the filters installed directly on the main lines to avoid any possible breakdown due to bentonite contamination.

The hydraulic swivel for +/-90° module rotation, the new powerful Cat C27 diesel engine and different winders design solutions are ideal for jobsites up to 150 m depth, and guarantee excellent performance in various conditions. The high depth vertical sensor, the independent mobile flaps and the DMS on board complete with the 3D graphic print out panel options mean verticality control as never before.

The Tiger SC-135 is fitted with a new safe anti-falling system, handrails and ladders, lashing points, remote control boards and reduced speed mode in order to carry out the main assembly/disassembly operations and maintenance procedures in safe conditions. The machine has also been designed for a modular assembly, with a maximum transportation weight of 45 t.

Soilmec's new SM-22 drilling rig is an evolution of the company's PSM-1350 and



SC-135 hydromill.



SM-22 drilling rig.

SM-20 models, and has been completely redesigned to ensure high efficiency and productivity levels on site together with greater safety standards. Thanks to its modular design, the SM-22 can be easily configured in different single rotary fittings, double rotary, top-hammer and vibro-rotary to carry out consolidation, micropiles and anchors with various drilling technologies, direct circulation, reverse circulation, DTH, CFA and jet grouting.

In addition, the new Soilmec SR drilling rig is equipped with more powerful and

lightweight rotaries, powerful diesel engine and increased pull up value in comparison to prior models. It also has a new winch version pull down system featuring a standardised and simplified design for improved safety and efficiency. The new generation SR line has seen a reduction in weight as well, with an improvement in performance, thanks to the use of high-strength steels and a new antenna design with standardised section. ■

Website: www.soilmec.com

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COMANSA

BOOTH: FS.1103/1

Comansa will be exhibiting its new high capacity model, available worldwide since September 2018. The 21LC1050 flat-top crane can load up to 50 t, has a maximum radius of 80 m, and is designed to provide excellent performance in large industrial or infrastructure projects as well as in construction with heavy precast or steel structures, including PPVC (prefabricated prefinished volumetric construction).

The 21LC1050 features high-speed hoist mechanisms (up to 300 m/min) and capacity for 1,570 m of wire rope, making it also an ideal solution for high-rise construction. Thanks to the single-double trolley system with automatic reeving change, the 21LC1050 offers an optimised load diagram. Working with the simple (or front) trolley, the crane improves its tip loading capacity and reaches higher hoist speeds; while with the double trolley (front plus rear), it can work with the heaviest loads.

A new modular counterjib has been developed for the 21LC1050, which allows up to six different configurations to suit the needs of each job and increase safety. Thus, when the crane is assembled with a maximum jib length (80 m), the counterjib radius is 31 m - and it can be reduced to 27 m when the jib length is 50 m. In addition, the 21LC1050 is fitted with Comansa's XL-size Cube cab, the largest from the company, ensuring high productivity thanks to its fully glazed front and enhanced comfort for the operator.

At bauma, Comansa will be sharing a booth with its German dealer BKL Baukran Logistik, which is purchasing the 21LC1050 for its rental fleet. ■

Website: www.comansa.com



Comansa 21LC1050 flat-top crane is equipped with the company's Cube cab (inset).

DRESSTA

BOOTH: FM.F4/417

The new Dressta TD-15 crawler dozer has been designed for maximum versatility through the widest choice of frame structures and blades. It has an operating weight of 20,760 kg, maximum draw pull of 535.3 kN, blade capacity of 3.8 cu m (angle blade) to 5.95 cu m (semi-U), and maximum ripper penetration of 600 mm (multi-shank) to 762 mm (single-shank).

New load sensing steering provides more precise blade and ripper control and reduces fuel consumption by up to 10%. The TD-15 also benefits from a new cab design that greatly improves operator comfort, safety and visibility with 30% more glass and the inclusion of rear-view cameras. Access for routine maintenance has been made easier to ensure the uptime and efficiency of the machine.

Another dozer model, the TD-25, is also a new machine in which visibility and safety have been significantly improved with 30% more glass in the cab and the inclusion of rear cameras. It offers an operating weight of 41,250 kg, maximum draw pull of 794 kN, blade capacity of 9.6 cu m (semi-U) to 21 cu m (coal), and maximum ripper penetration of 760 mm (multi-shank) to 1,700 mm (deep single-shank).

A new bogie undercarriage design give comfort for operator, especially on extreme rocky application and still delivers excellent drawbar pull and productivity. The operator environment has also



Dressta TD-25 crawler dozer.

been improved within the pressurised cab. Special attention has been focused on the operational ergonomics to increase efficiency and reduce fatigue. Upgrades in the suspension and hydraulics further enhance the operator experience by minimising noise and vibration. ■

Website: www.dressta.com

CARMIX

BOOTH: B5.414

Metalgalante will present its new Carmix 45FX self-loading concrete mixer, featuring a user-friendly driving system, compact size (4.50 m high x 7.750 m long) and 4x4 steering, allowing the machine to move around in limited spaces and travel easily on bumpy and rough roads. It has a drum capacity of 6,100 l, with an output capacity of 4.5 cu m. Internally, a system composed of a double mixing screw and a drum with hydraulic motor rotation and planetary gearbox can produce a homogeneous and compact mix. An automatic hydraulic loading system contributes to this result: with a large 600-l loading capacity bucket, it loads aggregates with a proper quantity into the drum without wasting material.

The Carmix 45 FX is also designed with a spacious cab featuring a ROPS/FOPS structure, and control and block valves to ensure maximum safety for the operator. The seat is reversible with automatic inversion of the flow circuit, thus providing an excellent visibility on the jobsite.

In addition, the Load Cells weighing system enables the Carmix 45FX to measure, weigh and programme any material to create a perfect mix on site. Such a process is possible thanks to the four load cells sensors, controlled by an on-board programmable computer, placed at the bottom of the drum in order to work as weight sensors precisely where the mixing takes place (RMC Plant standard level technology). Compared with systems using pressure sensors on the shovel, this system is said to allow direct control of elements where the mix is made (including the actual weight of water for W/C ratio optimisation), higher accuracy, and 3% to 5% weight deviation like in the most sophisticated concrete plants and the verification of finished product. ■



Carmix 45FX self-loading concrete mixer.

Website: www.carmix.com

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KOBELCO

BOOTH: FN.1016

Kobelco Construction Machinery will launch its new SK75SR-7 and SK85MSR-7 midi excavators. They feature several improvements over the previous SK75SR-3 and SK85MSR-3 models. For example, the distance between the upper structure and undercarriage has increased by 20 mm in order to reduce damage by rocks, and the machines' blade geometry has been improved, making it easier for operation in mountainous areas.

Other key improvements to the machines' all-round performance include a 15% reduction in digging cycle time and 37% increase in arm digging speed for improved productivity, and a 23% increase in engine output. The bucket digging force has been increased by over 14% from 52.7 to 60.3 kN for outstanding power when working in areas of hard ground.

With their short radius designs, the SK75SR-7 and SK85MSR-7 are also ideal for working on jobsites where space is limited, such as in residential areas. The inclusion of Kobelco's iNDr (Integrated Noise and Dust Reduction Cooling System) - an innovative method of noise suppression that promotes low noise, exceptional engine cooling, enhanced reliability and minimal machine downtime - reinforces the machines' urban working credentials.

The SK75SR-7 and SK85MSR-7 offer three working modes that can be used to balance work volume with optimum fuel consumption. H-mode is used for heavy working, S-mode normal working and Eco-mode for prioritising fuel efficiency over work volume. The machines also comply with Stage V of the EU emissions standards, which are set to come into force in 2019.

Particular care and attention has been given to the new, larger-size cabin for increased operator comfort and safety. A Kobelco-branded Grammer heated air suspension seat is installed as standard for excellent shock absorption and superior operator comfort, and the armrests and joystick moves with the seat for optimum working position.

The ROPS II-compliant cabin enhances operator safety while the LED-spec work lights and rear/side cameras provide excellent visibility on site. All maintenance related items are concentrated at the right hand side of the machine for easy access, and the FOPS II guard can be opened for window maintenance.

The SK75SR-7 is available with fixed monoboom and offset boom configurations. The SK85MSR-7 is available with swing monoboom and can also be fitted with a two-piece boom. This special two-piece configuration enables operators to work across a wide operating range while still providing smooth hydraulic operation, high performance and increased fuel efficiency, and gives more digging space within the same area.

Kobelco is also preparing to launch its largest excavator yet. The new SK850LC-10E is the latest addition to the company's Generation 10 range and will make its European debut at the show. Driven by a powerful Hino engine, the new machine delivers superior strength and performance via an uprated specification of 2,120 Nm of torque and 380 kW of power. It features Kobelco's latest cooling system - a hydraulically driven twin-fan engine cooling system. This hydraulic version also prevents over-cooling by use of integrated sensors to reduce the speed of the twin-fan unit, helping to increase efficiency and reliability. Moreover, technically advanced systems in the engine's dynamics have been designed to further help reduce the machine's carbon footprint and meet the new Stage V emissions regulations.



ABOVE:
SK75SR-7 midi
excavator.
LEFT: SK08-2E
mini excavator.

The conventional SK850LC-10E, with standard boom and four arm variations, is well suited to general construction and excavation jobsites. However, extensive development and testing was undertaken in quarry conditions in China, India and some Southeast Asian countries, also proving the machine's hardworking and durability credentials. An 'ME' version of the SK850LC-10E, with short boom and short arm, is also available specifically for quarrying. A demolition (DLC) version is expected to launch in 2020.

In addition, Kobelco plans to relaunch a number of its smallest excavators, in preparation for the next stage of the EU emission standards. The SK08-2E, SK10SR-2E, SK18-1E, SK22-1E, SK25SR-6E, SK26-1E, SK28SR-6E, SK30SR-6E and SK35SR-6E are now fully-compliant with Stage V emissions regulations, while the SK17SR-3 is expected to be upgraded in April 2019. ■

Website: www.kobelco-europe.com

ALIMAK

BOOTH: FS.1102/10

Alimak has upgraded its Scando 650 FC-S high-speed construction hoist, offering a payload capacity of 3,500 kg per hoist car - an increase of 300 kg compared with its predecessor, thus boosting productivity on high demand construction projects by up to 10%. The hoist car height has been enlarged from 2.3 m to 2.8 m, increasing the total load space volume by 22%.

To achieve the capacity upgrade, Alimak has redesigned the hoist concept having a 5 m car length as standard. The load carrying car frame and floor have been reinforced and a new safety device has been developed to handle larger weight.

New intelligence in the Alimak Overload Sensing System with measurements of parameters such as the weight of the hoists trailing cables, ensures that the correct weight of the hoist is updated in real time, regardless of the vertical position of the hoist.

A new smart Frequency Converter (FC) guarantees that the maximum speed of the hoist is independent of payload or any voltage drop. The ride comfort has also been improved with a lower operating noise level, through a sound reducing roof cover and guide rollers



of composite material. Available in either a single or dual car configuration, the 650 FC-S offers speeds of up to 100 m/min.

In addition, the new Alimak MC 650 mast climber boasts platform lengths of over 19 m in single mast configuration and over 40 m in twin mast configuration. The maximum payload is no less than 4,000 kg on a single mast platform and 7,100 kg on its twin equivalent.

As the MC 650 work platform uses the same mast sharing system as the Scando 650 construction hoist, the maximum length of the platform is actually determined by the length of the building on which it will be used, said Alimak.

The MC 650 is suitable for use on corners, curves and angles, allowing the platform to be shaped to the building profile. It can be operated on either a mobile chassis or base frame. ■

Website: www.alimak.com

The upgraded Alimak Scando 650 FC-S construction hoist.



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LINTEC & LINNHOF

BOOTH: FS.1110/3

Lintec & Linnhoff Holdings Pte Ltd, a global manufacturer of asphalt and concrete batching plants, will present its innovations - one of them is a new Lintec containerised asphalt plant series, the CSE asphalt plant. The model currently available is the CSE3000, with an average capacity of 220 - 240 t/hr (at 3% moisture content).

The company said the new series has been developed to provide an option of a highly versatile containerised asphalt batching plant. The basic concept of CSE structure allows the plant to be easily retrofitted and upgraded in the future without any major structural modification.

The CSE plant is highly customisable to be a city plant. The basic plant can be easily upgraded with the Lintec Ecological Processing (LEP95) warm asphalt mix system, hot or cold recycling system, environmental protection system for the bitumen fumes, foreign filler silo, integrated hot storage silo, and so on.

In addition, Lintec & Linnhoff will debut its latest Lintec Eisanlagen (LEA) concrete cooling plant. The first available model, the LEA 100, is built in a single 40-ft HC sea container with ice production capacity of 100 t/day. Due to its containerised structure, it can be stacked on top of the storage containers and the storage units are upgradeable from 60 t to up to 400 t a day.

The LEA 100 is a dual function ice/ice water plant controlled by a single switch. This innovative design allows the production of

either ice or chilled water from the same ice generator module.

The LEA 100 plant uses ammonia (NH³) as the main refrigerant. Ammonia is believed to be the most effective natural refrigerant that is environment-friendly, as it is water soluble and contains simple elemental structure. Furthermore, with its platelet method, the LEA 100 consumes up to 30-50% less energy compared to conventional drum ice plants, said Lintec & Linnhoff.

The company further pointed out that the LEA 100 plant offers excellent durability and flexibility, enabling it to handle water of far greater total dissolved solids (TDS) levels than any conventional ice plants can handle. The first-in-first-out (FIFO) principle in the LEA plant ensures that the oldest ice is consumed first to avoid any blockage or glaciation from older and stagnant ice.

Lintec & Linnhoff is a global manufacturer of asphalt and concrete batching plants under the Lintec, Linnhoff and Eurotec brands. The company also provides innovative pavement related technologies and machinery as well as specialist concrete cooling solutions that meet or support industry standards for environmental impact, recyclability and reusability.

At bauma, Lintec & Linnhoff will officially celebrate its new brand identity and 100 years of business operation (*see page 30 for further information on the new brand identity*). ■

Website: www.lintec-linnhoff.com



Lintec LEA100 concrete cooling ice plant and storage container arrangement for a maximum production capacity of 400 t /day.



A 3D illustration of Lintec CSE3000 asphalt batching plant.



Lintec & Linnhoff also offers Eurotec concrete batching plant (left) and Linnhoff asphalt batching plant (right).



GENIE

BOOTH: FM.711

The new Genie S-45 XC boom lift has a working height of 15.72 m and a horizontal reach of 11 m. It combines a consistent dual lift capacity of 300 kg unrestricted and 454 kg restricted to provide twice more lift capacity than its predecessor, as well as saving time by significantly reducing the number of up and down trips to reload the platform. This new standard, which is now consistent across the full Genie XC range, gives the ability to perform a wider range of heavier lift tasks on construction and industrial jobsites with up to three people in the platform.

As part of the Genie XC capabilities, the new boom lift features an automatic envelope control. This is the ability for the machine to retract the boom automatically as it reaches its operating envelope; it also allows for precise platform positioning and an enhanced operator experience. It is also equipped with a load sense cell that continuously checks the weight in the platform and limits the operating envelope to match the load chart, all while offering the ability to do zero-load field calibrations. Compared with its predecessor, this model's gradeability has been improved to 45%, making it ideal for rough terrain jobsites. ■

Website: www.genielift.com



RIGHT: Genie S-45 XC boom lift in operation.

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LIEBHERR

BOOTH: FM.809 – 813 / B5.439 / A4.326

The new Liebherr LR 1300 SX crawler crane offers a maximum lifting capacity of 300 t. For heavy loads, the machine can be fitted with a derrick boom in combination with an additional counterweight. The new suspended counterweight no longer has a fixed counterweight radius and instead can be hydraulically displaced.

The Liebherr 'Boom Up-and-Down Aid' assistance system indicates the approach to the tipping border and automatically stops operation before the operator unintentionally enters an unsafe zone. It assists the operator in leaving the danger zone without having to activate the safety bypass switch. The LR 1300 SX is fitted with wind sensors on the main boom and jib. Both the measured wind speed and the actual crane configuration (boom length and boom angle) are taken into consideration when calculating the current hazardous situation for the crane. When the conditions become too dangerous, the system gives a warning. The actual status is visible for the operator in the cabin at all times. At wind speeds of 10-16 m/s, the operator can adjust the maximum lifting capacity through a simple selection on the control panel.

The Ground Pressure Visualisation calculates the current ground pressure of the machine in real time and compares it with the specified safety limits of the relevant position. The ground pressure is displayed in the cab and the operator knows whether the machine is situated in, or is approaching, a critical area.

Three different driving speeds are available. Driving is always carried out in 'Safe Mode' with active Load Moment Limiter, and is dependent on the driving speed. This means the Liebherr crane control system, Litronic, automatically adjusts the lifting capacities to suit the driving speed, when driving with a load on the hook. For barge operation, the lifting capacities are automatically adjusted depending on the inclination of the barge.

According to Liebherr, the LR 1300 SX is approved for personnel lifting. Thanks to the EC type approval certificate of the Liebherr crane for the occasional lifting of persons, local approval from an acceptance authority is no longer required by the crane operator. The statutory emergency generator and emergency controls required for personnel lifting are offered by Liebherr as a simple plug-and-play solution. In case of emergencies, the crane availability can be restored within a few minutes.

In addition, Liebherr will present its new EC-B flat-top series, covering maximum load capacities from 6 t to 16 t and maximum jib head load capacities from 1.6 t to 2.8 t – working at a maximum radius. The first eight cranes in the series include the 125 EC-B 6, 220 EC-B 10, 220 EC-B 12, 240 EC-B 10 Fibre, 240 EC-B 12 Fibre, 340 EC-B 12, 340 EC-B 16 and 370 EC-B 12 Fibre.

Highlights of the new EC-B series are the 240 EC-B Fibre and 370 EC-B Fibre. These cranes are equipped with soLITE high-tensile fibre rope, which has been developed over a period of 10 years by Liebherr and the rope manufacturer Teufelberger.

As well as the fibre cranes offering up to 20% more jib head load capacity when compared to cranes using steel rope, fibre rope also has a four times longer service life than steel rope, said Liebherr. As the fibre rope only weighs around a fifth of steel rope, reeving the hoist rope is significantly easier in terms of handling. Moreover, maintenance is less complicated as the fibre rope does not need lubrication. Operational safety is also increased; the different elements of the rope's outer layer wear out at a different pace – the crane operator knows when it is time to replace the rope (when the red layer underneath the sheath becomes visible).



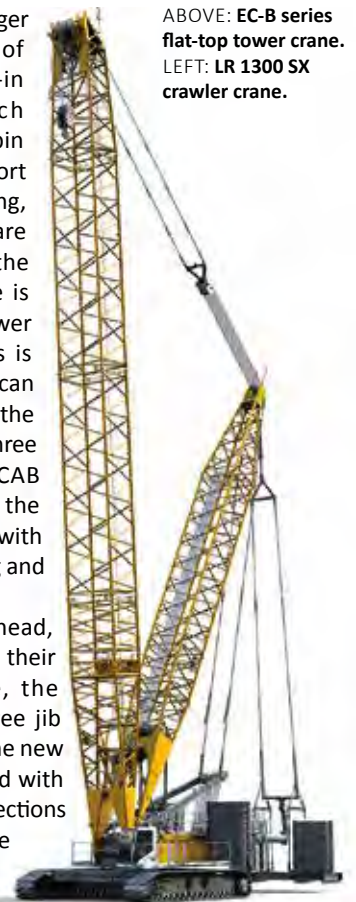
The new LiCAB cabin is larger and also has a greater field of vision. It features a new 12-in multi-touch display, which ensures all devices in the cabin are networked together. Comfort functions such as air conditioning, radio and windshield wipers are also controlled centrally via the new display. Whenever there is an update available for the Tower Crane Operating System, this is indicated on the display and can be loaded with a single tap of the finger. The cabin is available in three options: The LiCAB Basic, LiCAB Air with air conditioning, and the premium LiCAB AirPlus version with air conditioning, double glazing and tiltable side windows.

The new EC-B's compact head, jib and trolley are lighter than their predecessors. Furthermore, the jib is now so narrow that three jib sections fit onto a truck bed. The new cranes have also been designed with optimised quick assembly connections for jibs and counter-jibs, to make assembly even easier and safer.

The new EC-B series makes optimal use of the tower systems' performance capacity. Even the currently largest, new EC-B, the 370 EC-B 12 Fibre, works using the 21 HC 290 tower system with corner posts measuring only 2.1 m.

Liebherr has developed a new tower system, the 12 EC 125, for the 125 EC-B 6 as part of the new series. With its extremely slim corner posts measuring 1.2 m, the 12 EC tower system is particularly suitable for construction sites where a limited amount of space is predicted. The 12 EC tower system comes in two lifting capacities: the 12 EC 100 and the 12 EC 125. ■

Website: www.liebherr.com



ABOVE: EC-B series flat-top tower crane. LEFT: LR 1300 SX crawler crane.

BROKK

BOOTH: FM.713/2

Brokk demolition robots are increasingly used for a variety of tasks at the jobsite, and to meet this demand the company has developed new attachments and upgraded its machines to work well with a wider range of tools.

Some of the attachments include eight high-performance breakers optimised for Brokk robots, which range from 50 kg compact BHB 55 to the powerful 700 kg BHB 705 breaker. At bauma, this product line will be extended.

Brokk has also introduced a full range of drum cutters, the BDC (Brokk Drum Cutter) series, including the BDC 40 for the smallest Brokk 60, BDC 50 and BDC 100 for the mid-range models, and BDC 250 for the biggest machines. These drum cutters are intended to meet the increased demand for Brokk robots in underground applications and the use of Brokk robots to carry out more applications in the construction sector.

At the same time, Brokk has upgraded its demolition grapples, such as the new G32 that is designed for the most compact Brokk models. The grapple features a wider grip of 320 mm and an improved rotating function. Together with the larger model, the G50, Brokk now offers an innovative solution for 'soft demolition'.

There are rock drill attachments as well, which are customised and fully integrated with the control and operation of Brokk robots. The range has been extended with the new TE326 for the new Brokk 300 and Brokk 500. With this latest addition, Brokk has a complete range of rock drills ranging from the small TE160 used on the compact Brokk 110, to the TE360 for the biggest Brokk machines.

In addition, Brokk's subsidiary Darda GmbH has upgraded its concrete crushers. Comprising the CC440, CC480 and CC580, they are designed as a low-noise yet powerful attachment tool for the new Brokk demolition robot series as well as for mini excavators in the 2.5- to 9-t class.


The new Darda crushers feature significantly increased performance with higher crushing power and wider jaw openings. These improvements make it possible to crush thicker and harder concrete slabs, while keeping to the same size and weight segment. All crushers retain their proven options, such as additional crushing teeth or full 360° hydraulic rotation. ■

Website: www.brokk.com / www.darda.de




Brokk BHB 305 breaker (far left), Brokk BDC 100 drum cutter (above), Darda CC480 concrete crusher (left) and Brokk demolition robots (bottom).

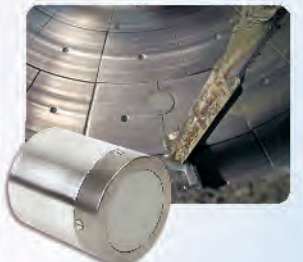




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ENERPAC

BOOTH: FS.1105/1

Enerpac will introduce its new SL200 Super Lift hydraulic gantry. Both the new SL100 and SL200 models offer higher lifting capacities and accurate load positioning on a narrow 610-mm track gauge. Ideal for machinery and industrial moving specialists, these gantries have lift capacities ranging from 100 t to 200 t respectively and feature two stage lift cylinders with a maximum lifting height of up to 4.75 m (SL100) and 6.7 m (SL200). Typical industrial moves applications include: transportation and installation of presses, machine tools, electrical transformers and injection moulding machines.

Designed for safe lifting in confined or limited-access spaces, the new SL gantries are easy to mobilise and demobilise and include self-contained hydraulics allowing quicker and safer deployment. Each gantry leg features self-propelled wheels for travel along a narrow gauge track together with an Intellilift synchronised control system, providing wireless control, unrestricted operator position, and automatic synchronisation for lifting/lowering and travelling.

Additional components and accessories are available such as header beams, lifting anchors, side shifts and skid tracks. There are also tarpaulin covers, transport frames for side shift units, slings and shackles. According to Enerpac, all of its gantries are CE & ASME B30.1 compliant and tested at maximum capacity at maximum extension and tested under witness of Lloyd's Register.

Another new product from Enerpac is the SCJ50 50T Cube Jack. It is designed to provide an alternative to traditional climbing jack systems and works in a similar way to Enerpac's current jack-up system but without the necessary electrical controls. The SCJ50 Cube Jack offers contractors a safer alternative to jack and pack with wooden cribbing, said Enerpac.

The SCJ50 50T Cube Jack also has a significantly smaller footprint, providing heavy lift contractors with a more stable lift up to 2 m and where space is restricted. Safe operation is built-in with the self-locking design. Blocks are stacked manually, with a mechanical lock on the up stroke and down stroke. The operation is incremental; at the end of the up stroke the lock will engage. Once engaged the lift cylinder is retracted and another block is safely added.

In addition, the Enerpac ETR1250 trolley system provides an alternative method with increased benefits over traditional skidding methods. It comprises electrically-driven trolleys that can carry heavy loads along a fixed rail system. Compared with skidding systems, the trolley offers continuous movement allowing for significantly faster travel, said Enerpac.

The ETR1250 trolley system has been successfully deployed on a jack-up vessel for a recent GeoSea Geotechnical & Offshore Solutions project. This involved the movement of 500 t offshore wind monopile transition pieces some 90 m across the ship's deck to within range of the on-board crane for offshore installation.

Along with the latest high tonnage hydraulic cylinders for loads up to 1,000 t, Enerpac will also exhibit its ultra-thin cylinders and multistage cylinders for heavy lifting in confined spaces. The company will showcase new tools designed to complement its bolting range, including new flange alignment tools and line boring machines for maintenance work on large mining shovels.

Furthermore, Enerpac mechanical and hydraulic lock-grip pullers is an ideal solution for removing shaft-mounted parts on construction and mining equipment. Both mechanical (LGM-series) and hydraulic (LGH-series) pullers are offered for pulling small- to



TOP: SL100 and SL200 hydraulic gantries for machinery and industrial movers.

ABOVE: ETR1250 trolley system can carry heavy loads along a fixed rail system.

LEFT: The ETR1250 trolley system was recently used in a GeoSea Geotechnical & Offshore Solutions project.

medium- sized wheels, sprockets, bearings and other similar shaft-mounted parts. The puller's self-centering closing system allows all jaws to move simultaneously, making it easy for a single operator to mount the puller and to perform the application. ■

Website: www.enerpac.com

GOMACO

Gomaco Xtreme three-track Commander IIIx and two Gomaco 3300s with the Gomaco G+ control system will be on display. These pavers feature rotary-sensored slew drives on the tracks, sensed leg positioning, and independent travel circuits to each track to allow tight radius slipforming. Intelligent All-Track Positioning is accomplished with smart hydraulic cylinders on the three legs, which allow G+ to know the position of the tracks at all times. The cylinders are also used for telescoping the mould mounting system for intelligent offset and repeatable mould offset.

The Commander IIIx and 3300 feature Tier 4 engines and optimised cooling packages with G+ controlling the hydraulic fan. The G+ quiet technology make the machines some of the quietest pavers on the market, while adapting the paver's cooling needs to jobsite conditions. It makes for a quiet and efficient paving operation. Improved fuel efficiency is another advantage with a power-optimised engine and load-sensed hydraulic circuits.

The Commander IIIx has a pivoting operator's console that allows the operator hands-on control and a clear view no matter what application is being slipformed or what the direction of travel. Gomaco's 3300 is designed for European-style paving with its right-side and left-side pour capabilities. The 3300 has a symmetrical design, a U-shaped operator's platform and the control console easily slides from side-to-side to accommodate the direction of the pour. Both models are multi-application machines for slipforming curb and gutter, safety barrier, sidewalk, slotted drain, flat slabs, and more.

Gomaco's new GP4 slipform paver, capable of paving widths up to 12.2 m, will also make its international exhibition debut at bauma. The machine has a dual-telescoping roller frame with Smart Cylinders and Smart Telescoping for accurate frame widening and

automatic width reference for easy and accurate steering setup. The modular roller frame telescopes up to 2.1 m on each side for a total of 4.3 m of telescoping ability.

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

In addition, the GP-2400 is Gomaco's smaller, economical slipform paver capable of slipforming widths up to 7.4 m, with 2 m of telescoping ability on the left side. This four-track paver has smart steering cylinders on each leg for dependable steering control with electronic feedback for push-button steering setup and the setting of parameters. The T-beam mounting rail allows for quick and accurate mould positioning, as well as quick mounting and removal of the mould. The GP-2400 has a U-shaped operator's platform for excellent visibility of the entire paving operation. The paver's smaller size makes it popular on projects all across the world. ■

Website: www.gomaco.com



Gomaco G4 (above) and 3300 (below) slipform pavers.



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LINK-BELT

BOOTH: FS.903/3

The 175AT is the newest five-axle all terrain crane from Link-Belt, with a base rating of 150 t. It offers a 60.1-m main boom that is six-sections of pin and latch telescopic boom that rides on Link-Belt's greaseless wear pads, meaning there is no need to grease the bottom of this boom.

The 16.8 m on-board fly has a choice of four manual offset positions or variable offset range from 0° to 45° with hydraulic cylinders. The fly features Link-Belt's innovative approach for erecting and stowing that minimises the number of times a ladder is needed. Three additional 5.4-m lattice boom extensions bring the maximum tip height to 96 m.

Both the operator's and driver's cabs are completely new with Link-Belt's Pulse 2.0. Comfort and convenient features include automatic climate control, Bluetooth radios, heated and ventilated seats, and a comprehensive vision and lighting packages.

The 175AT is fitted with a 398.9 kW Cummins QSX15 engine. The chassis features all-wheel ABS disc brakes, engine and powertrain braking, eight-wheel drive, and speed dependent all-wheel steering. At the jobsite, five steering modes and low speed travel gears makes it easier to manoeuvre into position. There are 81 outrigger positions to choose from with 78 of those being asymmetric V-CALC (Variable Confined Area Lifting Capacities) positions.

Another new feature of the 175AT is the counterweight detection system (CDS). The counterweight is weighed as it is being lifted off the carrier deck. All the operator needs to do is verify the amount is correct. For easy transportation, the 175AT weighs around 60 t fully equipped with 5 t of counterweight. So two overflow

trucks are considered more than enough to carry matting, rigging and the remaining counterweight.

The 235-t TCC-2500 is Link-Belt's most recent addition to its telecrawler lineup, with a Tier 4 Final Cummins QSL 9 diesel engine and seven-section formed boom. According to the company, customers are notably impressed by the TCC-2500's controls, how smoothly it handles 62,000 kg nacelles for the wind sector, can roll panels for tilt-panel applications or how easily and quickly it can suck in its boom and travel under overpasses and power lines. The crane also provides an outstanding reach in industrial applications where it is required to reach out at 80.7 m radius with 35.6 m jib, offset 45° to lift material into a small working area.

A highlight of the TCC-2500 is its ultra-wide matching front and rear winch design. The wider design allows the winch to handle its maximum permissible line pull through the fourth layer. The rear auxiliary winch can be removed for transport weight reduction and a power pinning system mitigates work at height exposure.

In addition, Link-Belt's new 90-t 100RT rough terrain crane has a five-section 12.3 – 47.2 m full-power formed boom. An available two-piece, 10.7-17.7 m on-board offsettable fly provides greater flexibility and range, and manually offsets at 0°, 15°, 30° and 45°. A 4.9 m lattice insert extension offers a maximum tip height of 72.2 m.

The 100RT is the first Link-Belt rough terrain crane to utilise new fly erection technology from the company's latest telescopic truck and telescopic crawler cranes. A fly assist cylinder makes erecting and stowing the fly a one-person operation



100RT rough terrain crane.

and minimises work at height. Boom head speed screws and numbered spring loaded latches provide intuitive assembly. Given the natural elevation of a rough terrain crane boom, Link-Belt has simplified fly assembly with new ground level carrier controls. One control raises and lowers boom angle from 10° to -3°, and another control is used for the fly assist cylinder.

The 100 RT's six-speed transmission is powered by a dual compliant Cummins Stage V/Tier IV QSB 6.7L 173 kW - but a Cummins Tier III QSB 6.7L 179 kW diesel engine is available. The crane is also equipped with Link-Belt's V-CALC system featuring 81 different outrigger configurations with real time 360-degree charts. ■

Website: www.linkbelt.com



175AT all terrain crane (left) and TCC-2500 telescopic crawler crane (above).

SKYJACK

BOOTH: C4.515

Skyjack will showcase its DC scissors, an electric rough terrain scissor lift, articulating booms and the first models in the next generation of DC and rough terrain scissor lifts. The company will also give updates on its off-highway telematics solution (Elevate) and Stage V emissions standards.

One of the highlights is the SJ9253 RT, a key part of Skyjack's new line of full size rough terrain scissor lifts. This new model, with a working height of 17.98 m, will maintain main features found on Skyjack's current SJ9250 RT such as an axle-based drive system, rigid scissor stack, oversized platform with a 680 kg capacity (available with single or dual extension decks), and easily accessible serviceable components.

According to Skyjack, one big difference between the two models will be an additional 3-ft of platform height. The new range of full size rough terrain scissor lifts will also feature more commonality across



Skyjack SJ85AJ articulating boom (left) and SJ9253 RT rough terrain scissor lift (below).



the line (ie. same platform, base, drive train), and an enhanced version of Skyjack's SkyCoded control system. This provides Elevate customers with the opportunity to get additional telematics data points and self-diagnostic communication. ■

Website: www.skyjack.com

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HERRENKNECHT

BOOTH: C3.547

With E-Power Pipe, Herrenknecht has developed a new method to quickly and securely install small-diameter cable protection pipes underground over long distances of more than 1 km. The company said this system has purposefully modified and further developed proven drilling technologies so that in the future, underground cables can be installed trenchlessly and close to the surface at a depth of between 2 m and 4 m with minimal intervention in the landscape.

At the heart of the system is the AVNS350XB, a fully remote-controlled tunnel boring machine (TBM) with an excavation diameter of 505 mm and is designed for drive lengths of more than 1,000 m. The machine can keep to the planned alignment with high precision and thus cross safely under existing infrastructure such as pipelines, roads, railways or smaller bodies of water. Individual boreholes can be placed a small distance apart of only 1 – 2 m, so several lines can be installed in parallel.

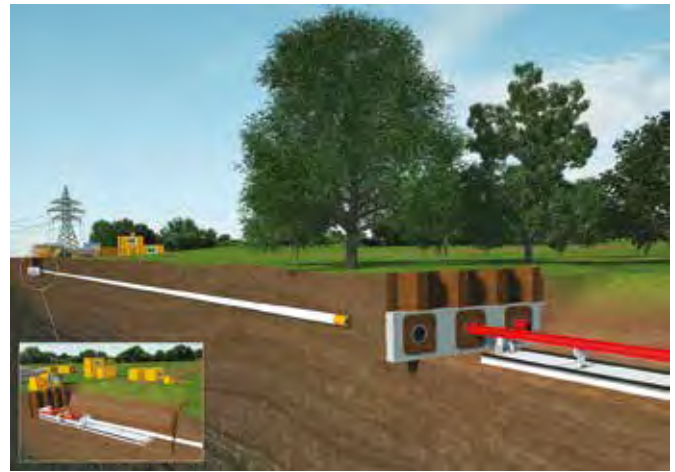
The tunnelling machine is equipped with a jet pump and an integrated hydraulic power unit. With conventional methods, space restrictions limited muck removal over longer sections and as a result also limited the drive lengths possible, said Herrenknecht. Through the use of the jet pump for transporting the muck, up to 10 times longer tunnelling distances can be achieved at high speeds in the small diameter range.

At the starting point, a newly developed push and pull unit is installed and its thrust is used to push the jacking pipes and the TBM along the specified route in the direction of the target point. The borehole remains securely supported by the machine and the jacking pipes the whole time. After breakthrough at the target point, the TBM is separated from the jacking pipes. Subsequently, the prefabricated cable protection pipe is connected to the jacking pipes still located in the borehole and pulled back and thus into the borehole by the push and pull unit in the launch shaft at the other end. After installation of the protection pipe, the E-Power Pipe mission is complete. Final insertion of the underground cables is carried out by appropriately specialised companies.

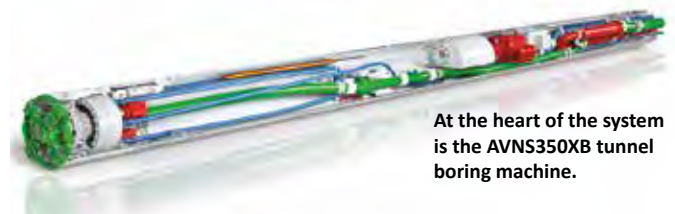
The method innovation involved the development of new, extended jacking pipes that allow a much more continuous advance. Herrenknecht also developed a push and pull unit with a 10 m stroke and a push and pull force of 350 t specifically for these jacking pipes. The technology is based on a rack and pinion guide, powered by electric motors. As a result, the innovative concept ensures higher installation performance and greater acceptance thanks to lower noise emissions.

According to Herrenknecht, E-Power Pipe has already been successfully demonstrated in pilot projects. Daily best performances were achieved of 184 m during tunnelling and 266 m when the protective pipe was pulled in. The development of the method received funding from the Federal Ministry of Economics and Energy (BMW research project IBoTec) and was carried out by Herrenknecht in cooperation with Amprion GmbH and RWTH Aachen.

The installation of underground cables using E-Power Pipe is a ground-conserving alternative to the conventional open-cut method. Due to the trenchless installation method, earth movements are reduced at the places where HVDC cables have to be connected later. This can mean a reduction of about 90% in relation to the entire alignment, revealed Herrenknecht. Installation takes place without any environmental impact over



E-Power Pipe is an economic and environment-friendly trenchless installation method for underground cables, developed by Herrenknecht.



At the heart of the system is the AVNS350XB tunnel boring machine.



ABOVE: In the pilot projects, the E-Power Pipe method delivered daily best performances of 184 m during tunnelling and 266 m when the protection pipe was pulled in.

LEFT: The third pilot project with E-Power Pipe is currently taking place near Bacharach in Germany.

long distances, since the surfaces and the soil structure are left largely untouched. The use of construction machinery and trucks is also significantly reduced in this way, as are noise and emissions.

The E-Power Pipe method has been nominated for the bauma Innovation Award 2019 in the 'Machine' category. ■

Website: www.herrenknecht.com

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SENNEBOGEN

BOOTH: FM.712

The new Sennebogen 6133 telescopic crawler crane has a maximum capacity of up to 130 t and boom lengths from 12 m to 52 m. It is now fitted with a six-piece boom, a 194 kW Tier V diesel engine, two powerful 125 kN winches and a Maxcab comfort cab that can be tilted by 20°. The crane's vertical reach can be extended to almost 70 m with an optional 15 m fly boom.

With the telescopic crawler undercarriage, it can be retracted to a total machine width of less than 4.0 m for transport and travel. When extended, the crane delivers excellent stability and good manoeuvrability thanks to its 6.30 m track width.

Featuring a self-assembly system, the 6133 E can be set up and taken down in just a few steps, within a short time and without the need for an auxiliary crane, said Sennebogen. The 6133 E is not only easy to manoeuvre on the construction site, it is also easy to load. Once the travelling gears and the ballast have been dismantled, the transport width is only 3.0 m.

Sennebogen has upgraded its 5500 crawler crane as well, now having a maximum capacity of up to 200 t and is powered by a 283 kW Tier V diesel engine that drives the two 160-kN winches. Thanks to its robust Star Lifter crawler undercarriage, the machine is not only stable, it can also be conveniently driven under load. Depending on the boom configuration, the working load values can be increased by between 15% and 50%, as a result of the newly developed and strengthened boom construction and the increased ballast.

A modular boom design allows numerous equipment variants with lengths of up to 104 m, including luffing jib. The crawler tracks can be easily removed for transport, after which the base machine, at just 3.0 m wide, can be easily transported. All further components are designed so that they can be stowed in containers or tarpaulin-covered trucks in a space-saving way. With its self-assembly system, the Sennebogen 5500 can be assembled quickly.

In addition, the Sennebogen 355 E telehandler is designed for challenging and constant use. A notable feature is the Z kinematics of the boom head, similar to that of wheel loaders. This greatly increases the breakaway torque as part of bucket operation. The machine is purposely geared towards a multi-functional machine in terms of wheel-loader operations and is more than just a traditional telehandler.

For operator comfort, the 355 E telehandler provides an air conditioned, temperature-controlled cab. The standard reversible ventilators ensure the engine stays clean and ready-to-use, and guarantees reliability even in unfavourable environmental conditions.

Sennebogen is also offering its 870 E demolition material handler with either the original 33-m-long attachment or the longer 36-m version with a maximum capacity of 4 t.

The new, longer attachment consists of a 19.5 m basic boom with a quick-change facility and a 2.5 m intermediate boom, along with the 12.5 m stick with reversing mechanism. This gives the equipment an overall vertical reach of 36 m and a boom range of 20 m. The demolition machine can handle loads of up to 4 t with ease across the entire working range.

Thanks to its telescoping crawler undercarriage, the 4.2 m and 2.6 m tracks can be adjusted. The attachment and the rear ballast can be removed in order to transport the 155-t machine, thus reducing the transport weight to 66 t. ■

Website: www.sennebogen.com



Sennebogen 5500 crawler crane (right),
6133 telescopic crawler crane (below)
and 355 E telehandler (bottom).





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AMMANN

BOOTH: FS.909

Among the highlights at Ammann booth is the ARX 91 articulated tandem roller, which utilises high compaction output to make quick work of thick or thin asphalt layers in fewer passes. The output is provided through a combination of drum dimensions, frequencies and amplitudes. Applications include medium and large jobsites, including paving projects related to infrastructure, such as roads, airfields, harbours and parking lots.

The ARX 91 has a weight of 9 t, maximum working speed of 7 km/h, maximum travel speed of 12 km/h and gradeability of up to 40%. It is powered by a Cummins BS-III/Tier 3/Stage 3A engine. The machine's propulsion system features an efficient hydraulic system, traction control and speed sensors. This enables smooth starts and stops that improve asphalt mat quality.

The location of the engine in the rear of the roller is another advantage. It helps drive vibration away from the operator and towards the compaction target. It also improves visibility and redirects heat from the operator, thereby increasing comfort.

The ARX 91's electronic joystick controls are intuitive, making it easy for operators to use the machine. A tight turning radius improves operator control and manoeuvrability. A large water tank (1,000 l) minimises the need for refills.

Ammann Compaction Expert (ACE), Ammann's proprietary Intelligent Compaction system, is available as an option on the ARX 91. ACE monitors density and provides feedback, helping to reduce the number of passes. It also eliminates both overcompaction and undercompaction and reduces fuel consumption.

In addition, Ammann ABC ValueTec asphalt-mixing plant is built to provide efficiency – and ultimately reduce costs and improve profits. It is suitable for business owners who want straightforward processes and the ability to further customise with options. According to Ammann, the plant offers the lowest product life cycle cost of all products in the segment and customisation enables the use of 25% to 40% recycled asphalt.

Key to the plant is the intuitive CS100 control system, which provides efficiency during production and also delivers built-in statistical reports to uncover cost-saving opportunities. A compact, modular four- or five-bin feeder ensures quick transport and assembly, and the plant's small footprint allows it to fit into tight spaces. The quality of mix is consistent from the feed stage thanks to a large storage capacity. Frequency controlled conveyors extending to the drum inlet chute ensure hassle-free material delivery. The fully modulating burner features a simple, easy-to-adjust mechanism to set the air/fuel ratio for precise combustion and emissions control. The burner combines with the baghouse to ensure suspended particulate matter (SPM) levels are within limits and the carbon footprint is minimal.

The plant's direct-coupled gear motors add value by reducing fuel and maintenance costs. Quality is boosted through a screen that uses vibratory motors, providing uniform distribution of aggregate on the screen mesh surface. Circular material movement and transverse transport between the two shafts ensure thorough mixing.

Ammann will also showcase its RSS 120-M, a mobile machine that prepares recycled asphalt for use in an asphalt plant. It is essentially a 3-in-1 machine that functions as a shredder, iron separator and screener. It is ideal for recycling asphalt that ranges in size from millings to larger pieces/slaps. The machine can go from installation to production in as quickly as 30 minutes, said Ammann.



ABOVE: **ABC ValueTec** asphalt plant.



LEFT: **ARX 91** articulated tandem roller.

BELOW: **RSS 120-M** shredder, iron separator and screener.



A single operator can run the RSS 120-M, which is comprised of a shredder that utilises two low-speed, electrically driven shredder-rotating shafts. The machine features milling cutters with interchangeable teeth that crush the material. This technology significantly reduces the power requirement, which leads to substantial fuel savings. The technology also enables crushing of hard and soft materials, such as clays, and can perform in all types of weather.

The electric motors ensure consistent crushing and screening, regardless of the working environment. The RSS 120-M is able to process up to 180 t of recycling materials per hour. A variety of green efforts are built into the machine, including a dust reduction system and minimised sound and emission levels. ■

Website: www.ammann-group.com

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TEREX CRANES

BOOTH: FM.711

Terex Cranes will officially launch its new 10-t-class Terex CTT 202-10 flat top tower crane. It can be configured with H20, TS21 and TS16 masts, offering from 1.6- to 2.1-m widths, so customers can efficiently manage component inventory while cost-effectively meeting tower height needs. The crane has three chassis options, budget to performance, with 3.8-m, 4.5-m and 6-m base selections.

The CTT 202-10 features nine different jib configurations - from 25 m to 65 m - to meet varying jobsite needs. With its competitive load chart, the crane delivers a maximum 10-t capacity at a length reaching 24.2-m, depending on jib set-up, and can hoist up to a 2.3-t load at the maximum 65-m jib length. The Terex Power Plus function will temporarily allow for an increase of the maximum load moment under specific and controlled conditions by 10%, giving the operator extra lifting capacity during those conditions.

A fully adjustable comfort seat and joystick controls with short stroke length provide a comfortable work experience throughout long shifts. Built-in heating and air conditioning maintain consistent cabin temperatures, regardless of working in below freezing winter temperatures or the heat of summer. The large, full-colour 18-cm display with anti-glare screen delivers operating and troubleshooting data to the operator.

Hoist, slewing and trolley speeds are designed so operators can move and position heavy loads efficiently and precisely. The CTT 202-10's new control system features expanded configuration options, allowing the crane to quickly adapt to different jobsite needs. The controls package includes the Terex Power Match system that gives the operator the choice between operating performance or lower energy consumption to fit lifting needs.

Depending on tower configuration, the CTT 202-10 has a maximum under hook height of 76.7 m and provides a competitive maximum crane height to shorten erection time and lower costs at the jobsite. Optimised for transport, all tower segments come preassembled with durable aluminium ladders for efficient erection. Each jib section features an independent lifeline to aid with safe work at height installation, and the galvanised jib walkways deliver increased operating longevity.

The CTT 202-10 can be equipped with a radio remote control to increase operating efficiency, allowing the operator to work remotely when necessary. The crane is built ready for installation of available zoning and anti-collision systems and cameras and the next generation of Terex tower telematics, T-Link. According to Terex, the CTT 202 will also be available with an 8-t capacity version (CTT 202-8).

In addition, Terex will exhibit a full range of Demag cranes as well as its rough terrain range with updates for the Terex RT 90.

The company will also give a preview for what its customers can expect for all other models in the future. ■

Website:
www.terex.com/cranes



Terex will officially launch its CTT 202-10 flat top tower crane.



Other cranes to be shown include Demag AC 45 City crane (above), Demag AC 300-6 all-terrain crane (below) and Terex RT 90 rough terrain crane (below left).



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ELEMATIC

BOOTH: B1.323

Elematic's new automatic Plotter E9 makes hollow core slab production process fast and accurate, resulting in substantial cost savings. It comes with a simple touch screen that meets the needs of the machine operator. The plotter marks cutting lines, rectangles and circles for openings and reservations as well as identification texts and codes on the cast slab surface. It also marks places for dividers and fittings on an empty bed surface. Both longitudinal and crosswise text printing can be achieved.

A new level of plotting accuracy is reached through a direct transfer of slab design details file from the design software (such as Tekla Structures BIM) to the Plotter's FloorMES machine control system. The transfer takes place via a wireless remote link connection without any manual interventions, which removes the risk of human errors from this stage in the process. Further improving the plotting accuracy is the continuous laser positioning along the casting bed. The accuracy of the laser is +/- 1 mm.

Plotter E9 is operated via a simple 15.6-in touch screen designed to meet the everyday plotting tasks in precast concrete plants. The screen shows the slabs on beds, and on-bed quick re-planning allows the operator to: check and edit the data on machine if needed, remove faulty slab sections, define a new starting point, and remove geometry.

The screen also shows work status such as start time, slab no., tasks and elapsed time, alerts and remaining battery power and ink levels. It is easy to use; users can zoom and drag and drop items similar to any other smart device. The user interface is available in English, Russian and Finnish as standard. Any other language is available as an option.

For safe operation, the plotter has light sensors on both buffers and also ultrasonic sensors. The machine stops automatically at any hinders on its way, and is equipped with light and sound alarms. No cables are needed as the plotter is battery-operated. A fully charged battery lasts 16 hours, or one to three days, depending on the beds and machine usage, said Elematic. Automated waterhole driller is available as an option.

There are several other features for easy maintenance of the machine. These include on-screen quick adjustment and calibration and clog-resistant print head. The machine is ready for remote troubleshooting and support via a WiFi link (network connection required).

In addition, the WallMES system is part of Elematic's new, advanced plant control solution for precast production, and will cover automatic production planning, work follow-up and quality control of precast wall production. The system can also take panel design information in directly from BIM systems such as Tekla Structures.

Elematic's WallMES system optimises the panel production and gives a variety of tools for planning and monitoring. The company said the main objective of the manufacturing execution system (MES) is to achieve smooth, continuous production and low operational costs as well as to ensure high quality of precast wall panels.

Elematic also offers precast wall producers an opportunity to take a virtual look at an example production line. The company pointed out that in the near future, 3D virtual models will be likely used for the engineering process right from the very beginning. Thus, understanding the big picture, how everything will work as a whole and seeing even the smallest details at the same time will make successful plant layout design easy.



ABOVE: Elematic's automatic Plotter E9 for fast and accurate hollow core slab production.

LEFT: The plotter marks cutting lines, rectangles and circles for openings and reservations as well as identification texts and codes on the cast slab surface.



Elematic also offers the WallMES system, which provides automatic production planning, work follow-up and quality control of precast wall production.

Furthermore, the all-new Elematic Extruder E9 will provide high casting speed aided by individual feed screw motors, second generation automatic compaction control and sophisticated bouncing prevention. In addition to the standard hollow core slab production, the new design of the machine will enable casting of a variety of precast slabs such as filler slabs, wing slabs, solid slabs and piles and poles.

Equipped with an advanced touch-screen user interface, added intelligence and a smart concrete recycling option, the new Extruder will also deliver a new kind of modern user experience and significant material savings without any slowdowns to production. With the new launch, Elematic Extruder family now consists of three different models: S5, P7 and E9. ■

Website: www.elematic.com



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MANITOWOC

BOOTH: FS.1201 - 1202 / 1302.1

One of three new Grove models from Manitowoc - two of them will be unveiled at the show - is the GMK3060L all-terrain crane, the successor to the three-axle GMK3060. The new machine is based on its predecessor's design but has a longer boom (48 m instead of 43 m). It features compact dimensions that allows it to access tight jobsites, manoeuvre easily around city centres, and even work indoors.

According to Manitowoc, the chassis of the new GMK3060L is almost as compact as a two-axle model and up to 1 m shorter than competitive three-axle cranes, with a carrier length of only 8.68 m and a minimum overall height of 3.48 m with the suspension fully lowered. The GMK3060L offers a longer, 48 m seven-section Twin-Lock hydraulic pinned main boom and boasts significantly stronger load charts.

The new crane is also equipped with Manitowoc's Crane Control System (CCS), as well as a boom configurator feature. As a result, operators can input basic lift parameters such as load, radius and load height, and the system automatically provides optimal boom options for performing the lift. This saves time at the jobsite and makes the setup process much easier. The crane will also feature the MAXbase option for variable outrigger settings and increase load charts in certain working ranges.

The Cummins QSL9, a 254 kW six-cylinder in-line diesel engine, powers the GMK3060L. It will be available in both Euromot III/Tier 3 and Euromot V/Tier 4 Final variants to cater for all markets. The crane will include a ZF TraXon automatic transmission, giving it 12 forward-speed options and two reverse.

As for Potain line, Manitowoc has also developed new models - which will be unveiled at the show. Along with this, the company will showcase its Potain Hup 40-30 self-erecting crane, which features a 40 m jib and boasts 16 configurations, making it suitable for various applications. The crane has a maximum capacity of 4 t, while it can lift 1 t at its jib end of 40 m.

The Hup 40-30 is fitted with a telescopic mast for a range of working heights. This design boosts the height under hook attainable by the crane to 25.6 m in its 'low position,' and 30 m when extended to its greatest height.

Further versatility is delivered with the crane's luffing jib that offers three positions: horizontal, 10° and 20°. These options give the crane a height under hook range of 20 m to 40 m. Shortening or extending the jib is a swift and straightforward operation, with the Hup 40-30 offering convenient configurations for both short and long jib lengths. With a transport package that is only 14 m long when folded, the Hup 40-30 is also easy to move from jobsite to jobsite.

Operator efficiency on the Hup 40-30 is maximised through Manitowoc's remote control unit. This remote system has three selectable profiles for operators that vary the working speed of the crane to suit the application: 'dynamic,' for quick and easy lifting; 'standard,' for typical lifting applications; and 'high precision,' for precise load positioning.

The Hup 40-30's hoist unit features Potain's High Performance Lifting (HPL) technology that can deliver unparalleled lifting speeds on the jobsite. The crane is able to deliver this maximum speed as soon as it's configured on the jobsite, thanks to its standard four fall rope configuration. The crane's High Performance Slewing (HPS) technology enables load moment optimisation, even as the crane swings. Integrated maintenance



Grove GMK3060L all-terrain (above) and Potain Hup 40-30 self-erecting cranes.



warning indicators also monitor this mechanism, and can provide valuable diagnostic information at a moment's notice.

What's more, the Hup 40-30 is equipped with a Power Control function that enables it to work on a variety of jobsites. Thus the crane is able to operate via a wide range of power inputs, including from low-level power supplies. This versatility means that the user may not have to provide additional power supplies, which could lower both the costs and preparation for many projects. ■

Website: www.manitowoc.com



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JLG

BOOTH: FS.904/5

JLG will showcase its R-series scissor lifts, including the new 2632R and 3246R. The 2632R has a platform capacity of 230 kg and a working height of 9.8 m, while the 3246R offers a platform capacity of 320 kg and a working height of 11.75 m. Following the advantages of the R-series scissor aerial work platform family, both platforms are made entirely of all steel components while a swing-out tray for battery and hydraulic system adding to greater serviceability.

The JLG light weight electric scissor lifts feature dual front-wheel drive electric engines, providing better endurance and performance. The front wheel steering system enables a zero turning radius, not only ensuring that the platforms meet the requirements of narrow space in constructions and improving platform manoeuvrability, but also enabling the equipment to fit in freight elevators. The design concept of this series is similar to that of the R-series scissor lifts, resulting in easy maintenance and thus reducing the total cost of ownership.

JLG will launch its electric 340AJ, 450AJ and 520AJ construction booms, offering similar lift speeds and platform capacities. Equipped with two-wheel drive and lithium batteries, the range provides good terrain capacity in semi-rough terrain. Maintenance and parts requirements are limited, which is considered a benefit of electric drive over conventional diesel, i.e. no filter replacements or engine maintenance is needed, simply because there are none.

As for safety innovation, JLG will release its SkyGuard SkyEye enhanced control panel protection system as an option on its boom lifts. This system uses sensors to register operation in the platform. If the operator breaks the connection between the sensors positioned on each side of the operator platform, the system stops all boom lift functions, then momentarily reverses or undoes most functions that were in use when the system was activated. The reverse functionality is said to be the only feature of its kind in the market.

Another notification feature on display is JLG's Enhanced Detection System (EDS). It uses strategically placed object detection sensors to detect obstacles in the surrounding environment. Audible and visual warning signals are triggered if and when the machine is getting close



JLG 2632R and 3246R scissor lifts.



JLG light weight electric scissor lifts.



FAR LEFT: JLG will launch its electric construction booms at bauma.

LEFT: The SkyGuard SkyEye enhanced control panel protection system will be offered as an option on JLG boom lifts.

to an obstacle. If the operator platform gets too close to an obstacle, the device automatically stops the machine.

JLG will also introduce its augmented reality equipment simulation app, allowing users to bring digital aspects of JLG equipment into the real world. With this tool, customers and equipment demonstrators are able to use access equipment in any working environment and at any working height without having to bring physical equipment on site.

One other technology that will be demonstrated is a mobile control app on the R-series scissors. The app allows operators to control equipment remotely, pairing any smart phone with the scissor via a QR code and Bluetooth. The mobile control app helps operators manoeuvre

equipment in tight spaces, through doors and during loading and offloading for transport, avoiding potential hazardous situations.

In addition, all JLG engine-powered boom lifts can now be equipped with a 3-ft platform. The smaller platform allows workers to access jobsites with limited space where traditional platforms can't fit, leading to more precise navigation between steel, concrete support structures and many other tight space applications. Apart from the 3-ft platform, JLG three-entry standard size platform has been developed with two additional entry points (centre and right side), giving flexible entry or exit when materials or multiple workers are brought up to working height. ■

Website: www.jlg.com

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LIUGONG

BOOTH: FM.F4/417

The new LiuGong 909ECR excavator has an operating weight of 8,900 kg, maximum digging reach of 6,847 mm and maximum digging force of 63 kN. It is equipped with a Stage IIIB engine that delivers 44 kW (@ 2,200 rpm), and standard bucket capacity of 0.28 cu m. Providing excellent stability, this compact radius machine is a highly versatile tool carrier, enabling it to use a wide variety of attachments, ranging from buckets to hammers, in road and inner-city applications.

For heavy demolition applications, LiuGong offers its new 950 demolition excavator. The machine has an operating weight of 64,320 kg, maximum working pin height of 30 m, maximum pin reach of 17 m and maximum attachment weight of 3,000 kg. Positive customer feedback focuses on the machine's improved stability and stronger 30-m-long reach boom, said LiuGong. The design of the attachment group also allows changing of standard equipment to high reach equipment and vice-versa in 30 minutes or less.

Operator comfort and safety are top priority in this demolition excavator. The cab is modified by replacing the front window screen with five-layer laminated glass, and the same modification has been applied to the roof glass. The front and roof glass are then butt joined to the front screen to give unsurpassed upward vision for the operator when working with the attachments. Thanks to increased visibility with the tilted cabin, a ROPS/FOPS certified cab and standard rear-view camera, the operator can focus on the job with confidence.

The new LiuGong 4180D motor grader offers 324° panoramic visibility owing to an innovative 5 post cab with a single C-pillar, a completely new cab interior that sets the benchmark for comfort and efficiency. New impact resistant materials have also been introduced to provide better weight distribution and increase recyclability. In addition, access for routine maintenance has been improved to reduce downtime. The machine has a blade width of 3,960 mm, operating weight of 15,500 kg, maximum drawbar pull of 84 kN and maximum travel speed of 42 km/h.

The LiuGong 848H wheel loader with new Ergo transmission delivers multi-tool flexibility with maximum power, minimum emissions and a safe and comfortable operator environment. It features an operating weight of 15,500 kg, breakout force of 129 kN, standard bucket capacity of 2.7 cu m and dump clearance of 2,840 mm. The new Cummins QSB6.7 engine combined with a wet axle and a five-speed transmission, with a lock-up clutch torque converter as standard, complies with Stage 4 regulations. Advanced load sensing hydraulics and auto shift transmission ensure rapid cycle times. Productivity is further enhanced by LiuGong's quick coupler that enables fast and easy swapping of attachments.

LiuGong will also introduce its 856H wheel loader. The machine's carrying and V cycle speeds are consistently high due to the stage V engine, wet axle, five-speed transmission and standard lock-up clutch torque converter. Ergonomically designed joystick further enhances the operator comfort and increases total productivity. Silicone oil shock absorbers improve the ride quality over the roughest terrain and help prevent material spillage. The 856H offers an operating weight of 21,200 kg, breakout force of 175 kN, dump clearance of 4,021 mm (side dump) / 2,894 mm, and bucket capacity of 2.5 cu m (side dump bucket).

For applications that require heavy lifting, the LiuGong 890H wheel loader will come in handy. The Cummins Stage 4 engine



FROM TOP: LiuGong 909ECR excavator, 856H wheel loader and 4180D motor grader.

is designed to develop more power at low speed, maximising torque output. The power shift transmission and advanced load sensing hydraulics combine to provide superior breakout force with speed and agility. Efficiency is increased further by the Intelligent Power Cut Off function, which improves braking and supports the hydraulics in reducing fuel consumption.

The 890H also provides better safety and comfort for the operator, including enhanced dust filtration, which significantly improves the cab environment. The machine features an operating weight of 30,800 kg, breakout force of 245 kN, dump clearance of 3,330 mm and bucket capacity ranging from 4.5 cu m to 9 cu m. ■

Website: www.liugong.com

bauma



Experience The Chinese Equipment on bauma Munich Booth No. : C6-302

Over the past decade, Chinese infrastructure construction including transportation, energy and municipal facilities has ranked highly for quality and efficiency in many projects built around the world.

Many of the builders of these projects have utilized Chinese-made construction machinery, which offers not only competitive price but also great performance.

There are more than 20 leading manufacturers in China, including XCMG, Zoomlion, Sany, LiuGong, Shantui, SinoMach, Sunward, NFLG, Yongmao, CRCHI, CREEG, who produce a wide range of lifting machinery, earth-moving machinery, concrete machinery, road building machinery and tunnel machinery, which has played a significant role in infrastructure construction in China as well as Asia, Africa, Latin America and Middle East.



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**Meeting Room C54 Booth No. :
2nd Floor of Hall C5 C6-302**



CATERPILLAR

BOOTH: FM.709/1 / B6.102 - 106 / A4.336

Caterpillar, along with its German dealer Zeppelin Baumaschinen GmbH, will display 64 machines, 20 of which are new introductions. The company's Next Generation excavators - the new Cat 330 GC, 330 and 336 - will be among the highlights. The 330 and 336 are equipped with integrated Cat Connect Technology that can increase operating efficiency up to 45%, compared with conventional grading operations, and can enhance fuel efficiency as much as 20%, compared with predecessor models.

Five new Cat Next Generation mini hydraulic excavators will include 301.5, 301.6, 301.7 CR, 301.8 and 302 CR. Features include joystick steering (stick steer) and a tilt-up canopy or cab, as well options such as air conditioning and expandable undercarriages. Three new models will also be available, including 308 CR VAB, 309 CR and 310.

The wheel loaders will comprise 950 GC, 950M, 962M waste handler, 986K and 992K, plus several XE models (966M XE, 972M XE and 988K XE). The 988K XE is said to be the company's first diesel/electric-drive loader, employing a durable switched-reluctance drive motor, generator and inverter, coupled with a mechanical gearbox and axles. The 966M XE and 972M XE are equipped with the Caterpillar parallel path drive system, which combines hydrostatic drive with a parallel mechanical-gear path to provide a continuously variable transmission that delivers flexible ratios to run the engine at proficient operating levels. The XE technology on the 966M XE and 972M XE offers up to 35% more fuel efficiency, compared with wheel loaders with conventional powershift transmission, said Caterpillar.

There will also be a concept compact wheel loader, the zero-emission 906 powered by a lithium-ion battery with an electric drivetrain; plus the 907M, 908M, 918M with a waste configuration, 926M in an agricultural configuration and 938M wheel loaders; 444 backhoe loader; 226D skid steer loader; 259D compact track loader; and TH408 telehandler.

The Cat D6 XE is believed to be the world's first high-drive electric drive dozer offering up to 35% better fuel efficiency than its D6T predecessor and the quick dirt-moving ability of constant power to the ground. The Cat AP555F is a mid-sized, rubber track paver that excels on highways, streets and other urban work sites. The machine features advanced, easy-to-use control technology and quick-heating SE50 VT electric screeds that boost productivity of the machine and crew. It features the Cat Mobil-Trac rubber track undercarriage, which delivers high travel speed, excellent flotation, superior traction and excellent mobility.

The Cat PM310 cold planer will also be present, which is ideal for small-to-medium jobsites and offers three drum sizes, wheel or track undercarriages, and articulating right-rear leg for right-side flush cutting. Features include advanced controls and system integration, as well as a full range of options. Machine performance is enhanced with Cat System-K rotors to produce a smooth, professional finish and to deliver long wear life.

For users of off-highway trucks, on display will be the 90-t 777G hauler with a Cat C32 engine rated at 945 hp with US Tier 2 equivalent emissions. The machine provides customers a choice of bodies: the 60.1 cu m dual-slope body is designed for maximum material retention on grades and has two side-board configurations available for light material, as well as a rubber liner; while the X-body is designed with a flat floor to better meter material into a crusher and is available with either steel or rubber liners.



ABOVE: **Next Generation 336 excavator.**

LEFT: **Next Generation mini excavator.**

BELOW: **PM310 cold planer.**

BOTTOM: **D6 XE electric-drive dozer.**



Cat articulated trucks will be represented by the redesigned 730, weighing 22% less than its predecessor, the 730C, yet retaining 98% of its predecessor's capacity. The machine features automatic control of traction, dumping and retarding, as well as the Caterpillar Stability Assist system. ■

Website: www.cat.com

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BAUER

BOOTH: FN.520

Apart from the core range of Bauer rotary drilling rigs, the MC series of duty-cycle cranes, diaphragm wall technology with cutters and grabs, Bauer's subsidiaries - Klemm, Prakla, Hausherr, RTG, ABS Trenchless and MAT - will also be exhibiting their equipment and systems.

Bauer ValueLine machines are specifically used for kelly drilling applications. The BG 15 H is a new model, which is available in two different configurations. The standard model offers a drilling depth of 32 m and the option of 'drilling under the mast', while the upgraded version provides the option of a drilling depth of up to 44 m and the CFA method.

A highlight of the BG 15 H is its BT 50 base carrier, which now delivers a whole range of benefits even for small machines. The integrated service platform allows easy access to all maintenance and service points in the upper carriage, and at the same time it meets the highest standards in terms of occupational safety. The drilling rig also brings a new level of comfort to servicing: a deep centre tunnel ensures a transport height of just 3.3 m and also serves as a service tunnel. This means that all maintenance and service points can be accessed conveniently from both sides.

Bauer PremiumLine drilling rigs focus not only on high-tech kelly drilling, but also on multifunctional applications for a wide range of challenges in specialist foundation engineering. The BG 23 H, BG 33 and BG 45 models are fitted with various attachments and tools, and feature the Energy Efficient Power (EEP) technology.

The BG 23 H and BG 33 will be shown on new base carriers, BT 65 and BT 85 of the latest generation. These base carriers now have an integrated service platform for easy, convenient and secure access for maintenance work. The BG 33 is the successor to the BG 28 and BG 30, and is available for the worldwide markets. The machine features the robust V-kinematics and is now designed with a single-ply piggyback winch - and in conjunction with the new adaptive kelly speed assistant, the BG 33 is well prepared for automated and fully supervised high-performance operation of the kelly bar. The BG 45, with a BS 95 base carrier, provides an advanced drilling system for creating deep, full displacement piles with the LostBit method.

In addition, a BC trench cutter will be displayed on a Bauer MC 96 duty-cycle crane - together with a guide wall. The MC 96 has been popular in the 130-t class, ideal for construction site environments. Bauer's range of medium-sized duty-cycle cranes will be supplemented by the MC 86 as a 110-t duty-cycle crane and, most recently, the MC 76 in the 90-t-category on the basis of the identical upper carriage platform.

Also at the Bauer booth, a diaphragm wall grab will be 'working' on a GB 50 base machine, equipped with a HDSG 80 system integrated into a boom for hoisting the hydraulic hoses and a DHG V diaphragm wall grab.

An RG 27S from RTG Rammtechnik will be presented with CSM equipment for cutter soil mixing (CSM) and a BCM 10 mixing head with a maximum mixing depth of over 30 m. The RG 19T with its SilentVibro MR 150 AVM sound-insulated silo vibrator is equipped for the insertion of sheet pile walls.

Klemm Bohrtechnik GmbH will showcase its KR 704-2E drilling rig. With its compact dimensions, the machine has been developed for use within existing buildings. The electric drive allows work to be carried out quietly and without exhaust emissions. The other models will include KR 709-3G and KR 909-3G drilling rigs.



FROM TOP: **Bauer BG 15 H ValueLine drilling rig, Bauer MC 96 duty-cycle crane, and Klemm KR 704-2E drilling rig.**



One of the highlights from Klemm will be the KR 806-3GS from the 806 series. It features newly developed kinematics, high load-carrying capacity and various pivoting possibilities. The KR 805-3G anchor drilling rig will be available in a version with a light, long feed and grab magazine. The HBR 120 boom handling module combines innovative technology with a high degree of occupational safety. ■

Website: www.bauer.de / www.klemm-bohrtechnik.de / www.rtg-rammtechnik.de

VOLVO

BOOTH: FM.714 / C6.203 & 213

Excavators will be the stars of the show at Volvo Construction Equipment (CE) booth. One of them is the new 20-t EC200E crawler excavator, which is designed for medium-duty applications. It is excellent for in-house operations or as part of a rental fleet, and is suitable for construction, utilities, road infrastructure and more.

The EC200E's advanced hydraulics system works in harmony with the fully-electric control system and Volvo CE's advanced Eco mode, in order to minimise power loss and improve both controllability and response times. The excavator can also be factory-fitted with additional auxiliary hydraulic piping to help power hydraulic attachments and boost the versatility and productivity of the machine.

Other features of the EC200E include a robust boom and arm, strong undercarriage, heavy counterweight and protected components, all of which enable the machine to carry out difficult tasks in tough environments. Featuring a design first for Volvo's mid-sized machines, the EC200E is now much easier to access from the right-hand side. This is made possible thanks to a new step being welded to the undercarriage and a three-point handrail above it.

The operator environment is further enhanced by excellent all-around visibility, aided by side view camera and optional Volvo Smart View that enhances the safety of operators and those working around the machine. Long service intervals for oil and filter changes lead to a reduction in stops required, and Volvo's CareTrack provides real-time telematics data, including operating hours, location and service alerts.

Another excavator model - the upgraded Volvo ECR88D short swing radius excavator - offers high productivity, stability, ease-of-use and safety when working in confined or restricted conditions. The already excellent fuel consumption is further improved, thanks to two new features. The first is an engine auto shut-down mode, which can be set to trigger after a period of inactivity between two and 60 minutes. There is also a fuel saving 'eco mode' that optimises the needs of the hydraulic and engine systems.

Featuring a narrow body design and centrally positioned boom, the superstructure on the upgraded ECR88D is so compact that its rear swings within its track shoe. This means that the excavator can get extremely close to objects without risk of collision with the rear of the machine as it swings. But the short front/rear radius is also well suited to working within a single highway lane, minimising disruption to the flow of traffic.

The upgraded ECR88D is available with a monoboom (or an optional two-piece boom) several arm configurations and blade for greater flexibility. There is also a wider dozer blade, which features a 600-mm steel shoe. Thanks to its reinforced, three-piece, high-tensile steel X-shaped frame undercarriage, the ECR88D is durable and reliable, able to withstand the rigors of demanding work environments.

Increased DPF cleaning interval up to 6,000 hours will help customers reduce the cost of ownership. An auto-idling system reduces engine speed when the controls are inactive for a specified time (operator pre-set via the display between three and 20 seconds), reducing running costs and fuel consumption. Volvo's optional CareTrack remote telematics system conducts a self-diagnostic routine, alerting the operator – or the fleet manager back at the office.

In addition, Volvo will unveil its first two hydraulic-electric



TOP: The upgraded ECR88D short swing radius excavator offers better fuel efficiency features.

ABOVE: EC200E crawler excavator.

LEFT: Volvo will unveil its first two hydraulic-electric machines at bauma.

machines, followed by a staged market-by-market introduction and ramp up in 2020. This news comes after the company recently announced it will go electric on its Volvo-branded compact excavators and compact wheel loaders in 2020. With this move, Volvo CE is believed to be the first construction equipment manufacturer to commit to an electric future for its compact machine range. ■

Website: www.volvoce.com

HAMM

BOOTH: FS.1011

The HP series of pneumatic tyre rollers will be one of the world premieres from Hamm, featuring various basic versions (HP 180/HP 180i and HP 280/HP 280i) and operating weights ranging from 8 t to 28 t. Hamm has improved the ballast flexibility with prefabricated ballast body kits available in different weights, and the facility for straightforward self-ballasting. There are also new solutions for water and additive sprinkling, including: large tanks; a pressurised filling system as standard; a large additional water tank that can also be used as ballast; and a novel additive preparation process, which is simple and efficient.

All of the models will be available worldwide in accordance with the locally demanded weight classes and equipment variants – taking into account local emissions regulations at all times. Hamm also offers a wide range of options, from classic features such as the tyre inflation system and the edge pressing and cutting equipment, to new innovations such as anti-slip control for optimum traction.

As for oscillation technology, Hamm will be presenting two innovations: a split oscillation drum and the VIO compaction meter for oscillation. The company has also further optimised the drive concept for oscillation drums, making the next generation of oscillation drums completely maintenance-free.

The split oscillation drums combine the benefits of oscillation with the added value of a split drum. Oscillation enables these drums to deliver excellent results for compaction on bridges, of thin layers, in vibration-sensitive areas or at critical temperatures. They are ideally suited to challenging tasks such as compacting difficult-to-compact asphalts and curved sections.

A separate, mechanically-independent oscillation unit operates in each half of the split oscillation drums, explained Hamm. An integrated control mechanism adjusts the rotational speeds of each half of the drum to match one another. The synchronisation is done electrohydraulically. Because the system reacts quickly and precisely, synchronous vibration in each of the two drum halves is guaranteed in any situation. This reduces the danger of cracks in or displacement of the asphalt, and is ultimately a great advantage in terms of quality.

With the VIO compaction meter, Hamm is expanding its range of modules for compaction measurement and documentation. The company is believed to be the only manufacturer offering the ability to measure compaction in oscillation mode. This means that its rollers can document their passes in a traceable way, even for continuous dynamic compaction control applications with oscillation. The system is already available for the H 7i VIO and H 13i VIO compactors.

In addition, the range of H series compactors is being extended to include the 'C models'. These machines are fitted with a reinforced hydrostatic drive and provide up to 30% more torque, giving them much better traction and climbing ability than that of the standard models. They are well equipped to deal with heavy earthwork, landfill construction and the compaction of cohesive soils. Despite this, they are still economical, said Hamm. Fuel consumption in the models with and without reinforced drives is almost identical because the same diesel engine is used in each of the rollers.

Hamm is also broadening potential applications in earthworks with a new dozer blade for compactors. The geometry of the dozer blade allows more material to be moved and distributed than before, while special skid shoes prevent it from digging into



Hamm's HP series pneumatic tyre rollers (above) and split oscillation drum (below).



Hamm now offers a new dozer blade for compactors (left).

the ground. Moreover, the high-visibility cross member provides an unobstructed view of the area in front of the dozer blade. Two versions of dozer blade are available for H series compactors.

Lastly, Hamm's Easy Drive operating concept has been introduced to all new generations of machines: it is now available for all DV+ series tandem rollers and H series compactors, as well as for most HD+ series tandem rollers and HP series pneumatic tyre rollers. It offers machine operators ample clearance, optimum ergonomics and plenty of comfort, apart from advantages such as intuitive and therefore safe user guidance, the shortest possible learning and familiarisation times and an operator's platform that can be adjusted to practically any body height. ■

Website: www.hamm.eu

VERMEER

BOOTH: FN.621/1

Vermeer will showcase its new RTX1250i2 ride-on tractor. The machine boasts intelligent controls and interchangeable attachments to help maximise productivity for utility installation work.

Based on the prior RTX1250 ride-on tractor design, the new RTX1250i2 features the latest in technology to make it more convenient to operate, be more efficient on the jobsite and reduce the amount of time it takes to swap out i2 attachments.

The controls on the RTX1250i2 deliver several productivity advantages, including Productivity Zone, Auto Plunge, TrenchSense electronic control system and Ecolde engine control system.

Productivity Zone intelligent feature identifies the ideal operating range and ground speed for the rear attachment being used to optimise machine production. With a flip of a switch, the Auto Plunge technology monitors engine rpm and reduces the rate of plunge automatically for a trencher or rockwheel attachment so that the rpm does not drop too far.

The onboard TrenchSense electronic control system helps prevent engine stall when working in challenging ground conditions. It actively monitors engine rpm while trenching and it will automatically pause the tractor's forward creep if engine rpm drops or the trencher chain stops. The Ecolde engine control system can help reduce fuel consumption by automatically lowering the engine's speed to an idle if the tractor has not been active for 30 seconds.

Vermeer has made it more convenient to customise and reconfigure the RTX1250i2 with intelligent i2 attachments that can be switched out in as little as 60 minutes. The self-identifying i2 attachments communicate with the tractor and the machine's controls are then adjusted according to the operational needs of the attachment.

Furthermore, the RTX1250i2 comes with an optional remote control for convenient maintenance and trailer loading/unloading. Powered by a 95 kW Deutz diesel engine, the machine offers efficient power for high load installs in difficult ground conditions and provides a quieter ride than similar-sized tractors, said Vermeer.

In addition, the Vermeer D40x55DR S3 Navigator horizontal directional drill (HDD) can be used in a broad range of ground conditions, from hard, medium and soft rock to loamy/dirt and clay. It features Vermeer dual rod technology that uses an inner rod to provide torque to the drill bit, while the outer rod offers steering capability and rotational torque for reaming.

Using a new dual drill rod design that simply and quickly makes up the inner and outer rod connections, the time and steps required to add or remove a rod on the D40x55DR S3 is cut by 30% compared to previous models, according to Vermeer. Fitted with a 104.4 kW John Deere diesel engine, the machine serves up 177.9 kN of thrust/pullback and 7,457 Nm of rotational torque. It can carry 152.4 m of drill rods onboard, and has a carriage speed of 35 mpm and low guaranteed sound power rating of 104 dBA.



ABOVE: **D8x12 Navigator HDD.**
LEFT: **D40x55DR S3 Navigator HDD.**
BELOW: **RTX1250i2 ride-on tractor.**



The smaller Vermeer D8x12 Navigator HDD is designed for tight spaces, suitable for small service installations like gas distribution, power, water and telecommunication networks. It is equipped with a 35.8 kW Kohler diesel engine and offers 1,355.8 Nm of spindle torque and 34.9 kN of thrust/pullback. With a low noise emission level of 85 dBA and guaranteed sound power of 104 dBA, the D8x12 is excellent for urban environments. It can fit through a 91.4 cm gate or onto a trailer with other jobsite essentials. With a forward travel speed of 4.5 km/h, this compact drill can quickly be repositioned between bores.

The Vermeer D8x12 also gives contractors multiple drill rod options, such as a 3.4 cm diameter Firestick drill rod when tight steering is required, or 4.2 cm diameter drill rod for more demanding ground conditions and longer drill shots. It can also share tooling with several current and previous Vermeer drill models, including the D6x6, D7x11 Series II, D9x13 S3 and D10x15 S3 Navigator HDDs. ■

Website: www.vermeer.com

POWERSCREEN

BOOTH: FM.711

The Trakpactor 550SR horizontal shaft impactor from Powerscreen is suitable for processing primary and secondary materials, such as natural rock and construction-derived materials like asphalt, recycling and demolition waste. It offers cutting-edge styling with GRP guards and comes with the Powerscreen Pulse Intelligence system.

The machine's robust impact chamber (54 in x 36 in) features a twin apron, 4 bar rotor design, with hydraulic release aprons, hydraulic setting adjustment, hydraulic crusher overload and is driven directly off the engine via clutch for optimum fuel economy. The product conveyor has a raise/lower facility to aid clearance of rebar in the event of a blockage.

The Metrotrak compact jaw crusher is ideally suited for operators in the mining, quarrying and recycling industries, especially those working in tight locations thanks to the machine's small footprint. The variable speed VGF is now fitted with bolt-in stepped grizzly cassettes and rotating mesh deck, which helps with quick application changes and maintenance. The three-way bypass conveyor is larger than its predecessor and has inspection holes and wear liners at discharge points to help with material flow.

One of the highlights of the Metrotrak is the chamber unblock feature which, with the aid of a motor attached to the flywheel on the chamber, will 'rock' the chamber back and forth until the blockage is cleared. This gives the machine the key advantage of a hydrostatic setup whilst retaining the fuel efficiency of direct drive.

The Chieftain 2200 3 deck has set a new standard in high intensity screening. Its two highly versatile, 22-ft x 5-ft three deck



Trakpactor 550SR horizontal shaft impactor.

screenboxes provide a total screening area of 19.5 sq m. This leads to a high tonnage capacity, often exceeding 700 tph, resulting in increased quality product and revenue.

The Chieftain 2200 3 deck also features a revolutionary drive system that allows switching between 2 and 4 bearing with bolt-on parts. By splitting up into two individual boxes, the machine is able to run aggressively without the constraints of a larger box. It can screen with a 20% increase in G-force compared to other screens with the same surface area, according to Powerscreen. ■

Website: www.powerscreen.com

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