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CONSTRUCTION

MARCH - APRIL 2015



Stuttgart - Ulm rail project under construction

France builds Tour Incity skyscraper

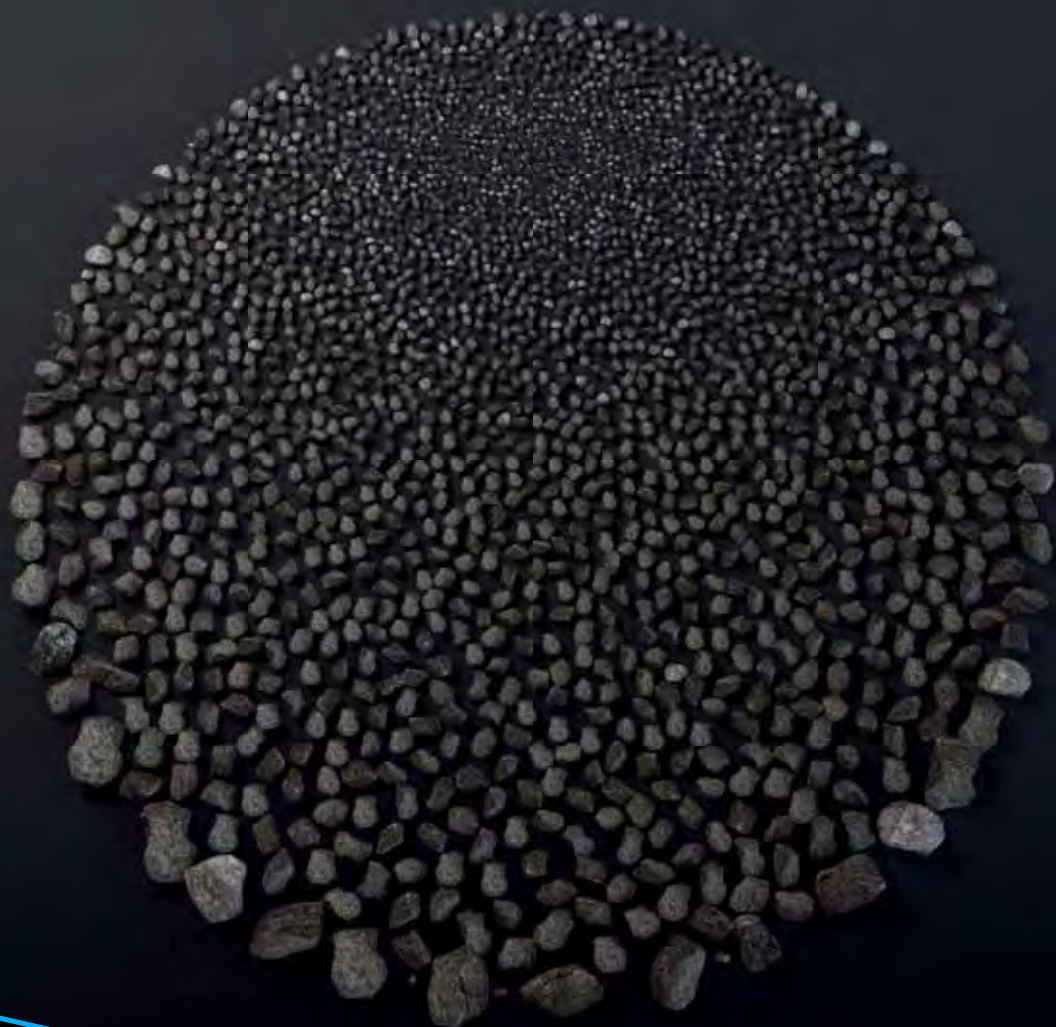
Tunnelling at Sabangan hydropower plant

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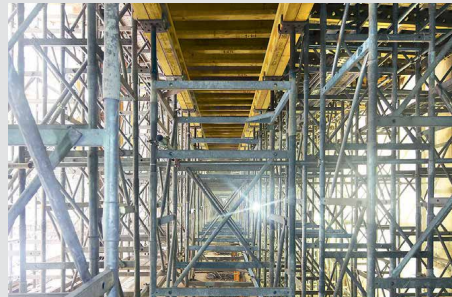


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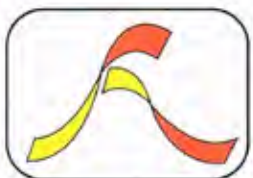
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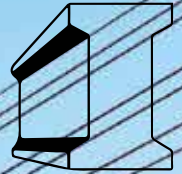


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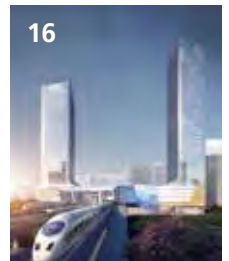
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Public sector projects to sustain Singapore's construction demand

Construction contracts for the built environment sector in Singapore is expected to reach between S\$29 billion and \$36 billion in 2015, given a sustained pipeline of public sector projects, according to the Building and Construction Authority (BCA).

The total construction demand in 2014 set a new record of S\$37.7 billion, fuelled by a higher volume of institutional and civil engineering construction contracts, including Sengkang General and Community Hospitals, Tampines Town Hub project and the award of various major contracts for the construction of Thomson-East Coast MRT Line as well as land preparation works for the upcoming Changi Airport development.

This year, public sector projects are expected to account for an estimated 60 percent or S\$18 billion to S\$21 billion of the total construction demand, said BCA. However, while public housing projects are anticipated to moderate this year in consideration of a more stabilised public housing market, public construction demand will remain stable due to an increase in industrial projects and the sustained pipeline of institutional and civil engineering works.

Meanwhile, private sector construction demand is anticipated to moderate to between S\$11 billion and S\$15 billion compared to S\$18 billion in 2014 as developers may adopt a cautious stance amid a slowdown in private home sales and global economic uncertainties. Nevertheless, the slowdown is likely to be cushioned by a rise in private sector civil engineering projects such as the proposed infrastructure works for the development of the Changi East Runway 3.

The average construction demand is expected to be sustained between S\$27 billion and S\$36 billion in 2016 and 2017, and S\$26 billion and S\$37 billion in 2018 and 2019 per annum, in view of mega public sector infrastructure projects required to meet the long-term needs of the population and maintain the competitive advantage of Singapore's economy.

"Construction demand over the next five years will remain strong. Major healthcare and infrastructure works, such as the remaining contracts for the upcoming MRT lines and Changi Airport Terminal 5 provide support for the industry demand. The healthy pipeline of construction projects over the next five years therefore presents an environment for us to press on with the re-structuring of the built environment industry, in search of excellence," said Lee Yi Shyan, Senior Minister of State for Trade & Industry and National Development.

"Our end goal is to see a more efficient industry structure. We should orientate our industry towards Design for Manufacturing and Assembly (DfMA) in order to achieve higher manpower savings while raising the quality of finished components. Our construction sites will become safer, cleaner and quieter.

"To help the industry gain experience in Design for Manufacturing and Assembly, BCA will continue to provide funding support. Already, NTU is building a student hostel and sports hall using the Cross Laminated Timber method. Crowne Plaza Changi Airport Hotel is building its extension using PPVC."

Mr Lee continued, "In addition, City Developments Limited is the first developer in Singapore to use PPVC for a large scale residential project – an Executive Condominium project at Canberra Drive. Some 3,300 room-sized modules will be built offsite and assembled onsite. Two other Government Land Sales sites at Yishun Avenue 4 and Jurong West Street 41 will adopt the PPVC construction method.

"To build up experience and new capability, we target to have 40 to 50 projects adopting PPVC and CLT over the next five years.



Lee Yi Shyan, Senior Minister of State for Trade & Industry and National Development.

Thus, we want to encourage more developers to embrace these new methods of construction."

Mr Lee also reminded that BCA is now working with the industry on the second Construction Productivity Roadmap. "One of its key focuses will be workforce training and development. When we introduce new materials, technologies and methods of construction, we will need to make sure that our workers are trained for them, know what to do onsite, do their best and achieve the high quality of finished work. We also need to de-bottleneck supply capacities associated with the greater adoption of DfMA construction methods," he said. ■

Jakarta to have new integrated development

CapitaLand Limited has entered a joint venture agreement (JV) with a subsidiary of Credo Group (CG) to develop an integrated development in central Jakarta, Indonesia.

The integrated development, CapitaLand's first in Indonesia, will comprise a Grade A office tower, mid- to high-end residential units, serviced residences and supporting retail space, spanning a total gross floor area of more than 40,000 sq m. Estimated to be completed in 2018, construction of the development is expected to commence in 2015. The total development cost is approximately S\$220 million.

Under the agreement, the JV will acquire from CG a 1-ha site located within the central business district (CBD) of Jakarta. The site, close to embassies, renowned civic buildings, offices, affluent residential neighbourhoods and the National Monument, also has good connectivity to major roads within the CBD and other areas in Jakarta.

CapitaLand has been operating in Indonesia since 1995 through its wholly-owned serviced residence business unit, The Ascott Limited, which is believed to be the largest international serviced residence owner-operator in the country. Ascott currently operates eight properties with about 1,800 apartment units in Jakarta, Surabaya and Bali. Three more serviced residences comprising approximately 700 units are currently under development in Jakarta and Surabaya. ■

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Keppel Land in joint venture to develop office tower in Myanmar

Keppel Land has entered into a joint venture agreement with the Shwe Taung Group to develop a 23-storey office tower in Yangon's central business district, at the intersection of Shwedagon Pagoda Road and Bogyoke Aung San Road. Keppel Land's total investment in the project will be US\$47.4 million.

Keppel Land will hold a 40 percent stake in the office tower, which is part of Junction City, a mixed-use development that will also comprise the five-star Pan Pacific Hotel, a shopping centre and residential towers. It will also house Yangon's largest car parking facility offering more than 1,400 car park lots.

The new office tower will offer a net leasable area of about 33,400 sq m of premium Grade A office space, meeting the demand for high quality office space in Yangon. Strategically located, it is about 19 km south of the Yangon International Airport and about 8 km from Keppel Land's Sedona Hotel Yangon. Major landmarks in the vicinity include Sule Shangri-La, Sakura Towers, FMI Centre, Bogyoke Market, Holy Trinity Church and the Yangon Railway Station. Government offices, heritage buildings, schools and retail outlets are also in close proximity.

Construction of the development has commenced and is expected to be completed in 2017. ■

MTR West Island Line opens in Hong Kong

The West Island Line (WIL), an extension of the MTR metro system in Hong Kong, has officially opened. Mott MacDonald has been involved with the project since 2009.

WIL is a 3.3 km long-extension to the Island Line and connects Sheung Wan station to the three newly built stations of Sai Ying Pun, Hong Kong University (HKU) and Kennedy Town. It now takes only about seven minutes to travel the length of the extension compared with the 30 minutes it used to by bus. Road congestion will be eased in the western district also as a result of the new line.

Mott MacDonald's involvement in the project included the detailed design for the temporary works and construction sequences for the caverns, the associated running tunnels and various entrances at Sai Ying Pun and HKU stations, on behalf of the Gammon-Nishimatsu WIL joint venture (JV). The company also designed the overrun tunnels at Kennedy Town Station and associated slope works along the alignment with Meinhardt for MTR. Systems assurance services were to the Dragages-Maeda-Bachy Soletanche JV for the Sheung Wan to Sai Ying Pun tunnels. Mott MacDonald's design services included innovations such as 3D modelling of ground conditions, discrete finite element analysis, highly detailed blasting assessments and ground freezing for passenger entrance tunnels.

"The significant depth of the tunnels and caverns, in the highly-urbanised location, certainly made this project one of the more complex type, ranging from detailed design of drill and blast for rock sections to system assurance for tunnel boring machine sections," said Dr Mark Swales, a transport director at Mott MacDonald in Hong Kong. "Projects such as these provide the technical challenges that Mott MacDonald likes to undertake and we are very proud to have been involved in the WIL." ■

Vinci wins high-rise building project in Malaysia

The Malaysian property developer Jesselton Group has awarded to Vinci Construction Grands Projets the construction of a 125,000 sq m mixed-use development on the Kota Kinabalu seafront in northern Borneo.

The project covers a seven-storey podium over two underground levels that will house a 20,000 sq m shopping centre and more than 900 parking spaces, as well as a complex made up of three 20-storey residential towers with a total of 333 apartments. The value of the contract, which does not include the foundations and underground levels, is €70 million. Handover is scheduled in July 2016.

Vinci Construction Grands Projets is currently working on the Menara Hap Seng tower project in Kota Kinabalu under a design-build contract and is also operating in Kuala Lumpur with the current Berjaya Central Park residential and office complex, having previously handed over the Berjaya Time Square shopping centre in 2003. ■

Dingli appoints TÜV Rheinland

Chinese powered access manufacturer Dingli has appointed Germany-based notified body and inspection authority TÜV Rheinland to provide third-party CE certification for its aerial work platforms. The company previously used the SGS notified body.

According to Dingli, the decision to change to TÜV was driven by a number of reasons. One of them is that TÜV has a stronger reputation and far greater experience in the European work platform market, where it has been active for more than 30 years. TÜV Rheinland also has a reputation as one of the strictest certification companies for machinery accreditation, and Dingli is looking to work more closely with the company to help further improve its current range of platforms in order to better serve the European market.

"Since we began exporting we have understood the importance of working with a notified body to obtain third-party certification for our products and SGS has been a good partner. However we see even greater benefits in working closely with TÜV, in order to achieve the long term aims we have to become a significant and serious participant in the world market for powered access," said Harry Chen, Dingli's sales and marketing manager. ■



Dingli has appointed TÜV Rheinland to provide third-party CE certification for its aerial work platforms.



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Design revealed for Cadre International TOD Centre in China

Atkins has revealed the design for Cadre International TOD Centre in Guangzhou, China. The mixed-use development has been designed based on Transit Oriented Development (TOD) principle and is believed to be the first fully integrated TOD project in the country.

“Cadre International TOD Centre is a truly transformational project, which evolves a sustainable model of high density mixed-use development that we at Atkins always have promoted. In urban and transport integration terms, it brings together places for people to work and live with East Guangzhou’s important transport hub. The integration provides enhanced convenience for visitors to Cadre International TOD Centre, interchanging passengers and people working or living nearby,” explained Ian Milne, Atkins’ senior design director. “We fully recognise and embrace the social, environmental and economic importance of connectivity to creating an urban development that is Future Proofing. We are proud to be at the forefront together with the project owner Shenzhen Cadre Group, and help the project owner support the central government’s vision for a quality urbanisation and to benefit the local communities through our expertise.”

The development hosts 250,000 sq m of commercial property, integrated with a transportation hub, including an underground high-capacity metro interchange station, an elevated intercity railway station, and bus and taxi interchange located at ground level. These three transportation facilities are interconnected via a shopping mall, which can be accessed directly from the railway station concourses. Approximately 450,000 trips are generated daily, which have significant impact in increasing footfall. The value for the commercial property can be increased up to 30 percent. The shopping mall, which consists of six levels above ground and two levels below ground, provides an array of entertainment facilities including a multiplex cinema, a food court and a large public roof garden surrounded by cafes and restaurants. Large areas of public space, including a civic plaza and a green garden, are provided outside the development to ensure this landmark project benefits the surroundings.

The two tall towers provide a dramatic and iconic visual impact for the development from afar. Standing at 260 m and 182 m, the



Cadre International TOD Centre in Guangzhou is scheduled to open in 2018. The two tall towers provide a dramatic and iconic visual impact for the development from afar, standing at 260 m and 182 m.

towers will be home for a five-star hotel, grade-A office space and SOHO residential apartments.

Integrating mixed-use projects with transportation facilities, TOD is emerging as an important new building type in both China and Southeast Asia. Cadre International TOD Centre is anticipated to open in 2018. ■

Elematic to deliver precast plant to Hansung PCC

Elematic Oy will deliver a precast plant to Hansung PCC in Asan, South Korea. The delivery, with a contract value of over €3 million, is scheduled to take place in the first quarter of 2015.

The plant will include a well-equipped hollow-core slab floor production line, a tower batching and mixing plant with heating equipment for the rock material, a concrete distribution system and comprehensive production supervision services.

Elematic said, over the years, it has delivered more than 10 plants to South Korea. This is the second delivery to Hansung, a precast concrete manufacturer with a previous focus on structural concrete production. The new floor production line is an update to the customer’s existing production facilities, delivered by Elematic in the 1990s.

“Precast technology, especially the utilisation of hollow-core slabs, is on the rise in the country. Elematic was chosen by Hansung due to the proven technology and positive experiences on the previous production line,” said Ari Mellanen, Elematic’s sales director in Asia. ■



Elematic Oy has received an order for a precast plant from Hansung PCC in Asan, South Korea. The delivery of the plant is scheduled to take place in the first quarter of 2015.



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Elematic and Aquarius team up for batching and mixing plants

Finnish manufacturer Elematic Oy has formed a partnership with Indian company Aquarius Engineers Pvt Ltd to work on the development and supply of batching and mixing plants for the precast industry. In the first phase, the agreement covers only the Indian market.

Elematic is a global producer of precast concrete plants and production lines for walls, floors, frames and foundations. Aquarius manufactures concrete batching and mixing plants, concrete pumps and boom pumps. Under the agreement, Elematic will provide its technology to Aquarius for manufacturing twin-shaft mixers and tower batching plants. In addition, Elematic will include Aquarius' batching and mixing plants into its offering for the Indian market, and later on, for selected markets globally.

The new tower plant solution will offer great value to any precast factory or ready-mix company working in the fast growing Indian metropolitan cities. Thanks to its compact size, the plant installation requires a fairly limited land area, thus bringing clear savings in land costs. The solution also features an environment-friendly closed structure, meaning that the plant produces a minimum amount of air or noise pollution. It can thus be operated even in the heart of a city.

In the past few years, Elematic has put a significant effort in developing its capacity to serve the Indian precast customers. The company has established a sales and services unit in New Delhi, and recently opened its own local manufacturing unit focusing on moulds. "Our goal is to serve the current and future precasters in India not only with fast deliveries, but also with high quality technology and services that meet the local needs. This co-operation agreement with a strong Indian player allows us to do just this – we can now offer whole precast production plants including well-priced, reliable batching and mixing plants," said Mats Jungar, CEO of Elematic.

He added, "In the second phase, the plan is to enlarge the co-operation to also cover selected global markets, in particular in the Far East and Southeast Asia."

Aquarius has more than two decades of expertise in concrete equipment. The company can also offer complete solutions in concrete production and placement equipment. Apart from its two manufacturing bases in India, Aquarius has a well-established Pan-



Finnish manufacturer Elematic is now working together with Indian company Aquarius Engineers on the development and supply of batching and mixing plants for the precast industry. In the first phase, the agreement covers only the Indian market.

India service network. The company's plants have a proven track record in India as well as in several other regions such as Africa, Middle East and Southeast Asia.

"Aquarius has always strived to work in high technology areas. With our inherent strength in absorbing the technology and delivering machines of high quality at a competitive price, this strategic partnership with a global player, Elematic, is bound to succeed. We look forward to working with Elematic for Indian as well as global markets," said M S Bhadbhade, managing director of Aquarius. ■

Abu Dhabi tops 'Construction Mega Cities' list

The Timetric CIC tracks large-scale construction projects in all sectors, and following a recent assessment of project pipelines in major cities worldwide it has compiled a listing of 50 'Construction Mega Cities,' each having a pipeline of projects with an investment value above US\$40 billion.

Abu Dhabi tops the list of these Construction Mega Cities, with total project values close to US\$480 billion, just ahead of London in second place (US\$477 billion) and Dubai in third (US\$394 billion). In addition to Abu Dhabi and Dubai, there are a further 10 cities located in the Middle East and Africa, and the combined projects pipeline value for the region stands at just under US\$2 trillion.

Some of the cities in the list have multi-billion dollar projects that have been announced or are in a more advanced stage of development, but the average value of projects tracked by the CIC in these Construction Mega Cities stands at US\$1.1 billion. The

combined value of the project pipelines in all 50 Construction Mega Cities stands at US\$5.9 trillion, and includes around 5,200 projects at various stages of development, from announced to execution.

A ranking based on the per capita value of mega-project construction pipelines shows that the oil-rich Construction Mega Cities in the Middle East are spending the most on major development projects relative to the size of their populations. Many of these cities are relatively small in terms of population. Doha, for example, has a population of around 1 million, and Manama just 0.3 million.

"The expansion in city populations places a huge strain on utilities and infrastructure, thereby contributing to long-term plans by governments, with the support of international development agencies and private investors, to finance large-scale developments," said Danny Richards, Timetric's lead construction analyst. ■

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East Timor - Global Equipment Trading
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Indonesia - PT. Panca Traktor Indonesia
0062.21.29025810

Indonesia - PT. Tekacia Machinery Jaya
0062.511.470.5955

Laos - VK Trading
0085.6.021265058

Malaysia - CIH (Malaysia) Sdn. Bhd.
00603.8068.4888

Myanmar - Aung Gyi Trading Ltd
00951.613629

Philippines - Qishu Heavy Equipment
0063.2.7491215

Singapore - Ten League
0065.68620769

Taiwan - Feng Yue Li Enterprise Co. Ltd
00886.4.737.6868

Thailand - Yontrakarn Machinery
0066.35.361495

Vietnam - Seabird Trading Company
0084.4.35372815

Oceania Region
Australia - Niche Equipment
0061.8.945751600

French Polynesia and New Caledonia
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New Zealand - Lincom NZ Pty Ltd.
0064.9.2362008

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Terex Trucks strengthens with new appointments

Following its acquisition by Volvo Construction Equipment (Volvo CE) in June 2014, Scotland-based Terex Trucks has now increased its support of and interaction with its dealers and customers with the appointment of key, senior sales & marketing and aftermarket management. The new appointments will help to position Terex Trucks as a main global competitor in both articulated and rigid dump truck markets. The team will assume their new positions through January and February 2015.

Leading Terex Trucks' new sales & marketing team is global director, Sam Wyant, who brings with him a wealth of construction equipment experience and sales expertise from senior leadership roles with Volvo CE in North America. He was most recently based in Brussels, Belgium, as the road global programme manager. Mr Wyant will be supported by new sales & marketing directors for each region along with global directors for aftermarket and dealer development.

Heading up the sales & marketing team in the Americas, Matt Deloglos will leverage his prior sales and finance background to support the team and gain traction in the region. Mr Deloglos developed a proven track record of expanding relationships, driving revenue and enhancing brand value during his previous role as global director for OEM Strategic Alliance in Volvo CE.

As sales & marketing director for EMEA, Guy Wilson will bring

to the table a breadth of knowledge of the construction equipment industry gained from his experience as managing director for Volvo CE Italia SpA. Previous to that he was CFO and deputy MD of the GB Volvo CE dealership.

Clement Cheong has been appointed as sales & marketing director for the Asia Pacific region. He is based in Singapore and has over 20 years of experience in dealer management, new business development and sales and marketing of construction equipment in the Asian marketplace.

In addition, Andy Turnbull will be relocating from the US to Scotland where he will join the Terex Trucks aftermarket team as global aftermarket director. Mr Turnbull will be moving from his current role at Mack Trucks as director of aftermarket & soft products for Latin America. He has also held senior roles within Mack Trucks in customer and product support, technical support, warranty and product quality.

Nick Rose will be based in the UK as Terex Trucks' new global dealer development director. With 40 years of experience in the construction equipment industry, Mr Rose brings with him a breadth of invaluable experience across service, marketing, remarketing, sales and dealer development. His previous role was director of rental & remarketing EMEA for Volvo CE EMEA. ■

Bilfinger sells construction division to Implenia

Swiss construction company Implenia plans to acquire Bilfinger's construction division, which is active in Germany and other European countries. It employs nearly 1,900 people and in 2014 was forecast to generate an output volume of about €600 million.

"Parting with what has been our traditional business for such a long time is not easy for us. It is therefore all the more pleasing that we have found a buyer like Implenia, one of Europe's most renowned construction companies. We are certain that we are putting the construction division in good hands. It will have very good development prospects in the new group of companies," said Herbert Bodner, chairman of the executive board at Bilfinger.

Bilfinger intends to focus on engineering and services for industrial facilities, power plants and real estate and had put its civil engineering business up for sale in May 2014. As for the remaining Polish construction business, Bilfinger is also in contact with other interested parties.

New building contracts

Bilfinger has earlier won new contracts in Germany for the construction of an administration complex in Mannheim, modernisation of an office property in Düsseldorf and construction of a development centre for

motors in Rüsselsheim. The three projects have a total order volume of nearly €50 million.

In Mannheim, Bilfinger is building a new headquarters for building society GBG. It will replace an outdated building that was built in the 1970s. When the building is completed in the first quarter of 2016, all of the company's 270 employees will be brought together in an area with an office space of 6,400 sq m. As general contractor, Bilfinger assumes responsibility for the design, planning and turnkey construction of the energy-efficient office building.

In Düsseldorf, Bilfinger has been tasked by Momeni Immobilien Holding with the complete modernisation of an office building that was also built in the 1970s. The 10-storey building will be redeveloped and another floor will be added. The Three George office complex with a gross floor space of approximately 14,000 sq m is scheduled to be completed by the end of 2016. It will meet particularly strict requirements in terms of energy efficiency and sustainability.

Bilfinger was also commissioned by Opel to build the new International Technical Development Centre for motors in Rüsselsheim. Once it goes into operation in 2017, the 36,000 sq m building will have 43 motor testing stations. ■

Skanska awarded railway contract in Sweden

Skanska has signed a contract with the Swedish Transport Administration to expand a section of the freight line Hallsberg-Degerön in Sweden. The contract is worth SEK 398 million.

The route is currently a single-track railway with low capacity. Through the expansion to double-track the capacity is increased,

which relieves the main tracks from freight traffic. The project is a turnkey contract covering 13 km double-track railway, seven bridges and about 9 km of roads and noise reducing measures.

Project planning will commence immediately, and the project is expected to be completed in October 2019. ■



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Kobelco to build hydraulic excavator facility in the US

Kobelco Construction Machinery is set to build a hydraulic excavator plant in Spartanburg, South Carolina, USA. This new facility will be incorporated into its North American subsidiary, Kobelco Construction Machinery USA Inc (KCMU).

The site area is approximately 340,000 sq m, which includes a 14,560 sq m factory building, a 1,600 sq m office space and a testing area, among others. Kobelco expects to begin site preparation from April 2015 and complete the construction in December. Production of 20 t models is to commence from January 2016. The plant will initially have an annual production capacity of 1,800 units.

Kobelco's target share in North America under the current medium-term management plan - whose final year is the fiscal year 2015 - is 7 percent or higher. However, by taking advantage of the local production, the company aims to enhance service functions further, reinforce foundation in North American market by improving after-sales activities including parts sales, continue increasing the

presence of its hydraulic excavators, and put a group-wide effort into regaining the 10 percent share in North America that it had before forming an alliance with CNH.

The new US facility, costing approximately 5 billion yen, will allow Kobelco to not only reduce the production lead-time of machineries for North American customers and improve its capability for meeting the market needs, but also reduce operational burden on the Hiroshima Itsukaichi factory and build an optimal group-wide production system.

According to Kobelco, the Hiroshima Itsukaichi factory has been operating at a production level of 10,500 units, which significantly exceeds the current production capacity of 8,500 units. The company said even after the production of the standard models for the US is transferred to KCMU, the plant is expected to maintain full production to accommodate the expansion of newly developed areas in Europe and the Middle and Near East. ■

New iconic transit hub for southern California

The newly opened Anaheim Regional Transportation Intermodal Centre (ARTIC) links commuter and regional rail service and intercity bus systems including Amtrak, Metrolink, OCTA bus service, Anaheim Resort Transportation (ART), Megabus.com and Greyhound. The 67,000 sq ft transit hub is projected to serve the transportation needs of more than three million people annually in the coming years. The building's flexible design ensures that it can serve as a southern terminus for California's future high-speed rail system.

HOK provided architecture, interior design, master planning and urban design services on the project. Parsons Brinckerhoff was the project manager and served as the rail and civil engineer. Other consultants include Thornton Tomasetti as structural engineer, Buro Happold as MEP and enclosure engineering, SWA as landscape designer, and Clark Construction as general contractor.

The station was also conceived as a catalyst for transforming Anaheim's core into a pedestrian-friendly zone that promotes connectivity and a vibrant, mixed-use environment. Known as the 'Platinum Triangle,' the area around the station includes destinations such as Angel Stadium, the Honda Centre, the HOK-designed Anaheim Convention Centre and nearby Disneyland.

ARTIC's signature parabolic form was achieved by employing a diagrid structural system of diamond-shaped steel arches infilled with translucent ETFE (ethylene tetrafluoroethylene) pillows. At the north and south ends, freestanding curtain walls bring in daylight and open the building to views. The long-span, grid shell structure creates a grand, light-filled atrium space that accommodates open circulation.

The design team used building information modelling (BIM) to develop ARTIC's complex form, geometry and functions, to navigate the complexities of the building systems, and to study the building's tolerances and environmental performance. "By using BIM, we were able to optimise and coordinate the precise geometry of the vaulted diagrid shell, ETFE facade technology, metal panel rain screen systems and glass," said Albert Kaneshiro, AIA, LEED AP, HOK's



© ARTIC

The Anaheim Regional Transportation Intermodal Centre (ARTIC) links commuter and regional rail service and intercity bus systems including Amtrak, Metrolink, OCTA bus service, Anaheim Resort Transportation (ART), Megabus.com and Greyhound.

project manager. "BIM allowed us to match ETFE connections with the geometry of the steel in a structure that is constantly expanding and contracting."

Based on the city's goals for sustainability, the team designed ARTIC for US Green Building Council LEED Platinum certification. The vault-shaped structure acts in concert with advanced mechanical systems to optimise energy efficiency. Inflated ETFE cushions cast a soft, translucent light throughout the great hall, while the additional frit pattern on the outer layer reduces solar heat gain. Convection currents naturally ventilate the building as heat rises from the lower south end up to the north side and out through operable louvers. The radiant heating and cooling floor system and optimised HVAC system will help reduce ARTIC's energy consumption by 50 percent. ■

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Date	Events in Asia	Organiser & Contact
19 to 22 Mar 2015	Megabuild 2015 Jakarta Convention Centre Jakarta Indonesia	PT. Reed Panorama Exhibitions Tel: +65 6789 8800, ext 4537 Email: meenyi.phua@reedpanorama.com Website: www.megabuild.co.id
27 to 29 Mar 2015	Constech 2015 Impact Exhibition & Convention Centre Bangkok Thailand	Impact Exhibition Management Co Ltd Tel: +66 2833 5208, Fax: +66 2833 5127-9 Email: pasinc@impact.co.th Website: www.thailandconstech.com
2 to 4 Apr 2015	BuildTech Yangon 2015 Myanmar Convention Centre Yangon Myanmar	Sphere Exhibits Pte Ltd Tel: +65 6319 4037 Email: lingoh@sph.com.sg Website: www.btyangon.com
23 to 26 Apr 2015	OneBuild@JB 2015 Expo @ Danga City Mall, Johor Bahru Johor Malaysia	One International Exhibition Sdn Bhd Tel: +603 8943 7488, Fax: +603 8943 7599 Email: info@oneinternational.com.my Website: www.oneinternational.com.my
28 to 30 May 2015	LankaBuild 2015 Sri Lanka Exhibition & Convention Centre Colombo Sri Lanka	AMB Events Group Tel: +603 4041 9889, Fax: +603 2770 5301 Email: suraya@ambexpo.com Website: www.lankabuild.org
9 to 12 Sept 2015	Construction Indonesia 2015 Jakarta International Expo Kemayoran, Jakarta Indonesia	PT Pamerindo Indonesia/IEM/OES Tel: + 65 6233 6777, Fax: +65 6233 6768 Email: violet@iemallworld.com Website: www.constructionindo.com
10 to 12 Sept 2015	Cambuild 2015 Diamond Island Exhibition & Convention Centre Phnom Penh Cambodia	AMB Events Group Tel: +603 4041 9889, Fax: +603 2770 5301 Email: richard@ambexpo.com Website: www.expocambodia.com
10 to 12 Sept 2015	The Big 5 Construct India 2015 Bombay Exhibition Centre Mumbai India	FICCI Tel: +91 882 624 6663 Email: shaurav.pandey@ficci.com Website: www.thebig5constructindia.com
17 to 19 Sept 2015	AseanMach 2015/OneBuild 2015 Putra World Trade Centre Kuala Lumpur Malaysia	One International Exhibition Sdn Bhd Tel: +603 8943 7488, Fax: +603 8943 7599 Email: info@oneinternational.com.my Website: www.oneinternational.com.my
22 to 25 Sept 2015	BICES 2015 New Beijing International Exhibition Centre Beijing China	CCMA, CNCMC and CCPIT - MSC Tel: +86 10 5222 0905/0946/0930 Email: info@e-bices.org Website: www.e-bices.org
7 to 10 Oct 2015	Buildtech Malaysia 2015 Putra World Trade Centre Kuala Lumpur Malaysia	Trade Link ITE Sdn Bhd Tel: +603 7842 9863, Fax: +603 7842 7863 Email: info@tradelink.com.my Website: www.tradelink.com.my/buildtech
28 to 30 Oct 2015	Concrete Show Southeast Asia 2015 Jakarta International Expo Jakarta Indonesia	UBM Tel: +62 21 2930 5959, Fax: +62 21 2930 5960 Email: niekke.budiman@ubm.com Website: www.concreteshowseasia.com
Date	Events outside Asia	Organiser & Contact
20 to 25 Apr 2015	Intermat 2015 Paris-Nord Villepinte Paris France	Intermat Construction Email: contact@intermatconstruction.com Website: www.intermatconstruction.com
11 to 17 Apr 2016	Bauma 2016 Munich Trade Fair Centre Munich Germany	Messe München GmbH Tel: +49 89 949 11348, Fax: +49 89 949 11349 Email: info@bauma.de Website: www.bauma.de

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bC India sees another strong performance

The third edition of bC India, which took place from 15 to 18 December 2014 at the India Expo Centre in Greater Noida, Delhi, attracted 26,000 visitors and 635 exhibitors from 25 countries. Igor Palka, CEO of the organiser, bC Expo India, is satisfied that many exhibitors are continuing to support the show “in what is still a difficult economic environment.”

According to the organiser, the exhibitors were also pleased with the quality of the trade visitors. One of them was Sorab Agarwal, executive director of ACE. “We had visitors from all over India, but also international ones. We only had genuine customers – there was no wasting time, they were here for business,” he said. Tanmay Majumdar, associate vice president of Gmmco/Caterpillar, added, “The quality of visitors was very high, including good buyers, contractors and the like. bC India is a good opportunity to meet new customers.”

bC India also enjoys a very high status as a presentation platform for companies. “We had many customers and very serious enquiries. The visitors were very seriously interested in our products,” said Sandip Choudhuri, general manager & head of Kansbahal Works at Larsen & Toubro. “We launched a new product here and in that respect, it was very important for us to be here to use bC India as a platform.” Likewise, Ramesh Palagiri, managing director & CEO of Wirtgen India, commented, “bC India is very important for the Wirtgen Group. Here in India, bC India is the most professional trade fair. We’ll participate in the next bC India, too.”

Apart from offering a high quality show, bC India also provided an excellent opportunity for signing up new businesses. “We had customers coming and buying equipment right off the booth. We are very excited about the profile of the customers here at bC India,” said Rajesh Shrivastava, general manager for marketing & dealer development at Terex India. ■

Website: www.bCIndia.com

The third edition of bC India, which took place from 15 to 18 December 2014 in Delhi, attracted 26,000 visitors and 635 exhibitors from 25 countries.



World Demolition Summit returns to Amsterdam in November

Building on the success of previous events, the 2015 World Demolition Summit will return to its normal venue, the Krasnapolski Hotel in Amsterdam, the Netherlands, on 6 November 2015. Like before, it will feature a one-day technical conference including technical reports on some of the most challenging demolition and associated recycling projects undertaken around the world in recent months, as well as other special topics of particular importance and relevance to the industry.

There will also be a presentation of the 2015 World Demolition Awards, which makes up the second component of the summit. The Awards is now open for entries and the closing date is 31 July 2015. Entries can be made for projects that were either started, ongoing or completed during the period of June 2014 to July 2015.

The 2014 event attracted delegates from all over the world, making it one of the most international annual gatherings in the world demolition industry. ■

Website: www.demolitionsummit.com



The 2015 World Demolition Summit will return to its normal venue, the Krasnapolski Hotel in Amsterdam, the Netherlands.



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IPAF urges machine pre-start inspections

IPAF recently launched its 'pre-start inspection' campaign in Singapore, urging the access industry to conduct machine inspections properly before starting any work. IPAF said the campaign is targeted to as many mobile elevated work platforms (MEWPs) in Singapore as possible.

IPAF encourages its members to adopt the campaign and use the inspection key tags, which provide a handy reminder of points to cover for pre-start and workplace inspection. The launch of the campaign in Singapore took place during the IPAF South East Asia annual gathering on 23 January at the Temasek Club. ■

Enquiry: sea@ipaf.org



IPAF launched its 'pre-start inspection' campaign in Singapore in January 2015.

IPAF Asia Conference to be held in Hong Kong



The next IPAF Asia Conference will be held on 26 May 2015 at the Royal Garden Hotel in Kowloon, Hong Kong. The event will feature rare presentations by speakers from the region, who will provide valuable insights into the developments, growth opportunities and challenges in emerging MEWP markets. Andy Studdert (left), chairman and CEO of US-based

NES Rentals, and IPAF vice-president, will give the keynote address at the conference.

The full-day conference will run from 8 am to 4:30 pm. On the day before, 25 May, a site visit to an IPAF training centre (1:30 to 5:30 pm) and a networking event (7 to 10 pm) will take place. ■

Website: www.ipaf.org/asiaconference

PAL Card holders across five continents win prizes

More than 460 PAL Card holders across five continents have won prizes in IPAF's 'Verify and Win' free prize draw celebrating the one millionth PAL Card (Powered Access Licence) ever issued. Five principal winners won free trips to the IPAF Summit and IAPAs in the US this March and another 10 winners received IPAF Powered Access Rental Market Reports worth around €1,000 each. Other prizes included t-shirts, hi viz jackets, caps, pens and clipboards. ■

IPAF Summit and IAPAs 2015

The IPAF Summit will be held together with the International Awards for Powered Access (IAPAs) on 26 March 2015 in Washington, DC, USA.

The summit attracts senior representatives from the access industry around the world to discuss and debate the latest technical, safety and business developments in this fast-growing sector. This year's theme is 'New Technologies and New Markets'. Frank Nerenhausen, president of JLG, will be the keynote speaker at the summit and he will explore emerging technologies and their potential application in the access industry under the title 'Gimmicks or the Next Reality?'

The panel of speakers will focus on how new technologies will change the face of the access industry in the next five to 10 years and look at how existing technologies are still battling to open up new markets around the world. Speakers are being finalised, and will cover various topics including a report from Bulgaria on the battle to reclaim stolen MEWPs, a presentation from Turkey on the challenges of opening new markets to new technologies, and an update from IPAF on the latest developments in eLearning.

The IAPAs are the premier event celebrating best practice and excellence in the powered access industry, drawing full-capacity audiences of around 450 each year. This is the seventh time that the awards are being held. Participants do not have to be an IPAF member to enter for an award.

The categories, open to all companies and individuals in the powered access industry, are: Contribution to Safe Working at Height; Access Rental Company of the Year; Powered Access Pioneer; Product of the Year – Vehicle/trailer-mounted; Product of the Year – Self-propelled (booms, scissors, atrium lifts); Product of the Year – Mast climbing work platforms/hoists; Product of the Year – Low-level access; Outstanding Customer Service; Project of the Year; IPAF/Access International Lifetime Achievement Award; and Access Photograph of the Year.

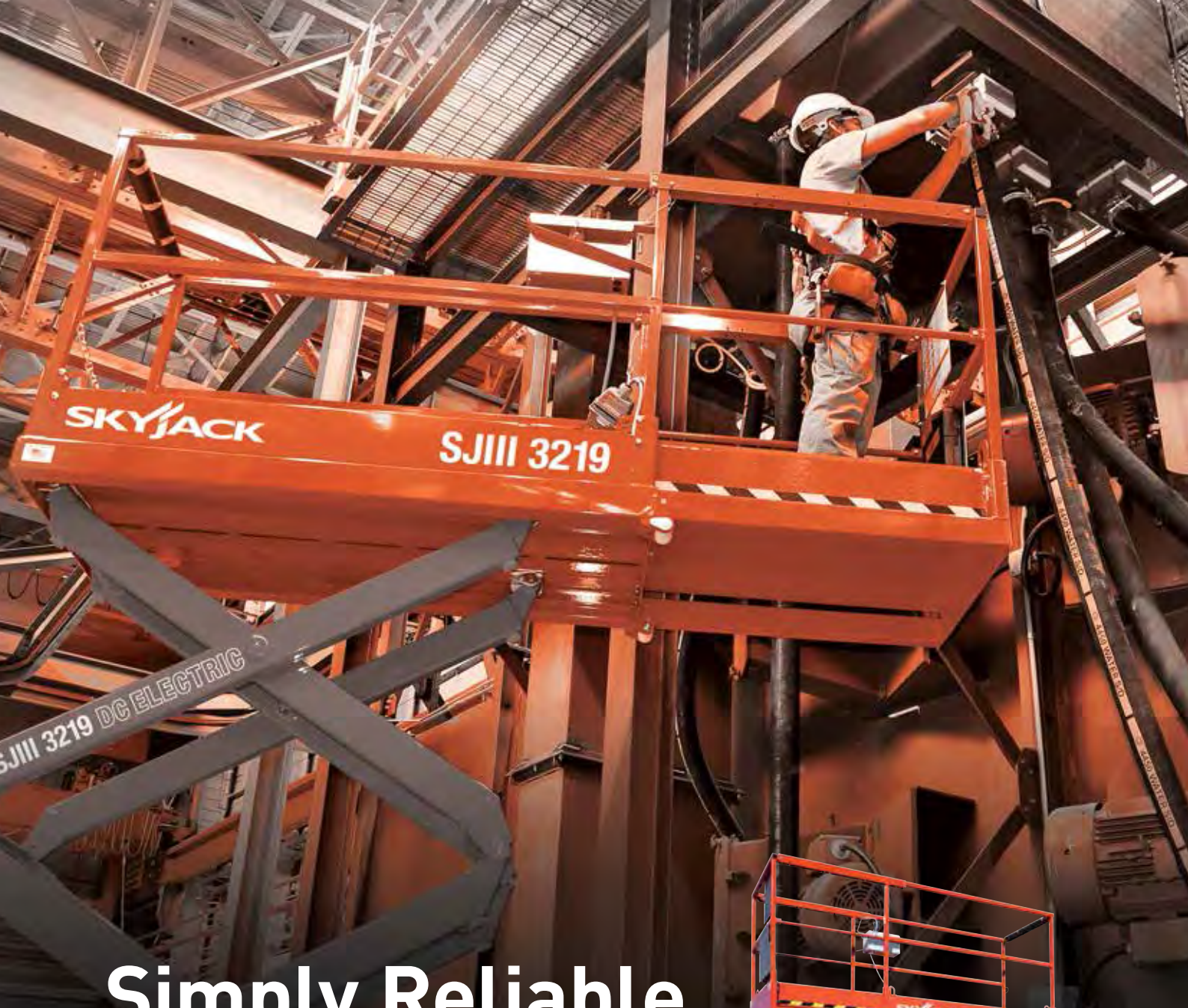
There are two categories designed for IPAF member companies and individuals only, including the IPAF Training Instructor of the Year and IPAF Training Centre of the Year.

The independent judging panel comprises industry experts with long-standing experience in the business. The judges are impartial and make their decisions based on the merit of each entry. Judges are excluded from entering their company for any awards. ■

Website: www.iapa-summit.info



The 2014 IAPA winners.



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New Potain MCT 85 flat-top tower crane

The Potain MCT 85 flat-top tower crane from Manitowoc Cranes has a 5t maximum capacity and an ability to lift 1.1 t at its jib end of 52 m. The crane is easy to transport, needing just two trucks for the entire top portion of the crane, said the company. On-site assembly is also simplified thanks to the pre-assembly work done at the company's factory.

The MCT 85 can be operated as an internal climbing crane, positioned within the building it is constructing. Mounted on 1.2 m mast sections, the crane offers a maximum freestanding height of 33.2 m when operating internally.

The MCT85 recently made its appearance at bC India, which took place from 15 to 18 December 2014. The crane was sold to SJ Contracts Pvt Ltd, a construction company based in Pune. ■

Enquiry: punitha.govindasamy@manitowoc.com

Potain MCT 85 tower crane at bC India.



The 'Super' spray paver from Vögele

The new Super 1800-3 SprayJet from Vögele boasts a wide range of innovations. The highlight of the paver is the integration of the control panel for the spray module into the Vögele ErgoPlus 3 operating system. The spray module is configured as a standalone functional unit. This design makes the Super 1800-3 SprayJet easy to maintain and also able to be used as either a spray paver or a conventional asphalt paver. The maximum spray width is 6 m, but as a conventional asphalt paver without spray functionality the pave width can be as much as 9 m.

The paver also boasts all the features of the Dash 3 paver generation. The Vögele EcoPlus package, for instance, significantly reduces both fuel consumption and noise levels. The new AutoSet Plus functions ensure quick and safe relocation of the paver on site and allow individual paving programmes to be stored. PaveDock, the sprung push-rollers, reliably compensates for the jolts generated by the feed vehicles in the feed process and, together with the PaveDock Assistant communication system, enables the mix to be transferred quickly and safely.

The Super 1800-3 SprayJet is ideal for paving thin overlays as well as conventional binder and surface courses. It can be deployed in various applications, whether used as a conventional road paver of the higher mid-range or a special machine for special jobs. ■

Enquiry: wirtgen@wirtgen.com.sg

Right: The highlight of the machine is the integration of the control panel for the spray module into the Vögele ErgoPlus 3 operating system. The spray module is configured as a standalone functional unit.



Above: The Super 1800-3 SprayJet is ideal for placing thin overlay as well as conventional binder and surface courses.

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XCMG develops a wide range of new machines

XCMG has launched several new machines for road construction, including the XM1003S road surface milling machine featuring a milling width of 1,000 mm, flexible travel steering system and front axle steering angle of up to 70°; XS83 vibratory roller, which meets the North America and CE certification requirements; 39 t XS395 single drum vibratory roller with a compaction depth of over 1 m; and GR215K grader, which is powered by a 164 kW Cummins turbo engine that complies with Euro Stage 3 emission standards.

In addition, XCMG's new LW900K-LNG liquefied natural gas wheel loader is designed to help reduce fuel costs by 30 percent and improve power efficiency by 15 percent. The top and bottom of the front and rear frames are connected with double-row tapered roller bearings, thus increasing the breakout force to over 260 kN.



Another highlight is the XSZ2000 hydraulic drilling rig, which features XCMG's proprietary technologies such as oil and gas suspension, independent axle lifting and intelligent multi-axle turning control. The machine has a small turning diameter of less than 23 m and is suitable for use in harsh environments such as mud, sand, snow, etc. It is also fitted with the hydro-pneumatic suspension technology for excellent riding performance. ■

Enquiry: export@xcmg.com

XCMG's XM1003S road surface milling machine (above) and XSZ2000 hydraulic drilling rig.



Linden Comansa introduces 21LC335 tower crane

Linden Comansa recently unveiled its new 21LC335 flat-top tower crane, which is part of the LC2100 series. It is intended to replace its predecessor, the 21LC290. Both cranes feature similar characteristics in terms of range (up to 74 m), maximum freestanding height (64.5 m) and versions depending on the maximum load capacity (12 and 18 t).

However, the new 21LC335 has an increased load capacity with maximum reaches under 70 m. For example, the 18 t 21LC290 with a 50 m jib can load up to 5,300 kg at the end of the jib, while the new 18 t 21LC335 with the same jib length loads up to 6,600 kg - an increase of almost 25 percent. With this same 50 m jib configuration, the 21LC290 can move the maximum load of 18 t up to 16.3 m, while the new 21LC335 moves the maximum load up to 19.6 m.

The tower sections of the 21LC335 are the S25, just like the 21LC290; the jib and counterjib sections of both cranes are also the same. There have been modifications only on the cat head and the upper turntable, allowing customers to convert their 21LC290 into a 21LC335 by replacing these two elements and modifying the configuration of the counterweights. These changes have also simplified and shortened the assembly sequence of the 21LC335 in comparison to



Linden Comansa's new 21LC335 flat-top tower crane has an increased load capacity with maximum reaches under 70 m, compared to its predecessor.

the 21LC290.

The 21LC335 crane comes standard with an Effi-Plus high speed hoist mechanism that reaches speeds of up to 150 m/min, although there are other optional engines

that can reach up to 228 m/min. This new model also includes the PowerLift system, which can improve the load diagram by up to 10 percent with reduced speeds. ■

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Sandvik's new, flexible screening solutions

Based around a 4 x 1.5 m Doublescreen the new Sandvik QA335 includes many innovative features for ease of operation and high levels of efficiency. These include a user-friendly electrical control system with sequential start up, hydraulic screen separation to aid screen media changes and a fuel efficient 74.5 kW engine.

The QA335 has been designed with wrap-around walkways to provide a safe working platform for service and maintenance, with these being hydraulically operated enabling quick set-up times. The QA335 also has a radio control for easy manoeuvrability on site, and an oil cooler fitted as standard.

The innovative Doublescreen technology consists of two high velocity screen boxes, featuring independent screen drives with the ability to adjust the working angle of each screen independently to each other to suit the exact requirements of the application. This offers greater adjustability, increased accuracy and higher screening efficiency, which makes it ideal for producing tight specification products, without compromising on production.

The QA335 also has massive stockpiling capability through integrated hydraulic conveyors and a wide selection of optional extras to suit every climate and customer need. Plus, it is easy to operate thanks to the new colour-coded control panel with sequential start up.

In addition, Sandvik has refreshed its flagship QE440 scalper with the QE441. Key refinements to the refreshed QE441 include updates to the screenbox, screen drive and screen media, which increases uptime, performance and versatility. Other improvements include upgrades to the apron plate feeder, wear resistant hopper and radio remote controls, all of which are fitted as standard.

To improve the experience for the operators, the QE441 is fitted with Sandvik's easy to use control system and user interface with sequential start, whilst two speed tracking will help to reduce travel time between jobsites. The QE441 also offers increased plant durability and operator comfort, without sacrificing on performance.

The QE441 can accept the most robust of infeed material, said Sandvik. The scalper is suitable for use in large quarrying, mining and recycling applications. It can also work as a standalone unit feeding a primary crusher.



The new Sandvik QA335 Doublescreen has many innovative features, including a user-friendly electrical control system with sequential start up, hydraulic screen separation to aid screen media changes and a fuel efficient 74.5 kW engine.



Key refinements to the refreshed Sandvik QE441 scalper include updates to the screenbox, screen drive and screen media, which increases uptime, performance and versatility. The unit is well suited to large quarrying, mining and recycling applications.

The QE441 features a total scalping area of 5.5 x 1.75 m / 5 x 1.75 m, allowing for enormous rates of production. The scalper is capable of operating in harsh environments

and can be transported from site to site easily. It also has massive stockpiling capability through integrated hydraulic conveyors. ■

Enquiry: satu.ramo@sandvik.com



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Tsurumi's submersible seawater-resistant dewatering pumps

For durability in seawater applications, Tsurumi's standard pumps can be fitted with a seawater-resistant kit (with a galvanic anode) and seawater-resistant special cast iron impeller. These pumps include those from the KTZ (1.5 – 11 kW), LH/LHW (3 -110 kW), KRS (2.2 – 22 kW), GSZ (22 – 37 kW), NKZ (22 – 11 kW) and GPN (5.5 – 22 kW) series. According to Tsurumi, its submersible seawater-resistant dewatering pumps can last for about two years depending on the operating conditions. They are ideal for use in projects such as waterfront developments and aquaculture facilities.

Tsurumi explained that, when metals with different potentials are brought into contact with seawater, only that of lower potential corrodes. As the difference in potential increases, the metal of lower potential corrodes faster. Based on this principle, a galvanic anode is applied on Tsurumi's submersible seawater-resistant dewatering pumps to protect the pump body from corrosion.

To prevent corrosion of the motor shaft - which may not be fully protected by the galvanic anode - Tsurumi has developed a seawater-resistant special cast iron impeller. This impeller has a lower potential than the motor shaft (420 stainless steel), but higher than a standard cast iron impeller. Thus, corrosion wear is only about 1/10 of a standard cast iron impeller, claimed Tsurumi.

A galvanic anode is an electrolytic protective measure used with metals of different corrosive potentials. Metals of a potential lower (aluminium and zinc) than the pump body (cast iron and steel)

are brought into contact with the body via the galvanic anodes and allowed to corrode in order to protect the body. However, the full effect cannot be obtained unless the anodes are installed in proper positions, highlighted Tsurumi. The company said it mainly utilises aluminium because of its superior anticorrosive performance per unit weight, while utilising zinc for only the strainer stand that is liable to be worn by water current.

Tsurumi added that, since the galvanic anodes are worn by corrosion, they need to be replaced regularly. They can be replaced easily and used immediately after replacement.

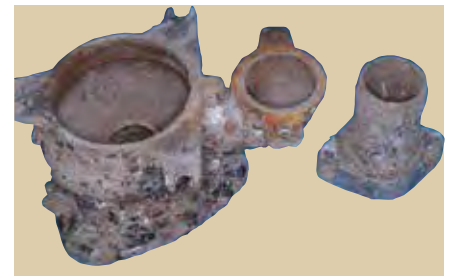
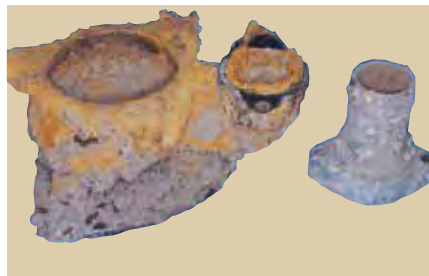
Moreover, while the pump is running, bearing grease serves as an insulation medium to electrically disconnect the rotating motor shaft and impeller from the pump body, so the galvanic anode does not protect rotating parts, explained Tsurumi. In seawater applications, the materials of the shaft and impeller must be carefully matched to avoid shaft corrosion and expensive repairs.

With that in mind, Tsurumi has developed a seawater-resistant special cast iron impeller to protect the shaft from corrosion by seawater. This material is made by specially treated chromium cast iron. Because its electric potential is slightly lower than that of the shaft, the impeller corrodes gradually instead of the shaft.

Tsurumi said the impeller needs to be replaced every few years up to 10 years, depending on the operating conditions. However, the impeller is believed to cost far less than the shaft to replace. ■

Enquiry: sales@tsurumipump.com.sg

The Tsurumi KTZ pump can be equipped with a seawater-resistant kit (with a galvanic anode) and seawater-resistant special cast iron impeller.



Above: Based on the field tests performed by Tsurumi, a galvanic anode was found to be very effective in preventing corrosion. These pictures show how the pump body would look like when installed without a galvanic anode (left) and with a galvanic anode.

Below: Tsurumi has also conducted a motor shaft corrosion test.



A cast 304 stainless steel impeller mounted on a 403 stainless steel shaft (the shaft is heavily corroded).

A seawater-resistant special cast iron impeller on a 403 stainless steel shaft (the shaft is protected from corrosion).



High-chromium cast iron.



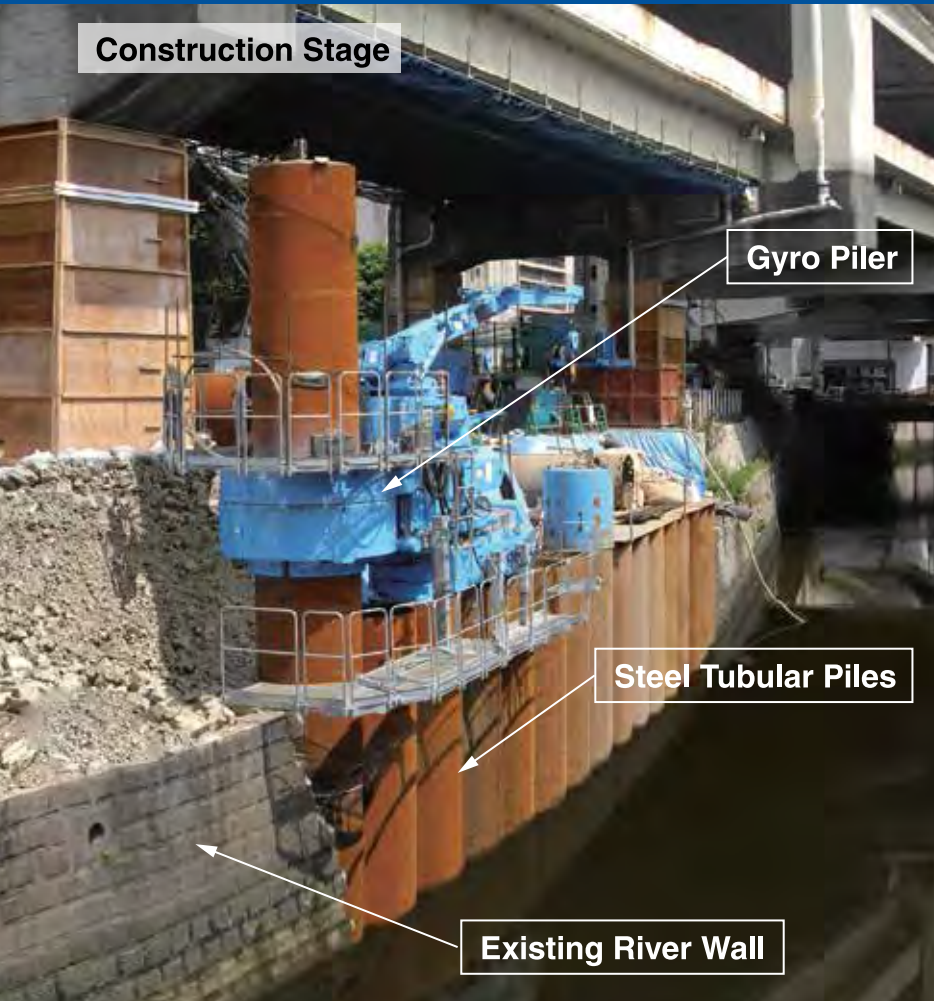
Seawater-resistant special cast iron.

Rapid Upgrading Method

Demolition work-free, advanced approach for upgrading and improving of existing infrastructure

Example: River Revetment Upgrading Work

Construction Stage



Restoration of existing infrastructure often requires the replacement of the existing infrastructure and sometimes, it is inevitable to demolish the existing infrastructure to build a new one.

In general, demolishing old infrastructure takes a long time and is costly, and the speed and budget of the project are hugely compromised.

The Rapid Upgrading Method enables the existing foundations to remain in place if necessary and construction costs and time can be minimised at the same time.

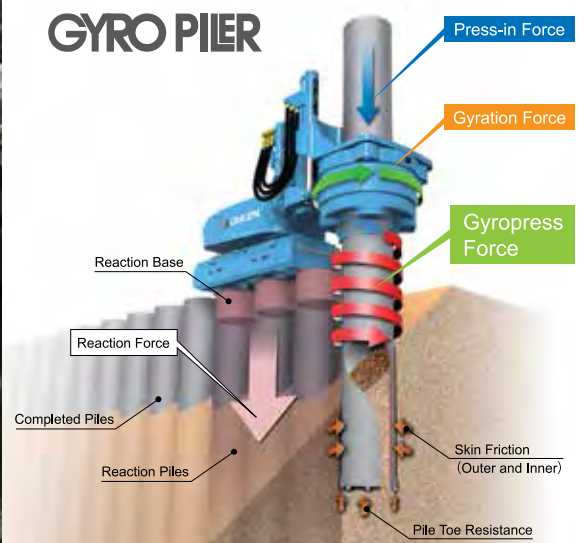


Completion



Gyropress Method

GYRO PIER



Various access equipment from JLG

JLG's 24RS boom lift features a streamlined design with fewer parts, making it easy to maintain without sacrificing performance. It is the lightest weight machine in its class, weighing just 10,568 kg, which is about 4,300 kg less than similar 24 m telescopic boom lifts, said JLG. The 24RS boom lift is engineered to fit into a 40-ft shipping container, providing significant savings in transportation costs and contributing to a lower total cost of ownership.

The JLG X23J compact crawler boom is powered by rechargeable electric batteries and a combustion engine, so it can be used indoors and outdoors. It moves on non-marking tracks instead of tyres, and its narrow chassis allows it to pass through gates, standard commercial doorways and public buildings. The X23J has a 21.10 m elevated platform height, an 11.4 m horizontal reach and an up to 200 kg platform capacity.

Other highlights from JLG include the E450AJ electric boom lift with a 13.72 m platform height, and the 3246ES electric scissor lift with a 9.68 m platform height and a steel platform.



A wide range of JLG access equipment on display at bC India 2014.

All of the machines were recently displayed at bC India, which took place from 15 to 18 December 2014. ■

Enquiry: juzhao@jlg.com

Innovative concrete screeding machines

Ligchine International offers the Screenshot series of laser guided boom extension concrete screeding machines. They use Topcon's 3D satellite controlled GPS system for screeding contoured concrete like parking lots. The Ligchine/Topcon system can run a fleet of machines simultaneously - including all Screenshot models, dozers, motorgraders, curb machines, excavators and pavers - from a single GPS base station.

The Screenshot machines can travel through difficult jobsites (e.g. sand) with total ease, thanks to their all-terrain track drive. The machines are operated with a wireless remote control, so the operator can move freely and safely at ground level controlling the crew and the concrete placement results.

The Screenshot machines also feature an independent hydraulic front wheel drive, which results in a zero turn radius. The machines are light enough to run on heat tubing, steel rebar and plastic vapour barriers. In addition, they can be transported easily with an economical personal size truck and utility trailer combination. ■

Enquiry: peter.paras@parchem.com.au



Above and left: The Screenshot machines operate with Topcon's 3D satellite controlled GPS system.

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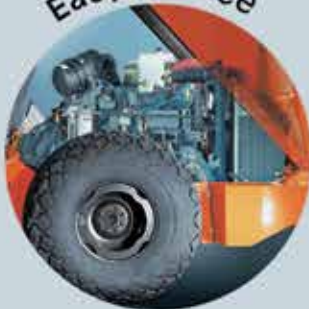
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Liebherr rotary drilling rig builds Myanmar's condominium

The first Liebherr LB 28 drilling rig in Myanmar is now working on its second project after successfully completing foundation drilling for one of Yangon's largest commercial projects. The rig has started bored piling work on The Illustra At Pho Sein, a 31-storey condominium project being built on Pho Sein Road in Yangon's premier Kandawgyi Lake district.

Developer of the project is PSWN Development Company Ltd, which has subcontracted geo-engineering specialist Golden Tri Star Co Ltd (GTS) to carry out the foundation work. GTS is the owner of the LB 28, and is a division of Shwe Taung Group, the company that is developing the Junction City project in downtown Yangon, which is where the rig made its debut on the foundation before being moved to The Illustra.

Designed by DP Architects, The Illustra has a total ground floor area of 30,800 sq m. Measuring approximately 50 x 100 m, the ground at the site consists largely of silt and has a very high water table of less than 2 m below the surface.

There are three sizes of piles to be installed. A total of 11 piles, designated T-1, will have a diameter of 800 mm and will be sunk to a depth of 55 m. Type T-2 will total 62 piles, and have a diameter of 1,200 mm. These will be sunk to 57 m, as will the total of 66 type T-3 piles, which will have a diameter of 1,350 mm. The first piles that have been bored are type T-2, with each boring has taken between eight and nine hours.

The LB 28 is a medium range rotary drilling rig that delivers a maximum torque of 320 kNm. It features an operating weight of 93 t and a maximum push/pull force of 400 kN. Powered by a 390 kW diesel engine, the rig can drill to a depth of 70 m and maximum diameter of 2,500 mm.

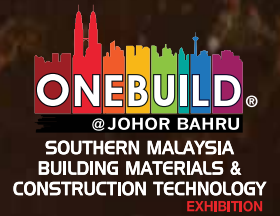
According to Liebherr, the LB 28 is the highest torque rotary drilling rig that has been used in Myanmar so far. The company believed there is a considerable potential in the country for high-torque machines such as the LB 28, seeing as many high-rise projects are due to be built in and around Yangon, and because of the soft ground conditions and the need to sink multiple concrete piles to great depths. The Illustra is due for completion in 2016. ■

Enquiry: tobias.froehlich@liebherr.com



Above: The first Liebherr LB 28 drilling rig in Myanmar is now working on The Illustra At Pho Sein, a 31-storey condominium project being built on Pho Sein Road in Yangon's premier Kandawgyi Lake district.

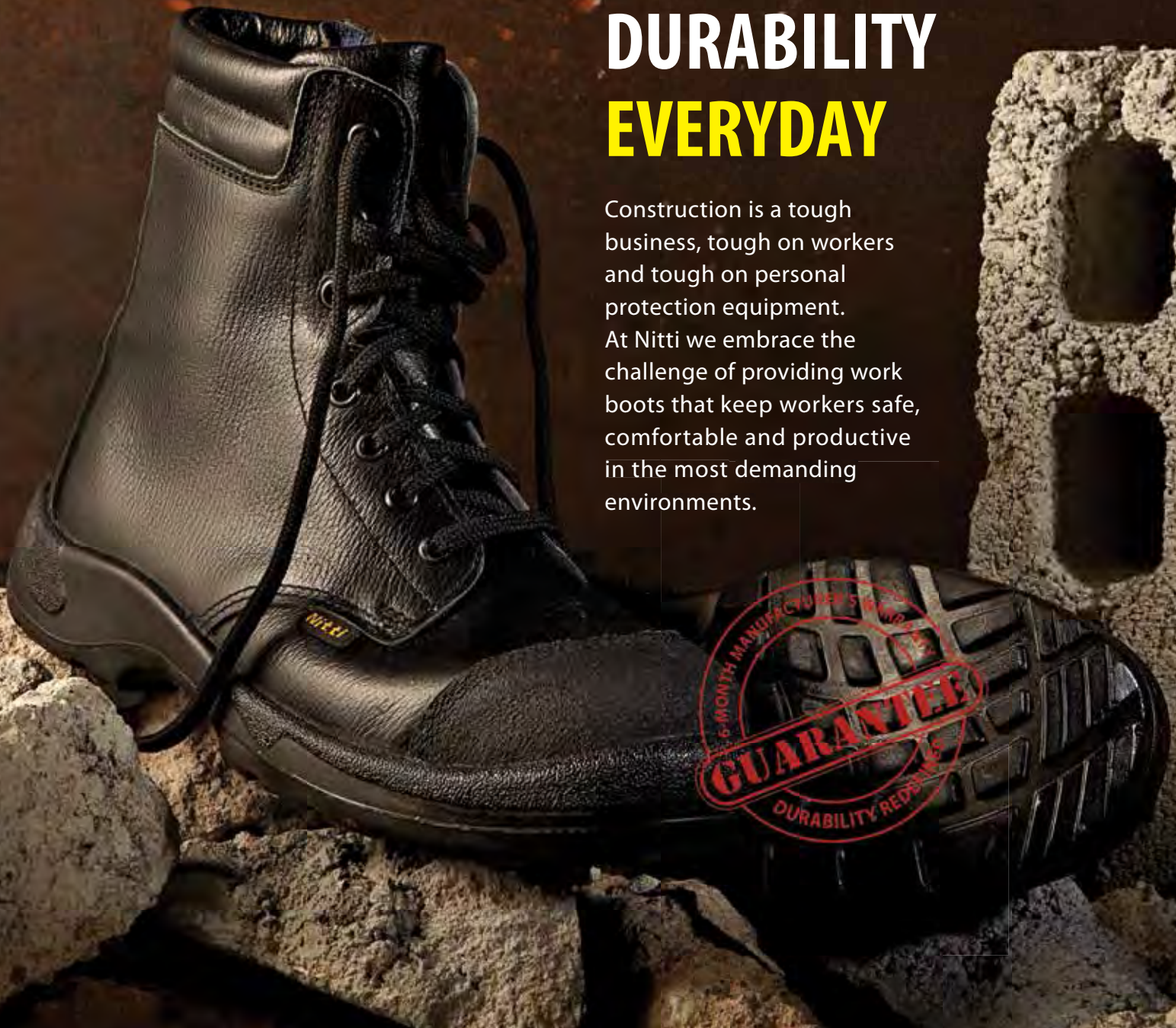
Left: The LB 28 is a medium range rotary drilling rig that delivers a maximum torque of 320 kNm. It features an operating weight of 93 t and a maximum push/pull force of 400 kN.



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Doka forms 'new district' of Istanbul

A massive mixed-use development is currently underway in Istanbul, Turkey. The Ağaoğlu Maslak 1453, as it is called, will have office buildings, residences, a hotel, a contemporary shopping mall and a city entertainment centre. The new complex sits on a 325,000 sq m land.

Contractor of the project, Akdeniz Construction, is using Doka's formwork system on five high-rise buildings with unique architectural designs, which are said to be the tallest in the complex. Doka's self-climbing formwork system allows each floor to be casted in approximately six working days.

The building cores will be formed using the SCP self-climbing platform (with a load-bearing capacity of 40 t) and Top 50 large-area formwork. Repositioning of the SCP formwork is carried out automatically, without any crane, saving time and money.

In addition, the Xclimb 60 automatic climbing protection screen guarantees safety of the crews and shields them from various



weather conditions such as storms and winds at every level of height. The flexible Dokaflex floor formwork system is used for the 2,000 sq m floor surface. Twenty sets of Top 50 column formwork ensure smooth and rapid progress during construction of the walls. Another Doka system used is the d2 load-bearing tower, which features easy assembly and high load bearing capacity.

Construction of the Maslak 1453 started in November 2012 and is expected to be completed in December 2015. The contractor is targeting LEED Gold status for the project. ■

Enquiry: wolfgang.pessl@doka.com

Top: Work on the Ağaoğlu Maslak 1453 started in November 2012 and is expected to be completed in December 2015.

Middle: The new complex will have office buildings, residences, a hotel, a contemporary shopping mall and a city entertainment centre on a 325,000 sq m land.

Left: Doka's self-climbing formwork system does not require any crane, saving time and money.



Technal & Jean Nouvel and François Fontès

The new city hall of Montpellier in France has been designed to be a flagship eco-friendly building. 13,000 sqm of solar panels, moveable louvres, and **clever aluminium building solutions such as SOLEAL window** profile range, have been selected here. This system enables to get **outstanding results**, especially in terms of superlative standards of thermal and acoustic insulation - achieving **significant energy savings and maximum comfort for users**. Our philosophy of working is always in **close collaboration with leading prestigious architects and also new emerging talents**; means we develop technically and aesthetically **advanced design solutions** for all our clients and which today can be seen in **over 90 countries** around the world.



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Eurotec supplies 'green' concrete batching plant to Lafarge

IPS-Eurotec has supplied its first environment-friendly ready-mixed concrete batching plant to Lafarge Concrete (M) Sdn Bhd in Kuala Lumpur, Malaysia. This is believed to be the largest fully enclosed ready-mixed concrete batching plant in Southeast Asia to date.

With a 4,000 sq m built-up area, the Chan Sow Lin City Plant started its operation in March 2014. It helps Lafarge to deliver various concrete materials efficiently and is currently working

up to 24 hours per day in order to cope with the increased local demand. In addition to being entirely covered, the City Plant boasts several features that can minimise both noise and air pollution level. The plant is also equipped with concrete recycling technologies. According to IPS-Eurotec, other technologies such as concrete cooling for special mix designs are included for Lafarge. ■

Enquiry: info@eurotec.com.sg



Left and above: Lafarge Malaysia has taken delivery of a ready-mixed concrete batching plant from IPS-Eurotec. The plant is fully enclosed, featuring reduced noise and low air pollution level.

XCMG XCA5000 erects wind turbine in Yunnan province

An XCMG XCA5000 all-terrain mobile crane was recently used to build a 2 MW wind turbine in Yunnan province, China. The 600 sq m job site was located at the top of a mountain, more than 3,000 m above sea level. The 2,000 t crane successfully installed the 22 m high and 68 t tower bottom on its base, and lifted the second and third sections into place.

Erecting the giant nacelle was the most challenging part of the project, due to the wind speed that reached 16 m/s, said XCMG. However, the XCA5000 managed to place the 91 t nacelle at the top of the 81 m high tower. According to XCMG, the XCA5000 all-terrain crane is suitable for 3 to 3.6 MW wind turbines up to 110 m high and can work under demanding conditions. ■

Enquiry: export@xcmg.com



Left and above: The XCA5000 erects a 2 MW wind turbine.



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Peri offers innovative solution for Brazil's new futuristic museum

The 'Museum of Tomorrow' in Rio de Janeiro, Brazil, was designed by the Spanish architect and engineer Santiago Calatrava. This futuristic building is said to be the central component of the ambitious 'Porto Maravilha' urban development, which is aimed to transform the city's historical waterfront into a thriving cultural and residential landscape by the start of the 2016 Olympic Games.

Located on the highly prominent Pier Maua, the museum extends 300 m into the sea being surrounded on three sides by water. The cantilevered roof and facade with moving elements ensure optimum air conditioning. The two storeys are connected by means of inclined ramps and have a total area of 5,000 sq m. Upon completion, the museum will showcase trend-setting exhibitions and technologies.

To allow the complex in-situ concrete design of the museum to become a reality, Peri planned, produced and delivered more than 3,500 project formwork elements, mostly double-curved 3D formwork units. Peri has also been responsible for the comprehensive formwork and scaffolding planning, as well as the assembly of the formwork elements.

The 3D planning was carried out at the Peri headquarters in Weissenhorn, Germany. The respective assembly plans and data provided the basis for the dimensionally accurate CNC-controlled cutting of the



Above: Supported by Peri Up shoring and working scaffolds, as well as a Variokit raised formwork units, the customised elements were assembled on site to form a complete 3D formwork construction.

Left: The 3D formwork units were pre-assembled with the help of the individual formwork elements produced at the CNC woodworking facility at Peri.



The 'Museum of Tomorrow' was designed by Santiago Calatrava and extends 300 m into the sea on a pier.

formwork units and final assembly. Peri said both tasks took place over a period of only 13 months through assembly operations at the company's Brazilian headquarters in São Paulo. Here, CNC woodworking equipment was used to process around 60,000 sq m chipboard to create the formwork units in two-shift operations – the decisive basis for the single and double-curved formwork elements. A total of 25 formwork erectors in Brazil ensured that between 10 and 20 ready-to-use customised elements were delivered to the site every day, explained Peri, just-in-time according to the construction schedule.

To perform such excellent formworking tasks in a cost-effective manner, Peri used a high proportion of system components for its complex project solution. In the main, Vario basic elements were selected, which also allowed efficient handling on the jobsite – similar to system formwork. ■

Enquiry: pha@periasia.com

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LEADERS IN LIFTING



PRIDE OF MYANMAR

The Hledan Flyover in
Yangon, Myanmar.



The Hledan Flyover in Myanmar opened to the public in 2013, after just 12 months of construction. T.Y. Lin International worked with the design and build contractor Shwe Taung Development Company to provide design and seismic analysis services on the project.

Built to alleviate severe traffic congestion in the busy, fast-growing city of Yangon, the flyover, which runs along Pyay Road, has a total length of almost 500 m and crosses Hledan Junction, a major five-arm intersection located in the heart of the city.

The flyover is a composite steel girder with a typical span length of 30 m. The main span across Hledan Junction measures 40 m and is divided into 14 spans with seven steel girders in each span. The width of the deck is 16 m, carrying dual carriageways with two lanes of traffic in each direction.



Top: Built to alleviate severe traffic congestion in the city of Yangon, the flyover crosses Hledan Junction with a total length of almost 500 m.

Above: Bored piling work started in 2012.



Installation of lead rubber bearings to improve the damping performance of the structure during seismic activities.

The flyover is located within a seismic zone where the peak ground acceleration is around 0.2g, which is considered high. Thus, lead rubber bearings have been adopted to improve the damping performance of the structure during seismic activities. This technology is believed to be a first in Myanmar.

In addition, the flyover features T-shape piers with a post-tensioned cantilever arm. Such design is also said to be the first of its kind in the country.

Bored piling work started in June 2012. A total of 94 piles were installed successfully after two months, and 13 crossheads were built within three months. The project was reportedly completed without any casualties (zero accident).

The Hledan Flyover won the 2014 Outstanding Engineering Achievement Award from the ASEAN Federation of Engineering Organisations (AFEO), which was presented at the 32nd Conference of ASEAN Federation of Engineering Organisations 2014 awards ceremony in Yangon on 12 November 2014. ■

Below: The Hledan Flyover is a composite steel girder bridge with a typical span length of 30 m. The width of the deck is 16 m, carrying dual carriageways with two lanes of traffic in each direction.



© Shwe Taung Development Co Ltd



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A total of 13 crossheads were completed within three months.

Top and above: Erection of steel girders.





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RETURN OF THE DRAGON



One of Da Nang's most iconic landmarks is a new steel bridge in the shape of a dragon. It has six 3.75-m-wide vehicle lanes and two 2.5-m-wide pedestrian sidewalks with a 666-m-long multi-arch structure. The bridge weighs up to 1,000 t, believed to be the largest in the world.

Designed by Louis Berger Group, a US-based construction and architecture firm, the bridge is modelled after the dragon of the Ly Dynasty, which ruled Vietnam from 11th to 13th century. The dragon is regarded as an important symbol in Vietnamese culture. At night, the bridge is lit by more than 2,500 LED lights and on special occasions, it can shoot out both fire and water.

The bridge crosses the Hàn River, providing the shortest link between Da Nang airport on the western side of the city and the beaches to the east. Apart from giving impetus to the city's coastal tourism and cultural development, construction of the project also reflects the aspiration of the local people for making Da Nang a modern, thriving and worth-living city.



Top: The Dragon Bridge across the Hàn River in Da Nang, Vietnam, features six 3.75-m-wide vehicle lanes and two 2.5-m-wide pedestrian sidewalks with a 666-m-long multi-arch structure. The bridge weighs up to 1,000 t, believed to be the largest in the world.

Above and right page: The bridge can shoot out both fire and water, and at night, it is lit by more than 2,500 LED lights. Construction of the project reflects the aspiration of the local people for making Da Nang a modern, thriving and worth-living city.



Work on the Dragon Bridge started in 2009. The project was inaugurated on the 38th anniversary of Da Nang City's Liberation Day, 29 March 2013.

The dragon structure is made of steel spans totalling 568 m in length and nearly 9,000 t in weight. To ensure the durability of the bridge, the contractor used Mapei concrete admixtures and Mapei protective and decorative coatings.

About 20,000 l of Mapei Dynamon SR1 concrete admixture was applied on the Super-T beams. The admixture is said to have excellent characteristics in terms of low water/cement ratio, high mechanical strength and long slump retention. Approximately

30,000 l of Mapefluid R104 was also used on the project, which features high retention of workability (low slump loss and/or retarding of cement hydration at early ages for successful application on the cast-in-place concrete piles).

Furthermore, around 5,000 kg of Mapei Antipluviol protective and decorative coating was applied on the sidewalks along the bridge and two bridge ends. The product is known for its efficient protection against aggressive atmospheric agents that penetrate into the structures and cause damages, and for its excellent resistance to the alkalinity present in cement materials and ultraviolet rays. ■

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K0 beam.



D1000 concrete pillar.



P3 concrete pile application.



The dragon's body application.



Fire breathing trial.



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The article courtesy of Realta Mapei International no. 46



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A PAVING MARVEL

The Oakland Bay Bridge in the US is a visual and engineering marvel in its own right. That was the case when it opened as the world's longest bridge in 1936, and the marvels continue with the recent 'seismic retrofit' and construction of a self-anchored suspension span (SAS). While the engineering received much of the attention, there were also significant changes to the asphalt on the bridge.

O.C. Jones & Sons Inc paved large portions of the bridge. The company essentially took on two different projects as part of the work. First was the placement of specialised epoxy on the SAS portion of the new bridge. The second project was the new transitional paving on the Oakland touchdown side of the new bridge - this area stretched 1,289 m from beyond the toll plaza to the new bridge approach. The California Department of Transportation (Caltrans) wanted a new surface on the approach, and also corrections to grade and slope.

Two 25 mm lifts of epoxy asphalt concrete (EAC) were placed on the eastbound and westbound lanes of the Bay Bridge's new SAS

span. The epoxy was believed to be chosen because of its extreme durability, tractive benefits and lighter weight. "The material used was quite unique, and presented some interesting challenges not normally seen with conventional asphalt concrete," said Kelly Kolander, president and CEO of O.C. Jones.

The EAC is essentially a 9 mm mix that uses a two-part epoxy. One part is blended with AR 4000 paving oil. It is combined with a specialised dry aggregate and a separate epoxy resin, and mixed in a pug mill. The resultant EAC is then placed atop a two-part epoxy bond coat. That bond coat was applied to both the steel bridge deck and the first lift of EAC.

The bond coat needed to be applied at a high application rate, using both a robotic device and spray wands. The epoxy products, as well as the technical support, were provided by Chemco Systems. "The EAC is significantly different from conventional AC in that once the material is produced from the batch plant, a chemical reaction begins as it is hauled to the project site," said project



The Oakland Bay Bridge recently underwent repair work.

manager Bill Jensen. "Due to this chemical reaction and extremely tight time and temperature requirements, consistency in travel time for the haul trucks and in the production of the material at the plant were crucial."

So crucial was timing that O.C. Jones was able to secure a haul route to the site with the help of the Californian Highway Patrol and Caltrans. Those organisations worked to minimise traffic disruptions.

Once the material arrived, it was again tested before it could be placed

Continued overleaf...



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through the paver. The window for mix placement was extremely tight and closely monitored by testing personnel to ensure project specifications were met. The material was then approved for placement on the bridge deck.

The process had another complication: trucks and other machines were not allowed to travel on the paving lane after the bond coat had been applied. That meant the material had to be loaded from the side.

This was one of the reasons that O.C. Jones utilised a Weiler E1250A remixing transfer vehicle on the job. The E1250A's conveyor accommodates offset paving, enabling trucks and the RTV to stay off the paving base and the bond coat. In addition, the E1250A does not have storage capacity, helping the machine weigh 23,000 kg less than an RTV with storage - an important factor when working on a bridge.

The material was discharged into a Cat AP1055E asphalt paver, which utilised non-contact averaging skis for enhanced ride quality. Compaction and rolling patterns were again closely monitored and achieved with Cat CB54 vibratory asphalt compactors and Cat PS150C rubber-tyred rollers. The compactors typically made three complete passes, with movement up and back counting as a single pass.

Another unique aspect of the project was the need to thoroughly clean out the RTV and paver after every pass, typically 670 m in length. Unlike conventional AC, EAC is not thermoplastic, and therefore cannot be reheated.

Once the chemical reaction occurs, the mix remains hard. "This required removing any built-up material in the paver's auger chamber as well as inside the RTV to avoid cured EAC from falling onto the finished mat," said Kevin Goddard, O. C. Jones' area manager.

The second project

The bridge was shut down over Labour Day weekend as O.C. Jones crews reconstructed the approach area on the Oakland touchdown side. This portion of the project did not require the placement of EAC. Instead, crews worked with traditional AC mix, as well as an open-graded asphalt cement. About 17,200 t were placed over an area of 93 mil sq m.

Yet the project had its own challenges. Cold planers had to remove mix over much of the area before repaving could begin. So large was the required milling volume that up to seven machines worked continuously for 36 hours. The levelling was particularly extensive in some areas. The eastbound direction required a large profile correction and required removing asphalt at depths up to 0.9 m.



The epoxy offered significant benefits, including durability and traction, but was very difficult to work with.



Compaction and rolling patterns were closely monitored given the challenging material.



Left and right: The Weiler E1250A remixing transfer vehicle features a conveyor swing, which enables offset paving, and weighs less than an RTV with storage - a key feature when working on bridges.

Continued on page 61...

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“Complicated cross-slope corrections, levelling and new construction to tie into the new bridge structure from the existing toll plaza area proved challenging, given the tight time constraints,” said area manager Jim Gallagher.

Paving work began at 10 pm Wednesday night and continued non-stop until Sunday morning, utilising one night crew and two daytime crews. “There was an incredible amount of coordination between the AC plants, grinders, trucking, traffic control and access points,” explained Mr Jensen. “Over half of the material placed was required to correct cross slope to aid drainage, establish a new roadway profile, and level uneven pavement, which is all very time-consuming.”

In addition, the westbound portion goes from five lanes to 20 lanes at the toll plaza, then back down to five lanes. “It made the joints and lane lines an increased challenge,” said Mr Kolander.

Equipment used included Cat AP1055E and 655D asphalt pavers; Cat CB64,



The Weiler E1250A RTV helped the paving train move continuously and consistently.

CB54 and PS 150C rollers; and the Weiler E1250A RTV.

Mr Kolander said the demands on the job left no margin for error, yet O.C. Jones was able to deliver. “Being such a complicated

and specialised paving project, not to mention such a high-profile one, we required high-production, quality equipment and 100 percent uptime,” he said. ■

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A JUMBO IN THE TUNNEL



A key part of the Sabangan Hydropower Project was the construction of a 3.2 km tunnel, which has recently been completed.

The Sabangan Hydropower Project in the northern part of the Philippines is currently under construction, and when operational will be a 14 MW run-of-river electricity generating plant. A key part of the project was the construction of a 3.2 km tunnel, which has recently been completed three months ahead of schedule.

The history of the project dates back to July 2011, when the go ahead to proceed was given to Hedcor Inc, which will own and operate the plant. When fully operational, the plant will supply the Mountain Province with 14 MW of clean and renewable energy. Construction began in the first quarter of 2013, and initially the project was expected to take 22 months to complete.

Sabangan is a municipality of the Mountain Province, and shares its borders with Bontoc and Sagada to the north, and the province of Ifugao to the east. It is politically subdivided into 15 barangays, of which barangays Namatec and Napua are the locations of the hydropower project. Besides providing clean and renewable energy, the project has also provided employment to hundreds of local residents who will also be trained to operate and maintain the power plant upon its completion.



From the very beginning the wishes and well being of the local inhabitants of the area have been paramount, with their consent being first sorted by Hedcor for the development of the plant. In return the local land owners, and the indigenous peoples of the Tinmakudo ancestral domain, have benefitted through employment on

the project, as well as rental and royalties derived from the use of their lands and communal properties.

In addition, the development of 9.5 km of access roads to the plant will serve as farm-to-market roads to be used by the local community as well as the project's conveyance line, which brings water to the



Top and above: When fully operational, the Sabangan hydropower plant will supply the Mountain Province with 14 MW of clean and renewable energy.

plant - which may also be used as a source of irrigation for farmers' crops.

The hydropower project itself will feature a run-of-river generating plant; this involves a portion of the water from the upper reaches of the Chico River being diverted into a pipeline through an intake weir. This pipeline brings water to a forebay tank where the water flow is slowed down allowing sand and other particles to settle. From the forebay, clear water passes through a pressure pipe or penstock to the turbine with the natural force of gravity generating energy used to spin the turbine, which is enclosed in a powerhouse together with the generator and control equipment.

The spinning turbine enables the generator to produce electricity from the turbine, with the water being discharged down a tailrace or canal back into the river. This ensures that the natural resources are maximised, with the design for this type of hydroelectric power generation plant being seen as the least disruptive to the environment.

Upon completion, the generating plant will have an estimated annual capacity of 55 mil kWh. To supply these energy requirements, the project necessitated the construction of a 3.2 km tunnel. This was originally scheduled to be finalised by the end of December 2014, but was completed three months ahead of schedule in October. The tunnel and penstock are seen as the two most critical areas of the project, and early completion will enable power generation (and revenue generation) to start earlier than planned.

The tunnelling contractor Sta Clara International not only finished the tunnel construction ahead of time, but also ensured a safe operation throughout its construction. The company was aided by two Sandvik DD210 jumbo drills and two Sandvik LH203 load-haul-dump units. Sandvik Construction also provided aftermarket support, parts and rock drilling tools.

At first, Sta Clara reportedly encountered difficulty in advancing through heavily fractured and varying ground conditions (including unknown fault-lines). However, the slow progress turned into a more rapid advance as the company moved further into the tunnel. The rate of advance rose to 9-10 m/day (and some days reaching 14 m) on a 7 sq m tunnel face.

The Sandvik DD210 single boom jumbo drills used on the project were equipped with HLX5 rock drills, providing improved drill-hole accuracy. The success also hinged on the Sandvik machine's performance and reliability (attaining a 90 percent mechanical



Top and above: The tunnelling contractor Sta Clara International managed to complete the tunnel construction three months ahead of schedule, with the help of Sandvik machines, including two DD210 jumbo drills and two LH203 load-haul-dump units.

availability on both drills and loaders), which was made possible by a Sandvik close-support team located at the site; it also helped ensure the excellent performance of the Sandvik rock drilling tools. Proactive maintenance and support saw the 45 mm button bits being re-grinded when required, with the S48 graded buttons proving to be the best tool for use on the andesite rock, which was predominantly encountered.

Hedcor has grown to be one of the largest developers and operators of run-of-river hydropower plants in the Philippines operating 21 plants located in Davao, Benguet and Ilocos Sur, with plans to develop more hydropower plants in Kalinga, Ifugao, Bulacan and Negros Occidental. Its aim is to generate more clean and renewable energy across the country in order to attain its vision of producing 2 bil kWh of clean, renewable energy by 2020. ■

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Sandvik Construction also provided aftermarket support, parts and rock drilling tools.



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'GOING DOWNTOWN' IN SINGAPORE

Singapore's Downtown Line Stage 3 (DTL3) is expected to be completed in 2017, after which it will have a 21 km long route with 16 stations. Robbins TBMs have played an important role in the project.

For three of the DTL 3 contracts (C925, C927 and C937) logistics are said to be quite complex. Each contract includes the construction of shafts, parallel tunnels and station sites.

Contract C925, with two 800 m long parallel tunnels running between Tampines and Tampines East station sites, was awarded to Korean contractor GS Engineering & Construction Corporation. The company selected a 6.6 m diameter Earth Pressure Balance (EPB) TBM to bore the parallel tunnels. As such, the machine had to be designed for quick removal from dead end tunnel - past segment rings that made the tunnel smaller in diameter - so that it could be launched on a second tunnel drive. Ground conditions based on tests included clays, sand, gravel and sandstone conglomerate.

Contract C937, comprising two 780 m tunnels driven between River Valley station and Bencoolen stations and two 560 m long tunnels between River Valley station and Upper Cross Street, was also awarded to GS Engineering & Construction. For this contract the company chose two 6.6 m diameter EPBs to bore each of the 780 m long tunnels and one identical machine to excavate both parallel 560 m tunnels. Sections of the C937 contract made contact with the Fort Canning Boulder Bed, consisting of relatively strong and large rock boulders in a stiff clay matrix. Other ground types include clays, mudstone, siltstone and sandstone.

Parallel 1.4 km lines on the C927 contract running between Bedok Park and Bedok Reservoir Stations were awarded to Italian contractor CMC di Ravenna. The company opted for two EPB TBMs for the tunnels, which pass below a canal, foundations for a pedestrian bridge and a national park. Based on core samples ground conditions included clays, sand and sandstone conglomerate.



Above: The first of the five Robbins EPBs broke through at the C927 site in October 2013 after achieving advance rates up to 15 m per day.

Left: The C925 location is located just metres away from high rise condominiums, a school and a busy roadway.

Map: Singapore's Downtown Line Stage 3 (DTL 3) is a 21 km long route with 16 new stations.



Mixed ground conditions ranging from clay to mudstone, sandstone and boulder fields dictated the use of mixed ground EPBs on many of the tunnels.

Of all the jobsites, GS Engineering's C925 site may be one of the smallest, according to Robbins. "It's very close to condominiums. We were limited to filling the mucking box during days, and we have noise barriers up. There were noise metres on tops of the condos, and our ambient noise readings were only allowed to average 65 dB, which is a little bit more than ambient noise," said Andy Birch, Robbins' field service site manager. The site was additionally near a main road and a school, and though the narrow jobsite was quite long, about 1.5 km, there is very little area for storage. A station box directly abuts the back of the C925 tunnel with STEC machines operating at that site, making space a premium.

Assembly of the Robbins machine at the jobsite was also a challenge. "We had to place cranes on the surface and do load calculations to get the machine down into the shaft for assembly. We had to build the TBM on an access between two tunnels, then push it over on jacks to get it into the right alignment for launch," explained Mr Birch.

CMC di Ravenna's C927 jobsite using two EPBs was similarly cramped. "We had a small shaft available for the

Continued overleaf...

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two TBMs, 20 x 20 m. Both machines bored in the same direction, for twin drives, and passed under foundations for an overhead pedestrian bridge. These tunnels are predominantly under a national park (Bedok Park), and also go under a large 9.5 m wide canal that is 3.5 m deep for about 400 m of the tunnel,” said Chris Knight-Hassell, project manager for CMC.

At all of the sites very little muck could be stored on location due to lack of space; instead it was immediately loaded into trucks. The material was then designated for landfill to build up the shoreline of Singapore.

‘Unique conditions’

At C925, the specialised mixed ground Robbins EPB machine was launched from the small shaft site in December 2013, and quickly began ramping up excavation pace using a muck pump for muck removal in old alluvium. “It’s the first time a muck pump has been used here. We’ve gotten good advance rates, the fastest advance rates in Singapore, in fact,” claimed Mr Birch. “We started our actual excavation at one ring a day, then very quickly moved to two, and then by the time



Above: Assembly of GS Engineering’s C925 EPB took place in a cradle that had to be jacked into place for the tunnel alignment.



Left: A Robbins EPB is assembled at shaft bottom on CMC di Ravenna’s C927 contract.



A cutterhead is lowered within a small opening of the shaft at CMC di Ravenna’s C927 jobsite.

we reached rings 50-60, were getting up to four rings per day - the first time that has been done here in a 24 hour period.”

While the 30 m deep tunnel did not pass near existing utilities or building foundations, settlement still had to be kept to a minimum and ground conditioning was a big factor in that. “The operators knew about continued conditioning in front of the head, and that the material had to be kept at a certain consistency,” said Mr Birch. “We injected foam and monitored the earth pressure sensors continuously. It was imperative that we maintained about 1.6 bar on the top two pressure sensors, the middle at about 1.8, and the bottom sensors around 2.0 bar.” GS Engineering verified the effect of the machines with surface settlement monitoring.

Steady progress was made using the 6.6 m diameter Robbins EPB and it finished its first 800 m drive in April 2014. The result was within five months of its start in early December 2013 and within its 180 m/month programme average. To facilitate in-tunnel disassembly of the machine so it could start its second drive, Robbins designed each of the major components in such a way that disassembly was possible and each component could be easily transported along the tunnel and readily reassembled in the new shield. The process took about 16 weeks.

Its second blind-hole finish was scheduled for late January 2015, when it would again be disassembled, and the shield could be abandoned with the components withdrawn through its completed tunnel.

The TBMs at site C927 for CMC were launched in October 2012 and June 2013, respectively. A soil mix block 10 m in length (length of shield) x 20 m wide was added around the docking area for the TBMs. Excavation began in tough conditions from the outset. “Old alluvium is renowned in Singapore to be particularly abrasive. We use foams and polymers. I’ve worked for 16 years in Singapore, and

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this ground was particularly abrasive, with regular interventions every week to change out carbide bits and scrapers. This was generally done every 100 to 150 m,” said Mr Knight-Hassell.

Ground was particularly challenging around the area of the canal, where it was sandy and already prone to natural settlement. “When we were going through this area with the first machine, we did experience some settlement, which we then mitigated during the second machine pass,” added Mr Knight-Hassell.

The first of the CMC machines broke through in October 2013, after having achieved up to 15 m per day. The TBM exited into a 20 m wide receiving shaft, abutting the 200 m long main station structure. CMC applied ground treatment to allow the TBM to sit at the diaphragm wall, so that crews could hand excavate to meet the TBM head, allowing the TBM to move forward onto the cradle. The second machine followed suit in May 2014.

The three EPBs at GS Engineering’s C937 contract were launched between March and October 2013. Sections of tunnel are located in the Fort Canning Boulder Bed, though as of February 2014 the TBMs were only beginning to touch the outer edges of the formation. Located between 0.5 and 20 m below the surface, the boulders consist of sandstone with quartzite and felsites, and are thought to have been deposited between ½ and 1 million years ago in a series of landslides and mudslides. Boulder sizes have a minimum of about 0.5 m and a maximum of 3 m in diameter.

The implications of the boulder field on TBM tunnelling have historically been complex, explained Robbins. Since the boulder bed has relatively strong boulders located in a clay matrix, the cutting action of the disc cutters on the TBM cutterheads is hindered. Before the pressure required to chip the boulders into fragments is reached, the boulder moves in the clay matrix. When these boulders move, they can bang against other parts of the cutterhead, such as scrapers and bits, and damage them as well. In addition, the boulders and clay matrix have different hardnesses, so that the cutters are exposed to many shock loads in a short time. This reduces the life of the cutter and creates more



The completed tunnels will run just 4 m below the bed of the Singapore River, and just 5 m away from active Central Expressway Tunnels.

interventions to replace the cutters. Boring through this boulder field has historically been a slow ordeal as the TBM must go slow enough to avoid moving the boulders, but still push hard enough to break the boulders. If the boulders will not break, divers must go in front of the cutterhead to manually break up the boulders before the machine can advance.

The Robbins machines at C937 advanced at rates of up to 33 rings per day. One of the contract’s three machines completed its first 783 m long drive on 24 March 2014, and the second machine completed the parallel tunnel on 4 May. The third machine on the contract finished the first 570 m long tunnel towards Chinatown and rather than breaking through into the neighbouring Chinatown station contract, the TBM holed into the station box diaphragm wall and had to be dismantled and withdrawn back through its completed drive, similar to the C925 disassembly process. It was then re-launched on a second drive in June 2014 and finished later the same year. ■

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GERMANY BY RAILS

The Stuttgart - Ulm rail project in Germany is currently under construction. Many new tunnels, bridges and tracks will be built as part of this massive development. Southeast Asia Construction recently visited one of the tunnels to see some heavy duty machines working on site.



© Aldinger & Wolf

Top: The Stuttgart - Ulm rail project aims to bring improvements for the people in Stuttgart and Baden-Württemberg, providing faster and direct train connections.

Above: An artist's impression of the new central station in Stuttgart.

The Stuttgart - Ulm rail project consists of two sub-projects, Stuttgart 21 and the new Wendlingen - Ulm route. These involve the reconstruction of the Stuttgart rail junction, construction of the rapid Wendlingen - Ulm route, a comprehensive town construction project and the expansion and construction of various railway stations. Both projects are divided into seven planning approval sections. Commissioning is planned for December 2021.

The Stuttgart 21 will feature 57 km of new track, 20 km of high speed tracks, 33 km of tracks in tunnels, 16 tunnels and 18 bridges. The Wendlingen - Ulm route will have 60 km of new track, 31 km of tracks in tunnels, nine tunnels and 37 bridges.

The project aims to bring improvements for the people in Stuttgart and Baden-Württemberg, providing faster and direct train connections. It is also part of the European high-speed rail network from Paris to Bratislava.

As part of the Stuttgart 21 project, Stuttgart's terminal station will be redeveloped and a new train station will be built at the airport and fair grounds. The time needed to travel to the city will be reduced to eight minutes, and numerous cities can even be reached about half an hour to 60 minutes earlier than before, according to Bahnprojekt Stuttgart - Ulm eV, the company in charge of the Stuttgart - Ulm rail project.

Approximately 7,000 new jobs are expected to be created during the construction phase, which could grow to more than 10,000 in the long term.

Heavy duty machines

Nine Liebherr tunnel excavators are being used for drilling work on the Stuttgart - Ulm rail project. The ARGE 'Tunnel Cannstatt' is currently operating two Liebherr R 944 C Tunnel models, while a Liebherr R 924 Compact Tunnel is used to build the mainline railway in Bad Cannstatt. A third R 944 C Tunnel is planned to join them later.

The Liebherr R 944 C Tunnel crawler excavator is designed for the tough operating conditions experienced during tunnelling. The machine comprising a swivel arm with double 45° swivel bearing and a 4.5 m telescopic boom features a heavy duty design. The hoses and lines on the machine are routed along the side and the hydraulic cylinders have been positioned in such a way that protects them against falling rocks.

The R 944 C Tunnel has an operating weight of about 44 t and two swivel arms with lengths of either 3.07 m or 3.70 m. Due to the operating conditions at the jobsite, ARGE 'Tunnel Cannstatt'



A total of 16 tunnels will be built as part of the Stuttgart 21 project.

Continued overleaf...



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has opted for the short swivel arm version. The short version is designed for a tunnel height of up to 7 m and is thereby precisely adapted to the local conditions. With this highest possible tunnel height, the excavator achieves a tunnelling path of 1.6 m. The maximum tunnelling path of 2.1 m with this equipment version means that a tunnel height of 5.4 m can be achieved. The R 944 C Tunnel crawler excavator with a short swivel arm offers a maximum tearout force of 164 kN and a maximum breakout force of 191 kN.

The Liebherr tunnel excavators are used in Stuttgart for direct excavator tunnelling. Thanks to the high tunnelling force of the R 944 C Tunnel, they work in most cases with an excavator bucket. If the rock is harder, a hammer or a milling machine is used. For direct tunnelling, the tunnel excavator requires a high hydraulic output. The Liebherr R 944 C Tunnel is therefore equipped as standard with high pressure hydraulics to enable this.

A Liebherr six-cylinder inline engine, which complies with Stage III/Tier 3 emission standards, powers the R 944 C Tunnel model. The diesel engine with turbocharger and intercooler returns 190 kW at 1,800 rpm. ARGE 'Tunnel Cannstatt' also chose to have the optional diesel particulate filter installed.

The special heavy duty cab features an ergonomic design and a high level of operating comfort. It comes as standard with protective devices in accordance with FOPS, FGPS and ROPS. The Liebherr R 944 C Tunnel excavators used in the Stuttgart 21 project are also fitted with video monitoring for the rear area.

In addition, there are three Liebherr R 944 C Tunnel crawler excavators



An artist's impression of the train platform at the new Stuttgart central station.

© Aldinger & Wolf



In the Stuttgart 21 project, eight Liebherr R 944 C Tunnel crawler excavators are tunnelling using the shotcrete method.



With its 3.07 m long swing arm, the Liebherr R 944 C Tunnel crawler excavator has a maximum tearout force of 164 kN and a maximum breakout force of 191 kN.

working in Stuttgart-Bad Cannstatt for the 'intermediate north heading'. This is the central point from which the tunnel is being dug from and to Bad Cannstatt, both in the direction of the main railway station and up to the Ehmmanstrasse. The tunnels feed into the Feuerbach-Bad-Cannstatt tunnel and, with that, planning approval section 1.5, which is part of the Stuttgart 21 project.

The Bad Cannstatt tunnel comprises two single-track tunnels which are created almost entirely by conventional tunnelling methods and have a length of 3,507 m. Unlike the 'intermediate north heading' (Feuerbach tunnel), the rail does not run horizontally through the mountain here but follows a vertical 26 m deep shaft instead. It lies in the same plane as the tunnel. Tunnelling for it began in the middle of February 2014.

Continued on page 76...



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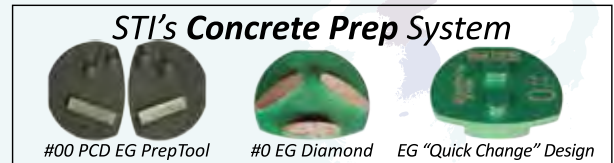
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Continued from page 74...



This intermediate heading is intended to keep any negative side effects for the public as minimal as possible. It is right next to the logistics area so that the rubble can be removed directly and transported away by rail without using public roads.

The fleet of Liebherr equipment deployed by ARGE 'Tunnel Cannstatt' includes not only three R 944 C Tunnel excavators and an R 924 Compact Tunnel excavator but also three L 556 Tunnel wheel loaders and an L 566 Tunnel wheel loader.

In the overall Stuttgart-Ulm project, many other items of special tunnelling equipment from Liebherr are currently being used. Working on the ARGE 'tunnel intermediate heading' are another four R 944 Tunnel models, supported by four L 580 Tunnel wheel loaders. The ARGE 'Atcost' also has an R 944 Tunnel in use. Furthermore, various other Liebherr tunnel excavators and wheel loaders are deployed on the ARGE 'Feuerbach' tunnel.

Liebherr said that, on completion of the project, the tunnel excavators will have created about two thirds of the overall 64 km of newly formed tunnel and passage routes in shotcrete design. ■



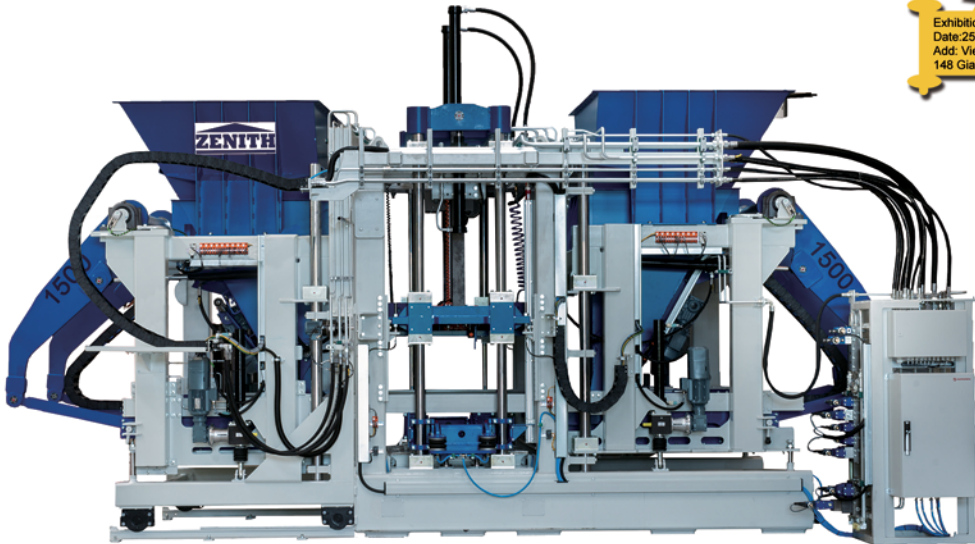
Top and above: Liebherr R 944 C Tunnel crawler excavators are working hand-in-hand with Liebherr L 556 Tunnel wheel loaders in the ARGE 'Tunnel Cannstatt'. Many other items of special tunnelling equipment from Liebherr are also being used in the overall Stuttgart - Ulm rail project.



Exhibition: Vietbuild Construction & Building Materials
Date: 25-29th Mar. 2015 Booth: D586
Add: Vietnam Exhibition and Fair Centre,
148 Giang Vo St., Hanoi, Vietnam



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PAVING THE WAY TO BELGIUM

The village of Watou, near Poperinge in Belgium, was prone to flooding from a nearby creek. To solve the problem, the road next to the creek was raised and a concrete flood defense wall was slipformed on top of the newly raised road. The Belgian company Aannemingen Sico BVBA was commissioned to carry out the slipforming work.

“The road next to the creek was raised 800 mm to act as a flood wall,” explained Thomas Cool, a co-owner of Sico. “Then, we were hired to slipform a retaining wall on each side of the roadway for added defense. The wall is 500 mm wide, 600 mm high, and each section of wall was 400 m long.” Sico was using a Gomaco GT-3600 to slipform the flood defense wall.

“This GT-3600 is our first machine and it has really helped with the start up of our new business,” said Mr Cool. “It was easy to learn how to operate, and being able to operate in our Dutch language really helps.”

The concrete for the flood retaining wall was a standard Belgian mix design with slump averaging 40 mm. It was delivered to site by ready-mix trucks carrying 9 cu m loads. Concrete delivery slowed slipforming production. Trucks one at a time had to back down the length of the existing roadway, which was only 3 m wide, to reach the GT-3600.

Hand-finishing work was kept to a minimum behind the GT-3600, no joints were necessary in the flood wall and Sico completed the special application in one day’s time. Then, Sico loaded up the GT-3600 onto its low-bed trailer and transported it to the next job site.

“The GT-3600 is the correct size for our type of work and offers us all the necessary options,” said Ward Simoens, co-owner of Sico. “It was a good value for our money, it offers a solution to our projects at a good price, and it gives us the flexibility and ability to pour curbs, sidewalk, or cycle track.” ■



Aannemingen Sico slipformed the retaining wall for flood defense using its new Gomaco GT-3600 curb and gutter machine. The wall is 500 mm wide and 600 mm high.



The concrete for the flood retaining wall was a standard Belgian mix design with slump averaging 40 mm. It was delivered to site by ready-mix trucks carrying 9 cu m loads.



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PIPE JACKING UNDER THE ELBE



Pipe jacking along 1.5 km in the 'Elbedüker Hetlingen' project was carried out under the Elbe through complex geological ground and under high water pressures of up to 4 bar.



The project team succeeded in steering the AVND2400AB TBM right along the specified route and precisely into the target shaft.

The existing pipeline network in northern Germany is being modernised for regional gas supply. This major project also includes the 'Elbedüker Hetlingen' project where a Herrenknecht AVND2400AB tunnel boring machine (with a diameter of 3,025 mm) crossed under the Elbe River near Hamburg in the second half of 2014. The tunnel was driven in a pipe-jacking process from the town of Hetlingen to the target shaft on Lühesand Island on the Elbe. "Construction of the two new gas transit pipelines enables us to guarantee gas supplies for northern Germany and also Scandinavia in the future," said Dr Philipp v. Bergmann-Korn, a spokesman for Gasunie Deutschland Services GmbH.

Among the main challenges was the diversified ground that ranged from sandy gravel soil with stones through layers of boulder clay featuring larger rocks to layers of clay, which tend to be very sticky. This was exacerbated by high water pressures of up to 4 bar and a route length of more than 1.5 km - it is said to be one of the longest pipe-jacking projects in the world.



A.Hak Drillcon celebrates the successful breakthrough on Lühensand Island on the Elbe.

The drilling company A.Hak Drillcon used Herrenknecht equipment on the project. Two Herrenknecht machine operators also supported A.Hak Drillcon during the tunnelling process, enabling efficient three-shift operations around the clock. “On such a challenging project, continuous mutual exchanges of experience are simply advantageous. We appreciate that. Comprehensive service is as important as good technology,” said Peter Dennig, the responsible manager at A.Hak Drillcon.

To increase safety, the contractor selected a range of navigation, survey and monitoring technology from VMT, a Herrenknecht subsidiary. Using IRIS.microtunnel - a web-based data management and monitoring system - it was possible to permanently monitor all support pressures while comparing them in parallel with the fluctuating tides of the Elbe. Furthermore, the comprehensive HADES communication system featuring several modules such as video surveillance, fire alarm or RFID job site access control was believed to be used for the first time in Germany.

According to Herrenknecht, the AVND2400 picked up speed along the remaining route (up to 40 m/day). Thus, the entire tunnelling length could be handled directly by the main jacking station in the starting shaft without using any intermediate jacking stations. ■

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TOUR INCITY IN FULL SWING



Tour Incity is a mixed-use commercial development in the heart of Lyon's business district, France. Featuring 200 m high, it is set to be the tallest building in the city and the third tallest in France. When completed, the tower will have 44,000 sq m of offices and four restaurants. It is believed to be the first inner-city building to be accredited as HQE (High Quality Environmental Standard) in France, thanks to a variety of environmental innovations.

Two Potain tower cranes are helping to build this ambitious project. They are working 14 hours a day for 30 months to build one floor per week at the congested jobsite. This demanding schedule is the result of the building's inner-city location. Flanked by a busy road, a school and a shopping mall, work must adhere to a strict schedule to limit disruption to the local area.

The 12 t capacity Potain MDT 222 and 16 t capacity MD 550 tower cranes are owned by the project's main contractor Bouygues. "Working in such a tight space means we need very precise load control and smooth movement, two things we know Potain cranes are ideal," said Julian Bargues, jobsite manager at Bouygues.

The cranes were erected in 2013. They are lifting general construction materials in loads of up to 16 t. Both cranes are climbing at a rate of 15 m per month and set to reach final working heights of 280 m.

The cranes' exact position and jib lengths were carefully planned to ensure maximum coverage of the jobsite, yet minimal disruption to the busy streets below. As a result, one of the cranes, the MDT 222, is climbing internally, adding to the technical challenge of the project. "Erecting the MDT 222 internally minimises the two cranes' footprints on the jobsite, while giving the crane the optimum capacity over the maximum area of the jobsite. It also ensure the cranes can work at a good pace without causing problems for the local area," explained Alexandre Chanteclair, EMEA product manager at Potain.

The Potain MDT 222 is erected with a specially-adapted floor climbing system where a unique frame is attached to the building's concrete core. This allows the crane to reach its final working height while maintaining its strength and stability. The MDT 222 offers up to 65 m of jib, but is fitted with a 30 m jib at the project.

The MD 550 is installed with Potain's external anchorage system where several frames fix the mast to the outside of the building. The crane offers a maximum 80 m jib but is configured with 60 m of jib at the jobsite. ■

Above and right:
Two Potain cranes
are working 14 hours
a day for 30 months
on the Tour Incity
project.



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THE FRENCH CONNECTION

Intermat 2015 will take place at the Paris-Nord Villepinte Exhibition Centre, France, from 20 to 25 April 2015. The show is expected to attract 1,300 exhibitors (including 70 percent international from 37 countries) and 200,000 visitors (including 34 percent international from 148 countries). Overall, there will be 375,000 sq m of exhibition space for exhibitors and visitors, with five indoor halls, five outside exhibition areas and one large demonstration zone.

This year, Intermat will present a new sector organisation to promote equipment for all the phases in the construction cycle. These consist of mines and quarries, production and use of construction materials; concrete industry (World of Concrete Europe); buildings and work sites; lifting and handling; drilling, boring and special foundations; earthmoving and civil engineering; construction and maintenance of road infrastructure; vehicles and transportation for materials, equipment and people; components, equipment and accessories; environment, demolition and recycling; topography,

engineering, automatic systems and new technology; and services and communication.

Other highlights of Intermat 2015 include Paris Demo, which will cover a 30,000 sq m outdoor demonstration area, and Intermat Rental Day on 23 April.

World of Concrete Europe

Organised for the first time in Europe within Intermat, under the banner 'Be Concrete', this section will be located at the front part of the exhibition centre's Hall 7. It will occupy 20,000 sq m of exhibition space, bringing together all the specialists in plant and equipment for the production, transport, handling and laying of concrete.

There will also be educational seminars, practical workshops and demonstrations. The seminars will cover five main themes: worldwide innovation, concrete fundamentals, maintenance and repair, special concretes, demolition and recycling. Concrete demos will be held on the outdoor plaza in front of Hall 7.



Continued on page 86...



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Continued from page 84...

Intermat Innovation Awards

The 2015 Intermat Innovation Awards reward companies' research and development initiatives and pay tribute to innovation in equipment and techniques for construction. The winners were announced on 22 January 2015 at the Pre-Intermat event, which comprised:

Construction Equipment

Gold: Wacker Neuson Group (mini excavator 803 dual power)

Silver: Alphi (TopDalle Eco)

Bronze: Fayat (Marini-Ermont - RF 160 Neo/new generation continuous asphalt plant)

Equipment and Components

Gold: Liebherr France SAS (lift crane operator)

Silver: Mecalac (quick coupler M-Connect)

Engineering & Systems

Gold: Merlo (M TSS - Merlo Transversal Stability System)

Silver: Liebherr France SAS (LDC - Liebherr Demolition Control)

Digital Applications

Gold: Atlog (LAND2MAP)

Silver: Autom' Elec (TAMIsoft)

Environment Award

Ms (water treatment plant for the elimination of Chromium VI and Total Chromium)

World of Concrete Europe Award

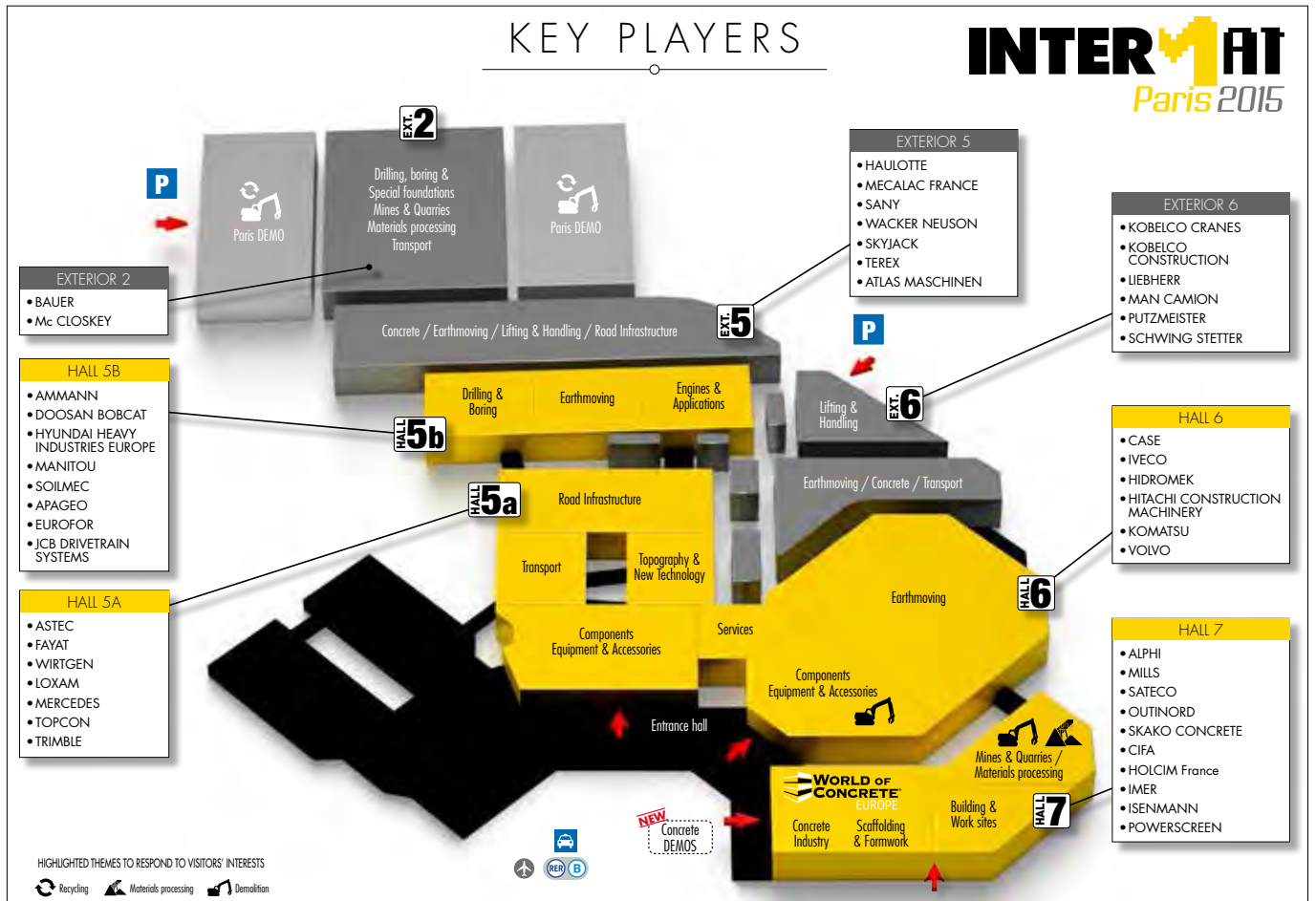
Tekla (Tekla Structures construction modelling)

Judges' Special

Bridgend Extrusion Ltd (K-Form)



All images: Scenes from Intermat 2012.





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ROCKMORE

STAND: 5b C 011

Rockmore International will introduce its new T-series DTH hammer line in Europe and present the first model in this class – the ROK 600T. This new series utilises drill bits with standard shank connections that no longer require plastic parts commonly known as blow tubes or foot valves.

According to Rockmore, the ‘tubeless’ DTH hammer has been offered before, but drilling performance was often compromised when designed to operate with an industry standard bit shank. Other manufacturers have also introduced DTH hammers that utilise bits without a plastic component, but such DTH bits are proprietary in design, which limit their availability.

There are clear economical advantages of eliminating the traditional plastic components from the bit shank section. Blow tube/foot valve breakages on DTH bits during drilling operations are catastrophic since the hammer will cease to function immediately. This is particularly damaging



The ROK 600T is the first model in Rockmore’s T-series DTH hammer line.

to drill time efficiency if such interruptions occur in deep-hole applications, requiring the hammer to be retrieved out of the hole for bit replacement. The T-series hammers will alleviate such costly downtime by elimination of the plastic bit component that is susceptible to breakages.

The ROK 600T is a 6 in-class model with high performance drilling characteristics, rated for drilling 155 to 178 mm diameter holes for blast hole applications in mining and construction. It is also suitable for water

well drilling since it exhibits good in-hole flushing that is necessary to evacuate rock chips in deep applications.

As a T-series design feature, the ROK 600T accepts the industry established bit shank model QL60, but with the blow tube/foot valve removed. Such standard bits are readily available from established supply channels in the mining, construction and water-well markets. The corresponding bit connection for this hammer is designated by Rockmore as QL6T, which has an identical shank design to the QL60, but without the blow tube/foot valve.

The new ROK 600T also takes full advantage of Rockmore’s SonicFlow technology, which optimises airflow by simplifying and streamlining the air paths to minimise backflow and turbulence, thus delivering more energy to the piston. Field testing of the SonicFlow design was determined to result in faster penetration rates and greater overall DTH hammer efficiency. ■



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LIEBHERR

STAND: E6 E 035

Liebherr has given its 160 EC-B flat-top tower crane a facelift and will unveil its successor, the 172 EC-B 8 Litronic. The design of the 172 EC-B has been completely revised, resulting in a major increase in lifting capacity at the jib head by 15 percent. The 172 EC-B will now hoist 2,100 kg with a radius of 60 m at the jib head, which is an increase of 250 kg at the jib head over its predecessor. The 172 EC-B reaches its maximum lifting capacity at 8,000 kg.

The modular concept and the compatibility of Liebherr tower systems among each other ensure that the crane is suitable for a wide range of applications. With Liebherr 120 HC, 170 HC or 256 HC tower systems, freestanding hook heights of up to 71.4 m can be achieved.

The 172 EC-B features an innovative jib erection concept. The load hook and trolley remain on the job pivot section during transport. This means absolutely no work for erecting the trolley, which gives some benefits, particularly for jib erection in the air. The hoist and trolley travel rope can be reeved easily. Improved quick-release fastenings on the cab and switchgear platforms now mean that the compact head can be split easily. If necessary this means that erection weights can be reduced with ease.

The standard equipment includes a 37 kW frequency converter hoist gear; a 45 kW



The new Liebherr 172 EC-B 8 Litronic flat-top tower crane.

frequency converter hoist gear is available as an option. The frequency converter hoist gear is only used in two-line mode. Hook heights of up to 328 m and empty hook speeds of up to a maximum of 177 m/min ensure that the crane is economical to use.

The 172 EC-B 8 Litronic is supplied with the advanced Litronic crane controller. Functions such as redundant load moment measurement, manipulation-proof

commissioning and the monitoring of hoist gear brake with managed lowering in emergency mode provide a high level of safety. Individual settings by the crane driver such as slewing gear modes and the trolley speed can be adjusted simply using the electronic monitor system (EMS). In crane mode the new Litronic crane controller system also ensures improved operating properties. ■



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TEREX TRUCKS

STAND: 6 C 084

Terex Trucks will showcase its TR60 rigid dump truck, which features a 55-t payload capacity. The company said it is a popular model in the EMEA region.

The TR60 is suitable for a wide range of hauling applications, from large construction projects to commercial infrastructure and mining sites. Based on the same platform design as the larger capacity TR100, the TR60 also ensures a consistent, robust performance. Its spacious and ergonomic cab enables maximum operator comfort and productivity.

Terex Trucks' rigid dump trucks range from the 41-t payload capacity TR45 to the 91-t payload capacity TR100. On-board diagnostics on the machines guarantee quicker and easier maintenance checks. The heavy-duty engine has been calibrated specifically for hauler applications. Combined with a robust drivetrain and rear axle, the trucks provide excellent traction, rimpull and high reliability on every stretch of haul road.

Fitted with a shift engine management transmission system, the rigid truck's performance can be tailored to every jobsite. The selectable shift modes ensure a faster, smoother and more efficient gear performance, which results in quicker haul cycles and efficient fuel consumption. A dual retardation system is installed as standard and gives the operator the flexibility to select the optimum retardation for various applications and conditions, enabling safer operation and greater operator control.

Terex Trucks will also present its Euro Stage 4/Tier 4 Final compliant articulated dump trucks, the 28-t payload capacity TA300 and 38-t payload capacity TA400.

Both machines are powered by Scania engines fitted with the latest generation Selective Catalytic Reduction (SCR) technology combined with Exhaust Gas Regeneration (EGR) technology and a Variable Geometry Turbo (VGT). The combination of EGR and SCR, coupled with the Diesel Oxidisation Catalyst (DOC), increases the efficiency of the SCR process, allowing Terex Trucks to meet European emissions regulations.

The TA300 and TA400 also feature the CAN-controlled engine exhaust brake. This provides improved reaction and performance of the exhaust brake retardation and higher efficiency of Euro Stage 4 after-treatment requirements, resulting in greater operator control of braking in downhill applications,



The TR60 rigid dump truck.



The TA400 articulated dump truck.

further improving safety.

The TA300 can be used in tough applications and is fitted with an independent front suspension system, an improved powershift transmission and a hydrodynamic retarder for more control during descents. The six forward/three reverse transmission provides a maximum forward speed of 50 km/h and 30 km/h in reverse. Daily checks have also been simplified, thanks to ground-level inspection points, making it easily

accessible for technicians.

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

Terex Trucks' articulated dump trucks range from the 25-t payload capacity TA250 to the 38-t payload capacity TA400. ■

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HYUNDAI

STAND: 5b M 002 & 5b M 028

Hyundai's new HL955 and HL960 wheel loaders will make their world debut. The machines are powered by Cummins engines that meet Tier 4 final/EU Stage IV emission standards; Hyundai has opted for a combined solution of EGR and SCR technologies. The company said that a 10 percent reduction in fuel consumption has also been achieved, depending on the applications.

Due to the new engine technology, the side vent holes of the machines have been increased in size for a better airflow towards the engine. The headlamps have also been redesigned for lower vibration and greater durability. The standard bucket has been optimised for 5 percent more efficiency and less spill during driving, and the engine is now easily accessible thanks to the electrical, fully opening engine hood.

The new cab is ROPS/FOPS certified and more spacious, featuring better noise reduction and lower vibration. The ergonomically improved seat is fitted with adjustable control levers, thus resulting in greater operator comfort. All switches and buttons are now centralised and easily accessible, including the auxiliary spool control button that is integrated in the joystick.

In addition, the new monitor screen has many functions such as engine mode, fuel/energy consumption, weigh measurement, hydraulic control and Intelligent Clutch Cut-Off. This touchscreen monitor also features additional short cut buttons with a variety of functions.



Hyundai's HL960 wheel loader.

According to Hyundai, many improvements based on the feedbacks from operators in Europe have been implemented to create a better, stronger and more efficient machine for customers worldwide. ■



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SKYJACK

STAND: E5 H 015

Skyjack will introduce its largest model, the new SJ86 T telescopic boom lift, as well as two vertical mast platforms, the SJ12 and SJ16. These vertical masts boast a lightweight design that provides operators with low ground pressure and floor loading, a zero-degree inside turning radius and a traversing platform for added reach.

The SJIII 3219 will also be on display, which is said to be the world's best-selling electric scissor lift. It has a working height of 7.79 m, 30 percent gradeability and a platform capacity of 227 kg. The machines in this class are all able to work in tight spaces.

Exhibiting alongside the SJIII 3219 will be the SJIII 3226; this electric scissor lift is extremely quiet, produces zero emissions, and boasts robust and reliable design features that offer customers an easy to service, low maintenance, compact and versatile package.

Also showcasing at Intermat will be a representative of the 1.2 m wide class, which boasts models with working heights of up to 11.75 m and 25 percent gradeability. A standard 0.91 m roll out extension deck can be secured in multiple positions, and both models can be driven at full height.

Skyjack has taken the proven control system technology – used in the SJ12 and SJ16 vertical masts – and applied it to its range of DC scissors (SJIII 3215, SJIII 3219, SJIII 3220, SJIII 3226, SJIII 4626 and SJIII 4632). All DC scissor lifts displayed at Intermat will feature this innovation, which provides many benefits including significantly improved battery life, leading to improved work time; reduced recharging time, which decreases energy consumption and lowers carbon foot print; increased controllability, beneficial when working in confined areas; and reduced operational noise levels.

From its articulating boom line, Skyjack will show the range-topping SJ63 AJ, featuring an open knuckle riser design for improved visibility, and dual lifting cylinders that provide great comfort and stability. Skyjack's SJ63 AJ boasts a working height of 21.2 m and a 227 kg platform capacity. The machines in this class offer excellent positive traction and 'terrainability', provided by the axle-based four-wheel drive that accounts for a low maintenance, rugged and reliable drive train. Zero tail swing and continuous turret



Skyjack's new SJ86 T telescopic boom lift.

rotation allows for flexible operation in tight locations.

In addition, Skyjack will be exhibiting the SJ6832 RTE from its rough-terrain scissor lift line, the only machine in its category to offer a 45 percent gradeability and four-wheel drive as standard. This RTE model offers end users a zero-emission scissor lift that comes with low running costs and high uptime. It has a platform width of 1.7 m and a maximum platform height of 9.8 m.

One of the highlights of Skyjack machines is Skycoded, a simplistic control system that uses the company's colour-coded and numbered wiring system, which makes the machines easy to trouble shoot and repair. Using an analogue based control system allows Skyjack AWP's to operate using a simplified system with fewer and less expensive components.

Skyriser is found on Skyjack's articulating boom lifts. This feature ensures that the riser and main pivot point connecting the fly boom to the riser travel in a straight vertical line. Movement in a true vertical manner, without drifting forward or back, reduces the amount of repositioning the operator needs to do in order to stay close to a building facade.

Axldrive is Skyjack's mechanical 'axle based' drive system that gives positive traction and excellent rough ground

'terrainability'. This is achieved using an automatic locking differential on the back axle and non-spin and limited slip front differential on the front axle. As such, machines can climb grades of up to 30 percent in the case of rough terrain scissors lifts, 45 percent in the case of articulating boom lifts, and 50 percent in the case of telescopic boom lifts.

Speedyreach is a boom geometry on Skyjack's articulated boom lifts, which allows the operator to lower the main fly boom to ground level to restock on material or supplies then return to full height at the original working position - without lowering the riser section. This functionality adds to the versatility and productivity of Skyjack's articulating boom lifts, especially as it can be quickly executed and there is no need for machine repositioning or having to remember the sequence of operations to get back to the original working position.

Easydrive is a boom feature only utilised by Skyjack, which means the boom lift controls are always in the orientation of the operator regardless of position of turret over chassis. This reduces operator confusion by eliminating the need for colour coded arrows to determine drive versus joystick direction.

Skyjack also offers a range of accessory products to further expand a given products adaptability. ■

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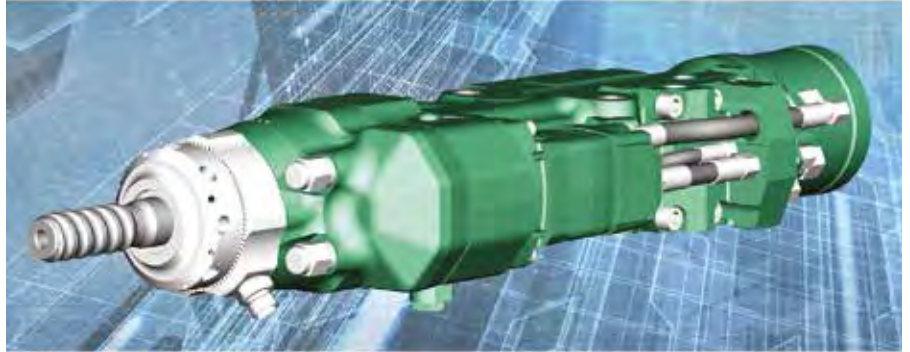
STAND: 5b J 025

Montabert will launch its new HC95 multi-purpose drifter, strengthening its position in the hydraulic drifter market. Three versions of this new model will be available, including the HC95 LA, HC95 LM and HC95 LQ.

The HC95 LA is designed to replace another drifter already installed on a drilling machine in order to optimise performance. Being multi-purpose, the HC95 LA could even be labelled 'plug & drill' as everything has been designed to allow this drifter to be swapped for another with a minimum amount of intervention, and minimal mechanical and hydraulic adjustment, explained Montabert.

The HC95 LM is designed for underground drilling operations. One of its main strengths, hammering with hydraulic reverse percussion, is included as standard (applications for long holes). The HC95 LQ is designed for surface drilling operations.

Montabert will also present its 'anti-seismic BRV' system designed to promote



The HC95 LQ is designed for surface drilling operations.

greater environmental safety. It is an electronic system intended to regulate the rock breaker's power according to the vibrations generated. Using sensors placed in sensitive areas (railway tracks, fragile buildings, etc.), the system is designed to temper the rock breaker's power based on

the guidelines provided by the contractor, and in a transparent manner for the user. The system also allows the operator to optimise the environmental safety/productivity ratio. The accessible power range is equivalent to that of three rock breakers, said Montabert. ■

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HYDRONIX

STAND: 7 L 036

Hydronix has re-engineered its digital moisture sensors to take advantage of increased microprocessor speeds and memory. A new version of Hydro-Com sensor calibration and configuration software is also being released. This is based on a client-server framework and supports multi-company, multi-site sensor locations enabling simple implementation of enterprise wide solutions.

The latest version of the Hydro-Probe sensor designed for measuring moisture in bins and on conveyors will feature an additional analogue output. This allows the simultaneous output of moisture and temperature. The sensor's filtering and averaging functions have also been enhanced to give greater flexibility when optimising the sensor's performance in continuous type applications such as conveyor belts.

The Hydro-Mix sensor, designed for measuring moisture in concrete mixers, screw conveyors and in chutes is now capable of concurrently running all three

Hydronix digital measurement modes. When using a suitable batch plant and control system the standard measurement mode already achieves +/- 0.1 percent moisture. Running all three modes concurrently simplifies the process of selecting the most appropriate mode to use for a given mix design. Hydronix said automation suppliers should consider the option of including the best possible mode as a parameter in their recipe database to offer excellent precision.

In addition, all Hydronix sensors can now store all of the individual sample points relating to a calibration directly inside the unit. It is therefore possible to connect any PC to the sensor and to check the validity of the calibration using Hydro-Com software without having to access the original computer used to load the points into the sensor. Compatibility mode has been removed due to field obsolescence, but all other aspects including the connections and the sensor body remain fully backward compatible. ■



New Hydro-Probe (HP04).



New Hydro-Mix (HM08).

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LIUGONG

STAND: 6 J 064

LiuGong's new 856H wheel loader has been tailored for the European market, and is powered by a Cummins QSB6.7 engine in compliance with EU Stage IV regulation. It adopts mature variable geometry turbocharger technology to provide excellent torque. The high pressure common rail fuel injection system improves injection pressure and optimises fuel consumption. With this powerful engine, the 856H can work in extreme conditions in Europe and the rest of the world.

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

The 856H's new cab design allows for improved visibility to the work tool and improves all-around visibility for safety. Frequently used controls are placed within easy reach of the operator and curved glass in the cab decreases sound levels. 360° access around the cab allows for easy removal of snow and frost, and a constant temperature function can adjust the temperature automatically. The cab is ROPS and FOPS certified in compliance with ISO3471 and ISO3449 safety standards.

Maintenance of the 856H is simple and convenient. It adopts a ground maintenance idea, which means that users can accomplish the replacement and checks of various filters and fuels by standing on the ground without climbing up and down. The forward tilting engine hood, which is equipped with an electric lifting device, allows for ground level access to service points to increase the accessibility to components, thus reducing daily and scheduled service times while increasing the machine's availability to work.

The LiuGong E-series excavators - including the 922E, 925E and 930E models - are also fully compliant with Stage 3B of the European emissions regulations.

The smaller 922E has an operating weight of 22,000 kg and a maximum



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



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

Each E-series model is equipped with a Cummins 6.7 l engine in compliance with EU Stage 3B regulations, with net power of 117 kW@2,000 rpm for the 922E, 129 kW@2,000 rpm for the 925E and 147 kW@1,900 rpm for the 930E.

In the new E-series, the engine features Cummins VGTTM Turbocharger technology, which continuously adjusts the vehicle's airflow boost to precisely match engine rpm and load demands to achieve a higher

working efficiency. The intelligent power control (IPC) system and a highly sensitive hydraulic system work together to reduce fuel consumption while increasing productivity. Six working modes optimise the machine's working performance.

The ROPS cab features expansive legroom, a new multi-function LCD monitor, an automatic air conditioner, increased visibility and large storage space. The engine itself is also easy to maintain, thanks to the ease of access when the engine cover is lifted up and the access doors on both sides of the machines opened up. All these features combine to provide a safer, more comfortable working environment. ■

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SENNEBOGEN

STAND: E6 D 060

Sennebogen will present its biggest telescopic crawler crane, the 6113, which has a maximum boom length of 67 m and safe working load of 120 t. The company will be at the show together with its French sales and service partner Sygmat.

The highlight of the 6113 is its robust telescopic boom, designed as a full-power boom. Thanks to the multi-cylinder technology, this maintenance-free system enables continuous telescoping and is always friction-locked. The machine can be set to any desired boom length via a joystick.

Featuring a length of 40 m, the Sennebogen 6113 covers a large working area. With fly boom and lattice boom extensions, boom heights up to 70 m can be achieved. The machine is able to manoeuvre comfortably even in rough terrain. Tasks up to maximum 4 degree inclined position can be carried out easily, thanks to its robust boom.

The 8 m long heavy duty travelling gear elements with up to 900 mm wide base plates ensure a customary low ground pressure and great stability; this is also due to the undercarriage that can be telescoped out to a track width of 5.40 m.

The Sennebogen 6113 is powered by a 168 kW Cummins diesel engine that complies with Tier 4f emission regulations. The machine is suitable for narrow jobsites, and besides performing lifting tasks, it can also be used in special underground engineering applications

or applications with hydraulically powered implements, such as vibrators.

The maXcab comfort cab with a sliding door can be inclined 20 degrees, offering good ergonomics and an excellent overview. The cab can also be designed with 2.70 m height-adjustability (optional), in order to maintain a good overview and safe work environment.

Equipped with the innovative self-assembly system of the Starlifter telescopic undercarriage, the 6113 can be set up in a few steps within a short time. When the travelling gear is dismantled the transport width is reduced to 3 m.

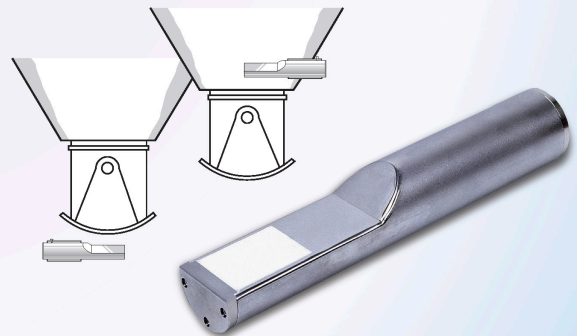
The 6113 offers significant energy savings in Eco Mode, operating at a reduced engine speed. The new Sennebogen Sencan control and diagnostics system provides a clear presentation of all operating parameters and easy, intuitive user control, as well as the ability to fine-tune machine performance and quickly process error messages. Furthermore, the load moment limitation system can be easily monitored.

The 6113 is also simple to maintain and service. A central lubrication point for all pivot points and the slewing ring reduces the required amount of service effort, optimises accessibility to all service points and important components, and saves time in daily operation. ■



The 6113 is Sennebogen's biggest telescopic crawler crane.

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VOLVO

STAND: 6 C 045 & 6 C 046

The new L60H, L70H and L90H wheel loaders from Volvo Construction Equipment (Volvo CE) will be unveiled to the European market. Each machine features a Volvo powertrain and is equipped with a Volvo 6-l diesel Stage IV engine. All of them are built with Volvo's Torque Parallel (TP) linkage for the best in versatility and front visibility. The TP linkage combines the benefits of the Z-bar and parallel linkage to deliver high breakout torque and excellent parallel movement throughout the entire lifting range. The operator has full control over the load for improved safety and productivity. Double seals on all linkage pins retain lubricating grease and prevent dust for outstanding durability and long machine life, and the TP linkage geometry provides excellent bucket roll-back angles for increased stability and less spillage.

For enhanced durability, the machines are equipped with a counter shaft transmission that can endure high levels of stress, and various tailored settings can be selected by the operator to match all applications from short cycle truck loading to long distance load and carry operations. And for more versatility in all applications, the machines are equipped with a 100 percent differential lock on the front axle, which provides good traction and rimpull on soft and slippery ground, minimising wheel spin and tyre wear.

An Eco-pedal featuring a push-back mechanism engages when engine rpm is about to exceed the most economic operating range. The operator senses the resistance and reduces pressure to continue within this range. If full engine speed is needed, the push-back mechanism can be easily overridden.

The load sensing hydraulics match power to the application, increasing fuel efficiency and precision. This system makes power available for rimpull, providing easier penetration for increased productivity. With help from the variable displacement piston pumps and precision control levers, hydraulic power is delivered according to demand.

When compared to previous models, the L90H delivers increased engine power, torque and an improved hydraulic flow rate. The excellent engine output and hydraulic flow ensures harmony between the drivetrain and the hydraulic system for improved fuel efficiency. This machine is also equipped with a longer wheel base for great stability.

The Volvo cab boasts excellent all-round visibility, minimum noise and vibration levels, and effective climate control. An intelligent HMI system informs the operator of all necessary machine information for easy control and reduced fatigue. Standard Automatic Heat Control (AHC) and air conditioning ensure a comfortable environment inside the cab, and Volvo's air filtration system allows 90 percent of the cab air to be recirculated through the main filter for continuous dust removal and a cleaner environment.

A wide range of Volvo attachments and the TP linkage offer more flexibility. The machines can also be fitted with the improved Volvo general purpose bucket, designed for high productivity in a variety of materials, or a robust Volvo light material bucket for efficient handling low density materials. Volvo's material handling arm further extends a machine's versatility and the option of Volvo's pallet fork frame with pallet fork tines allows a machine to handle, load and move pallets of building material, drainage pipe, lumber, or loose items around the uneven terrain of a construction site. ■

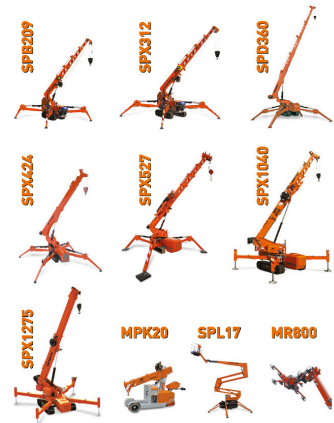


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BOMAG

STAND: 5a D 137

With an operating weight of 12 to 16 t, the new Bomag BW 191 and BW 206 articulated tandem rollers are designed for thicker layers and static compaction of open-pore asphalt. They are equipped with Bomag Economizer to measure compaction progress. This measuring system increases efficiency on site by indicating compaction during operations.

Three exciter systems are available for both models. In addition to the applications where the Double Vibration and Asphalt Manager technologies are used, Tango Oscillation is used for sensitive and risk-free compaction in difficult areas, e.g. on joints (hot to cold), on bridges or near buildings.

Tango Oscillation is controlled by just one amplitude, meaning that all drivers can master and operate the system easily, explained Bomag. The drum will not bounce in Tango mode, because the system always works at a tangent to the surface. And with the large diameter drum, no bow waves are pushed ahead, even at higher working speeds.

The spacious cab gives the driver a clear view of the drum edge and an excellent 360° view of the site. The seating unit with steering wheel, operating arm rest and instruments can be moved across the full



The BW 191 features large drums and is designed for high area output.

width of the cab. The suspended seat with integrated travel lever can be swivelled by 75° or 15° right or left.

The engine is located at the rear of the machine so that the driver is unaffected

by noise, heat or exhaust fumes. To keep maintenance simple, there are no lubricating points on the rollers. All other maintenance areas are readily and quickly accessible from the ground. ■

KOBELCO

STAND: E6 D 059

The 'Generation 10' series of specialist earthmoving and construction excavators from Kobelco will be introduced to the European market. This series meets Stage 4 emissions regulations and replaces the Generation 9.

The Generation 10 (e.g. SK210LC-10) with a Stage 4 engine delivers greater performance and efficiency in its working environment. In H-mode (heavy work), work volume increases by 6.7 percent for the same level of fuel consumption, while in S (normal work) and Eco-modes fuel consumption is reduced by 6.1 percent, according to Kobelco.

Serviceability is further improved with several key updates such as the introduction of a new compact and easily replaceable canister-type hydraulic oil return filter and a new specification air cleaner inner element. New operator accessible diagnostics via the cabin monitor also assist to ensure work continuity.



The Generation 10 series will be unveiled to the European market.

The boom and arm design features revised structural sections, reinforcement points and pin bosses. The safety cab has been updated to include control levers with

a new 'lock' lever and control lever box. The air-conditioning vents and redesigned rear storage tray also make the cab more comfortable. ■



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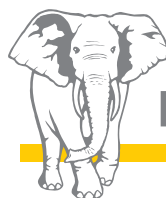
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HAULOTTE

STAND: E5 H 004

Haulotte has updated its STAR range of vertical masts, STAR 8 and STAR 10. The machines can easily manoeuvre around restrictive jobsites, featuring a 3 m outreach. They are suitable for everyday work, both indoors and outdoors. The STAR 8 can accommodate up to two operators.

The Haulotte Activ'Screen on-board diagnostic delivers real-time critical information to save time and facilitate maintenance operations. For a complete diagnostic, the STAR range is also compatible with the Haulotte Diag universal tool.

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

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

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

With a maximum weight of less than 9.5 t, a transport height of 1.8 m and a length of 6.4 m, the HA20 RTJ is very compact. According to Haulotte, two units of HA20 RTJ can be transported on a low flat bed trailer.

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

To alert the operator to potential risk of overhead trapping or crushing, the HA20 RTJ is fitted with the Haulotte ACTIV'Shield Bar secondary guarding device. This system complies with machinery directive 2006-42-EC. ■



Above: Haulotte has updated its STAR range of vertical masts, STAR 8 and STAR 10.

Below, right: The Haulotte ACTIV'Shield Bar guarding device.



The new HA20 RTJ rough-terrain articulated boom.



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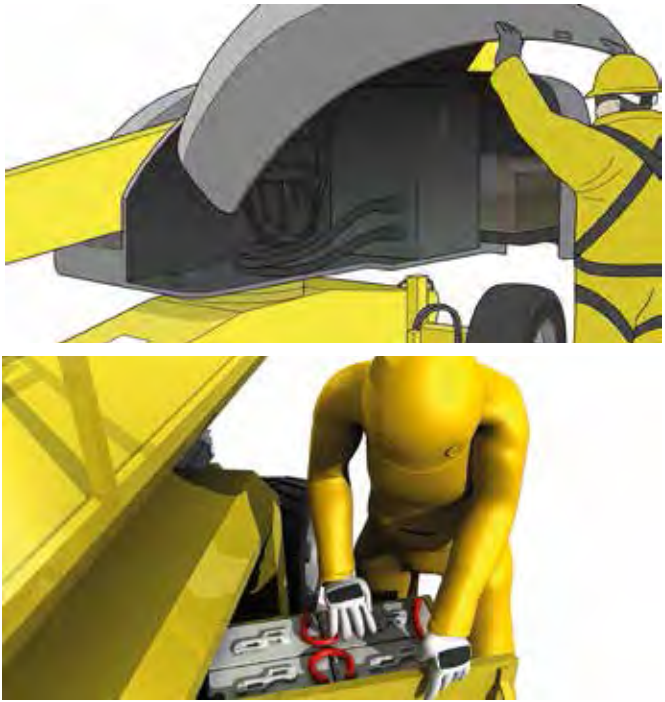
STAND: E5 G 005

Mobile elevating work platforms (MEWPs) are one of the safest ways to perform temporary work at height and the International Powered Access Federation (IPAF) is urging the industry to keep the use of this equipment safe by ensuring that pre-start inspections are done before starting any work. This is the message that IPAF will be highlighting at the show.

In addition to demonstrations showing how to carry out a pre-start inspection, IPAF will feature its latest safety videos that provide visual tours of how to conduct pre-start inspections for scissor lifts (mobile verticals, 3a) and booms (mobile booms, 3b). Each video lasts about 10 minutes and is currently available in English (UK and US), German, French, Italian, Dutch, Spanish, Portuguese and Chinese.

The Federation will also promote its range of resources on the subject of inspections, including the popular inspection key tags, which provide a handy reminder of points to cover for pre-start and workplace inspections. Furthermore, IPAF will hold several member meetings during the show, including the IPAF Manufacturers' Technical Committee meeting and Vehicle Mounted Manufacturers' meeting. ■

Both images: Pre-start inspections help keep MEWP operations safe, as IPAF will show at Intermat.



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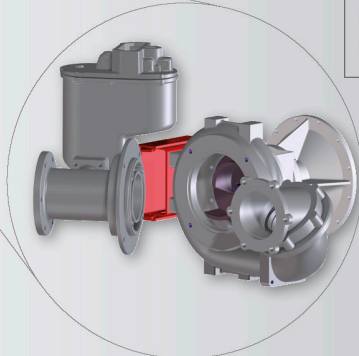
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TEREX CRANES

STAND: E5 E 010

The Terex Explorer 5600 is designed with performance and roadability in mind. This five-axle, 160 t capacity class all terrain crane offers a boom with a short 1.4 m front overhang, while its optional boom-off solution or dolly help in meeting stringent road regulations. Its automatic counterweight rigging system enables the crane to be ready to work quickly.

The 12.6 m carrier length enables the Explorer 5600 to quickly manoeuvre urban areas and efficiently navigate congested construction sites. All-axle steering delivers tight cornering capabilities and the ability to crab steer for outstanding on-site manoeuvrability. Featuring a 68 m main boom and maximum 95 m system length with a maximum load moment of 480 mt, the crane provides one of the strongest lift charts over the entire working range in this capacity class. It has a lifting capacity of 35 t while telescoping, and a strong 98.2 kNf hoist with robust 21 mm rope and 9.9 t cable pull that requires less reeving for shorter rigging times and increased performance.

A single, 405/265 kW (road travel/operation) Euromot IV/ Tier 4 final compliant diesel engine operates both the driveline and upper structure to lower the total cost of ownership. The Explorer 5600 is equipped with a power management system that provides excellent performance and efficiency for all load cycles to offer power when required and fuel economy when operating the crane's upper structure. The Explorer 5600 has plenty of power and control with a new electrical braking system that offers improved braking performance with reduced brake pad wear (vs cranes without this system), and dynamic launch control supporting the driver when starting upwards on a hill.

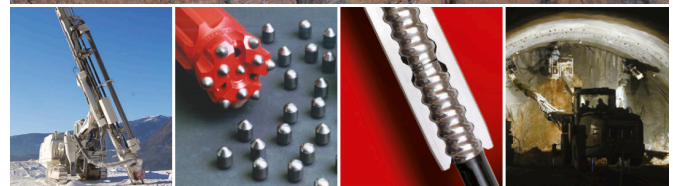
The upper structure of the crane includes multiple access and egress points, making access to the upper cab and components in the upper structure more comfortable and easier than ever. Its outrigger base of 8.14 x 7.50 m is said to be the largest in its class, offering stable operation when lifting heavy loads. The optional xenon working lights package around the crane and the optional pendulum load camera, tail swing camera, and hoist and right-hand side cameras provide good visibility of the jobsite even at night.

The Explorer 5600 also features the latest Terex Cranes driver and operator cabs, designed to boost productivity. Built around operator feedback, this functional cab repositions the electronics compartment to offer longer inside dimensions and provide more space for operators. In the 2.55 m wide driver cab, B-pillars have been removed for improved visibility. Moreover, out-of-window wipers and an infinitely variable tilt-up operator cab of up to 20° deliver excellent visibility of the work area. An ergonomic, multi-adjustable seat with lumbar support and head and arm rests helps to improve operator comfort and productivity.

The Explorer 5600 comes standard with the IC-1 control system, which offers efficient and intuitive touchscreen operation. The IC-1 software stores all load charts and offers easy configuration based on load and radius input. Operators can quickly configure the control system settings to meet jobsite requirements. The IC-1 system offers a work range limiter for ease of operation when working indoors or around obstructions. ■



The Explorer 5600 all terrain crane.



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AMMANN

STAND: 5b F 042

Ammann's range of lightweight, articulated tandem rollers consist of 13 models based on three chassis types in the weight categories of 1.4 to 4.6 t and working widths of 820 to 1,380 mm. Their areas of use include mainly small to medium-sized construction sites, inner-city roadworks, pedestrian pathways and repair works. All models are available with engines that comply with Tier 3/EU Stage 3A emission standards.

The machines feature electronic steering and an electronic tiller that together make operation easier. The gentle acceleration and deceleration helps prevent mistakes and avoids marks on the freshly laid asphalt. In addition, the vibratory system with two amplitudes and two frequencies featured in the ARX 36, ARX 40 and ARX 45 models supports an even broader spectrum of applications with a precise adaptation of compaction parameters, including large construction sites and asphalt-free applications. The ACE^{force} system supplies detailed information on the entire compaction process, thus enabling continuous control of the working process.

The new design of the machines not only is highly ergonomic, but also provides an excellent view of the drum edges and easy access to maintenance and servicing points. The combination of a maintenance-free articulated joint, high performance and the latest Yanmar engines results in low operating costs.

The ARX 90 and ARX 110 articulated tandem rollers offer greater ease of operation and better ergonomics, thanks to the improved design. The new control system provides precise information on the machine and its parameters via a display unit integrated in the steering wheel. The clearly laid out controls feature intuitive operator navigation to provide support for every task.

Both models are considered among the most productive and versatile asphalt rollers on the market, said Ammann, owing to a large selection of drum types (single-component drums, multi-section drums and combination drums) and tools (e.g. split spreader, edge cutter, etc.). They are powered by either a Tier 3/EU Stage 3A or Tier 4i/EU Stage 3B engine.

Furthermore, Ammann's ARP 95 articulated tandem roller, weighing in at 10 t, can be deployed at many locations in the world where maximum agility and high compaction output are required. The



The ARX 45 (above) and ARX 90 articulated tandem rollers.



independent steering of the front and rear drums ensures high flexibility, even when working conditions are difficult. This machine also offers crab mode, making it suitable for construction sites of all sizes.

The ARP 95 has an operating weight of 10,050 kg and a working width of 1,680 mm. The machine features the ACE^{force} and ACE^{pro} systems, which supply detailed information on the entire compaction process to enable continuous control and monitoring of the working process.

The innovative display-based machine control, integrated into the operating

platform, embodies a steering concept that typifies the new generation of asphalt compaction rollers. The main machine parameters can be called up on the display – starting with standard information for the operator about engine, hydraulic and compaction parameters through to detailed data for service technicians.

The ARP 95's engine is compliant with Tier 4i/EU Stage 3B emission standards. All the other models in the family of Ammann articulated rollers are equipped with Tier 3/EU Stage 3A and Tier 4i/EU Stage 3B engines. ■

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DRESSTA

STAND: 6 J 064

The Dressta TD-20M LA Extra landfill crawler dozer features an excellent waste compaction capability and optional large blades with a trash rack and multi-shank rippers. It is driven by a Cummins engine that meets EU Stage IIIA emission regulations and develops 179 kW flywheel horsepower.

The landfill machine is equipped with turbine type precleaners. The cleaner spins the air entering to the engine intake system and uses centrifugal force to eliminate contaminants from the air, thus prolonging the life of the normal filters, improving fuel economy and extending engine life.

The cooling module consists of a charge air cooler (CAC), engine coolant radiator, powertrain oil cooler and hydraulic oil fan drive cooler. The aluminium design of the cooling module aids durability, allows higher heat transfer and has good corrosion resistance. Cooling module louvered doors are hinged and equipped with quick disconnect latches and pins instead of mounted bolts. This solution allows fast and easy access to cleaning the cooling module as well as enhancing the radiator cooling ability. Perforated hood and engine side doors provide better ventilation of the engine compartment and better overall cooling of the engine. Angle iron deflector bars are welded below the engine side sheets to protect them against damage and protect engine access doors against any penetrating rods and other stiff metal pieces.

The standard TD-20M LA bulldozer is equipped with a hydraulically driven fan and self-cleaning of the cooling module is effectuated by reversing the fan rotation and airflow. Two modes of operation are available: automatic or manual. The reverse airflow enables cleaning of the cooling module and improves cooling when the ambient temperature is lower than inside. At low ambient temperatures, the hydraulic drive reduces the fan speed, resulting in reduced power, lower fuel consumption and a decreased noise level.

The operator's cab is specially designed to provide high safety and operating comfort as well as to contribute to increased productivity. The six-sided spacious cab is sound suppressed and protected with two-post ROPS. The cab is isolation mounted to provide a comfortable operating environment for the operator. An air-suspension seat with a safety belt offers full adjustment and provides substantial reduction of vibrations. The large cab windows and sloped hood



Dressta TD-20M LA Extra landfill crawler dozer.

provide an excellent view of the mounted equipment and an all-around viewing area. Harsh operating conditions in landfill areas require additional protection and therefore, the cab can optionally be equipped with screens of the windows and cab lights to protect against damage.

Ergonomically designed joysticks for motion and mounted equipment control are easy and comfortable to operate and offer excellent precision. The operator may use the preset forward and backward travel speed selection for increased performance. The automatic downshift function reduces the gear, if an increased load is detected, for better productivity.

The sealed operator's cab is equipped with an AC and air recirculation system. The recirculated air inside the cab is filtered with the internal filter, located behind the operator's seat. The outside air is filtered with the external filter, installed below the rear cab window. Cleaned air passes through the AC and is cooled or heated as required. Overpressure inside the cab prevents outside airborne contaminants from entering.

Semi-U or full-U blades, equipped with a trash rack, thanks to their large capacities (14.1 and 17.15 cu m), are very common blades used on landfill crawler dozers. The trash rack has a steel plate in the centre to prevent rods, wires, etc. from entering into the radiator area. Working with the heavy full-U trash rack blade, in the case of the TD-20M LA, requires the use of an additional counterweight, which will ensure

the appropriate balance of the machine. In addition, Dressta offers the TD-20M LGP LA landfill dozer with the low ground pressure undercarriage and 864 mm wide track shoes. This model has a straight blade with a trash rack (13 cu m capacity).

Dressta landfill dozers are equipped with track shoes with centre clean-out holes cut in a circular shape. The holes reduce the packing of materials between the sprocket and the track chain bushings, which cause accelerated wear of the track components.

Extensive guarding helps protect the critical machine components, especially the undercarriage, from being damaged by debris in harsh waste handling environments. Minimising build-up helps prevent component damage. Track roller guards are necessary to keep refuse, brush, etc. out of the rollers and track chain. Sprockets are protected with sprocket rock guards to prevent landfill material from entering between sprocket teeth and track chain bushings. Final drives are to be equipped with bolted final drive seal guards. Striker bars prevent debris from riding up the track and damaging the fenders. Front striker bars, depending upon the tractor size can be either bar type (STD) or bridge type (LT, LGP). Rear striker bars can be attached to either a ripper frame, if the tractor is so equipped, or to a landfill counterweight box. The standard bolted guard protects the fuel tank and the hydraulic reservoir against damage caused by wires, penetrating rods, sharp materials or other stiff metal pieces that are often found in landfills. ■

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INDOOGOO

Indoogoo is believed to be the first industry website to combine online auctions, rentals and sales listings with a social network framework – a structure that is set to disrupt the norm and completely reinvent traditional methods of trading heavy equipment.

The site, which launched in mid-2014, will be appearing at a major trade show for the first time when it attends Intermat. The exhibition will give Indoogoo the opportunity to talk directly with industry professionals and demonstrate how the social network can help buyers and sellers of equipment to grow their networks, improve their knowledge base, and streamline their buying and selling activities.

Mark Turner, CEO and founder of Indoogoo, and Hanoof Nass, the site's CIO, will be attending the show and leading demonstrations of the website on the



company's stand. They will also provide information on up-coming developments for 2015.

Indoogoo will offer visitors the chance to get to know the website, create a profile and explore the many features the site has to offer. In particular, the company will be

demonstrating its new Indoogoo Auctions feature. This service combines the social network structure with online auctions and allows all users to become auctioneers – ensuring they have the power to control and design their own auction at the touch of a button. ■

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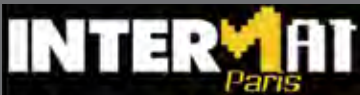


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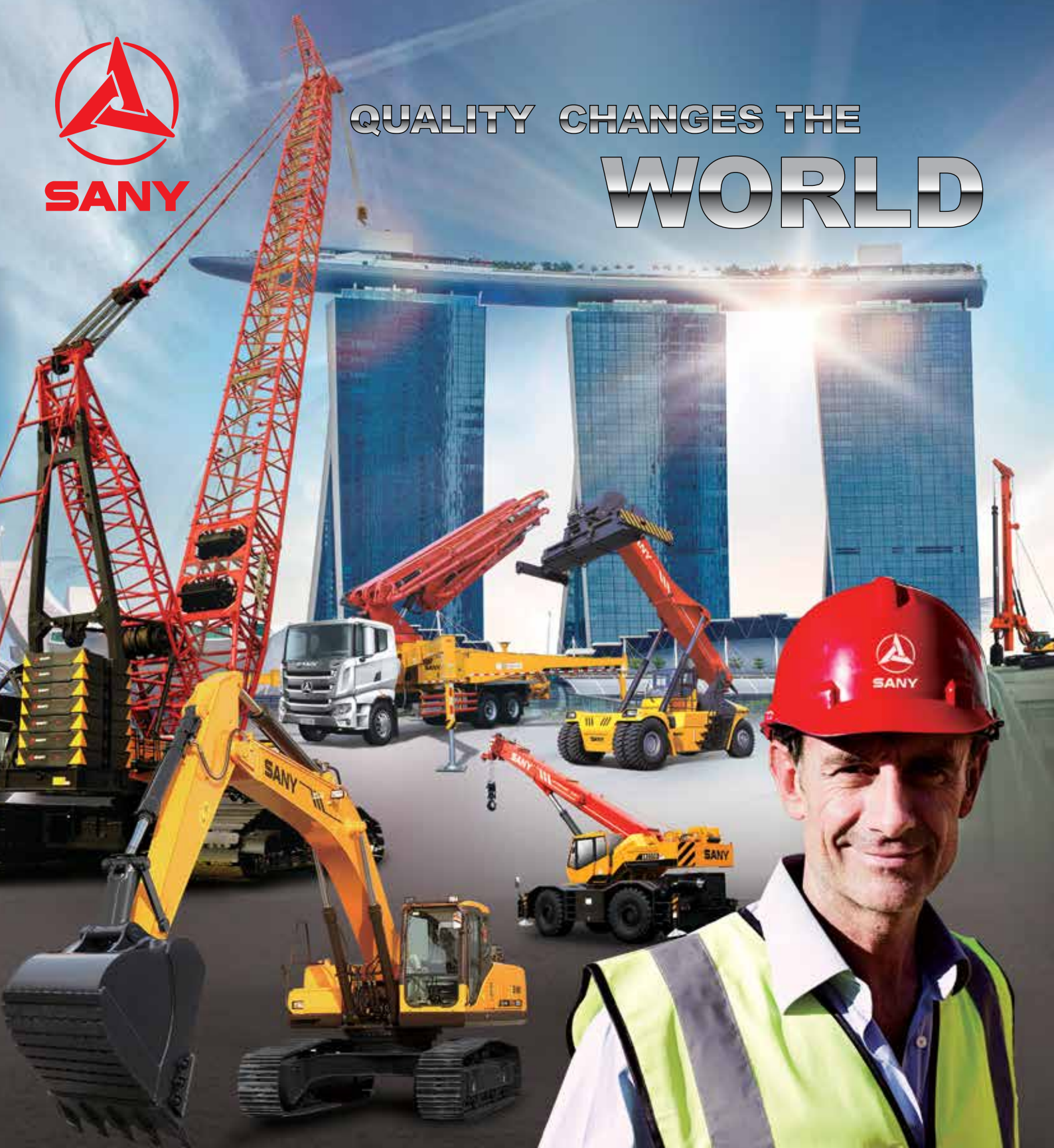
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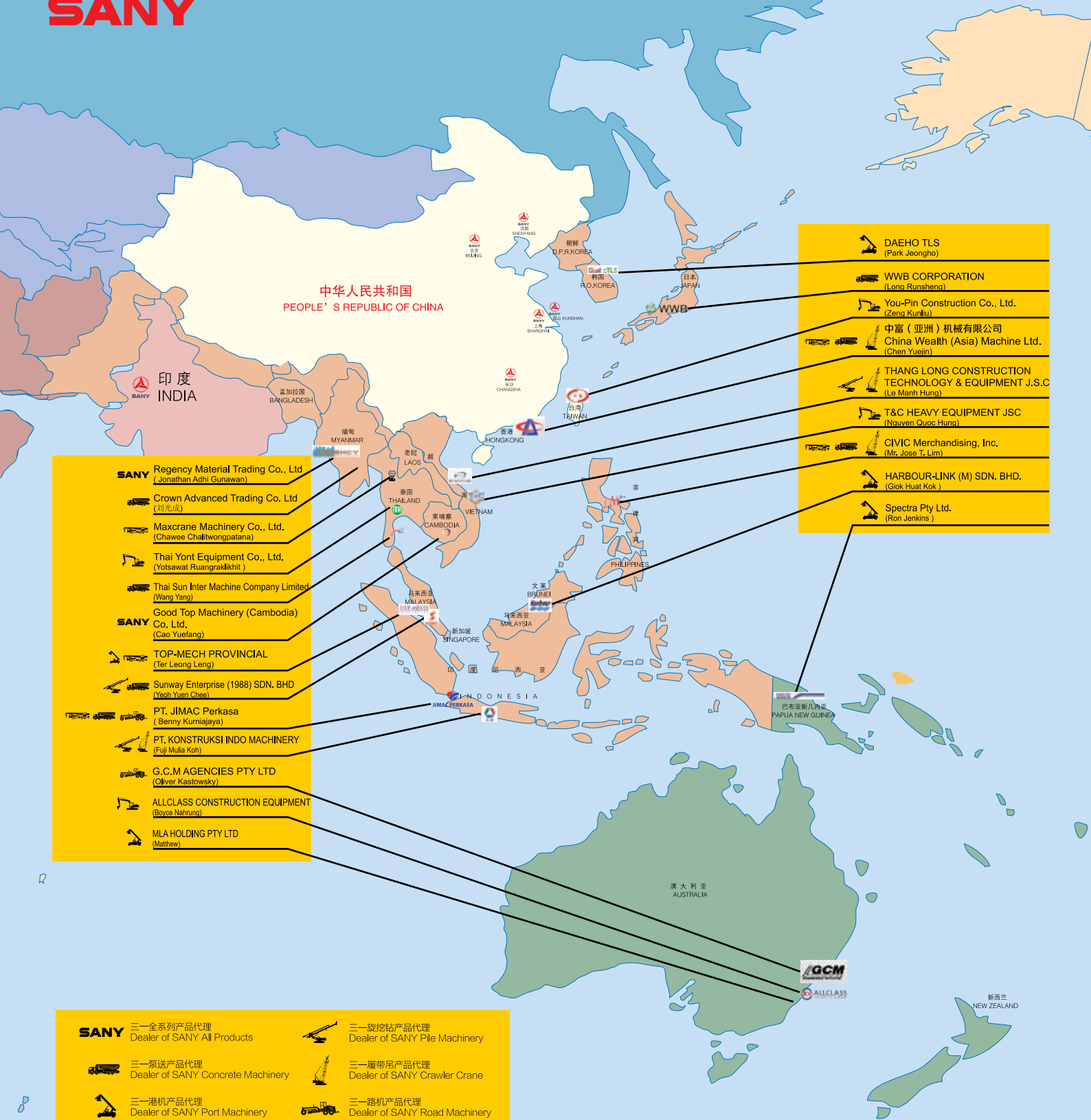
Website: www.sanygroup.com

三一集团有限公司
SANY GROUP CO., LTD.



三一集团亚太大区代理商分布图

Dealers Layout Map of SANY Group Asia-Pacific Region



- SANY** Regency Material Trading Co., Ltd (Jonathan Adhi Gunawan)
- Crown Advanced Trading Co. Ltd (刘光成)
- Maxcrane Machinery Co., Ltd. (Chawee Chaitwongpatana)
- Thai Yont Equipment Co., Ltd. (Yotsawat Ruangrakikhit)
- Thai Sun Inter Machine Company Limited (Wang Yang)
- SANY** Good Top Machinery (Cambodia) Co., Ltd. (Cao Yuefang)
- TOP-MECH PROVINCIAL (Ter Leong Leng)
- Sunway Enterprise (1988) SDN. BHD (Yesh Yuen Chee)
- PT. JIMAC Perkasa (Benny Kurniajaya)
- PT. KONSTRUKSI INDO MACHINERY (Fuji Mulla Koh)
- G.C.M AGENCIES PTY LTD (Oliver Kastowsky)
- ALLCLASS CONSTRUCTION EQUIPMENT (Boyce Nahrung)
- MLA HOLDING PTY LTD (Matthew)

- DAEHO TLS (Park Jeongho)
- WWB CORPORATION (Long Runsheng)
- You-Pin Construction Co., Ltd. (Zeng Kunliu)
- 中富（亚洲）机械有限公司 China Wealth (Asia) Machine Ltd. (Chen Yuejin)
- THANG LONG CONSTRUCTION TECHNOLOGY & EQUIPMENT J.S.C (Le Manh Hung)
- T&C HEAVY EQUIPMENT JSC (Nguyen Quoc Hung)
- CIVIC Merchandising, Inc. (Mr. Jose T. Lim)
- HARBOUR-LINK (M) SDN. BHD. (Glok Huat Kok)
- Spectra Pty Ltd. (Ron Jenkins)

- SANY** 三一全系列产品代理 Dealer of SANY All Products
- 三一泵送产品代理 Dealer of SANY Concrete Machinery
- 三一港口产品代理 Dealer of SANY Port Machinery
- 三一挖机产品代理 Dealer of SANY Excavator
- 三一旋挖钻产品代理 Dealer of SANY Pile Machinery
- 三一履带吊产品代理 Dealer of SANY Crawler Crane
- 三一拖机产品代理 Dealer of SANY Road Machinery
- 三一汽车吊产品代理 Dealer of SANY Mobile Crane