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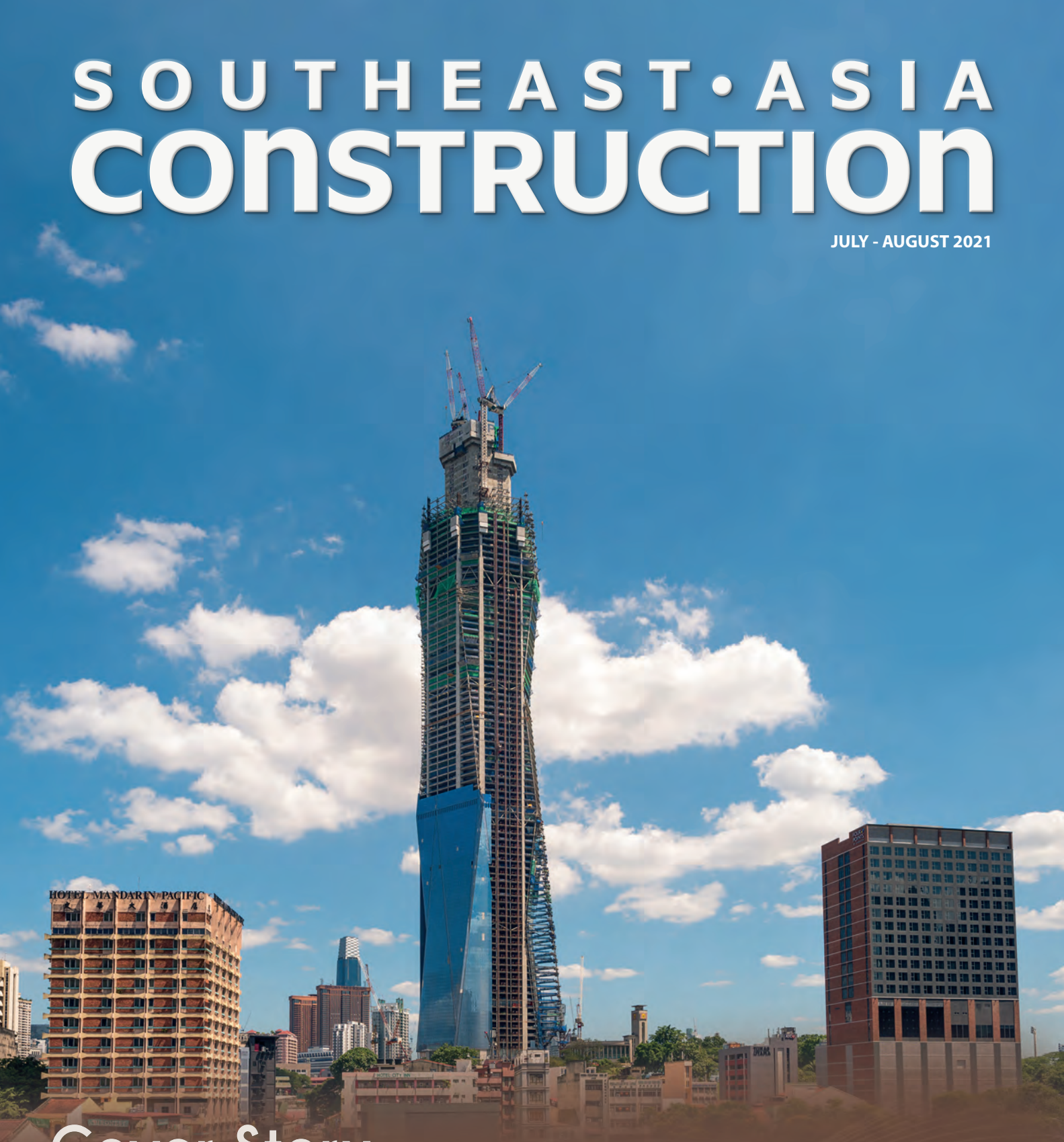

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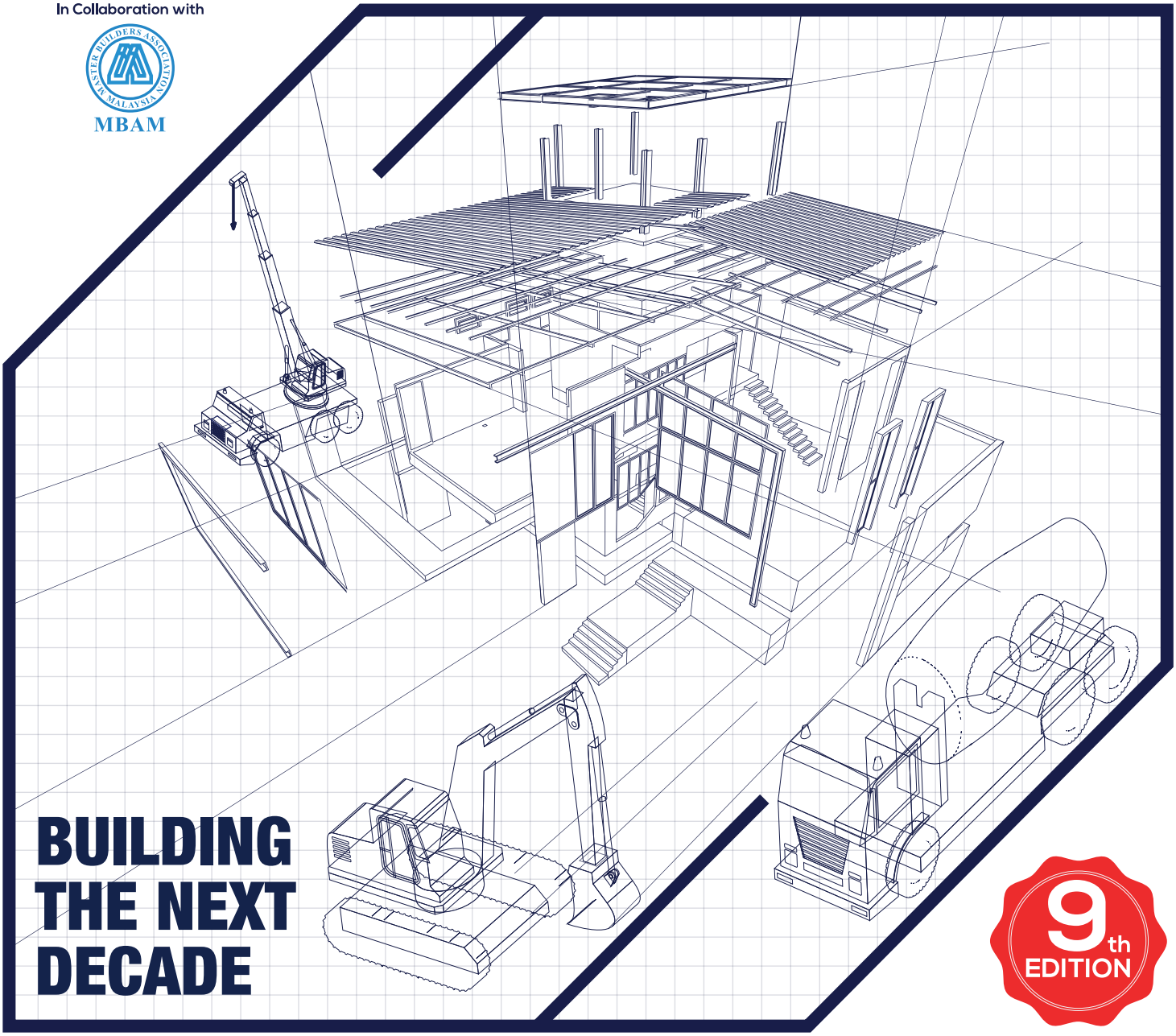

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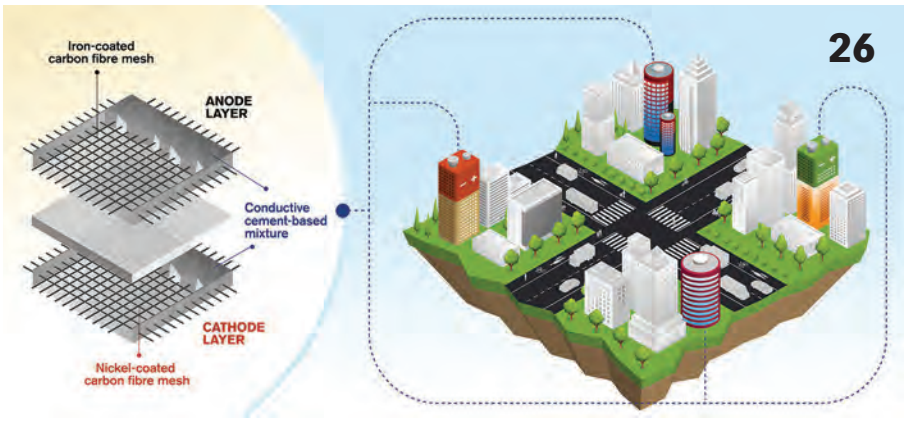

On the cover:
Construction of Merdeka 118 tower in Malaysia
(page 60)

Cover designed by
Fawzeeah Yamin

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

Associate Publisher
Eric Ooi (eric.ooi@tradelinkmedia.com.sg)

Editor
Fabia Sugandy (seac@tradelinkmedia.com.sg)

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

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

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

Any other matters : info@tradelinkmedia.com.sg
Website: http://seac.tradelinkmedia.biz

ISSN 2345-7082
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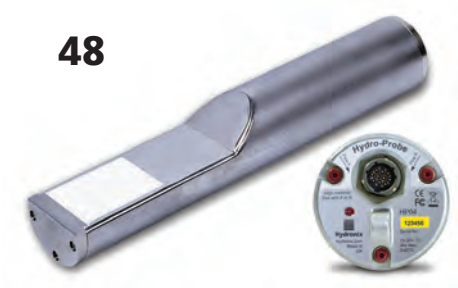

PROJECTS & SPECIAL FEATURES

SOUTHEAST ASIA CONSTRUCTION is published six times a year by:
Trade Link Media Pte Ltd. RCB Registration no: 199204277K
Address: 101 Lorong 23, #06-04 Prosper House, Singapore 388399
Tel: +65 6842 2580, Fax: +65 6842 2581 /+65 6745 9517
Website: http://seac.tradelinkmedia.biz Email: info@tradelinkmedia.com.sg

The magazine is available free-of-charge to applicants in the building and construction industries who meet the publication's terms of control. For those applicants who do not qualify for free subscription, copies will be made available, subject to the acceptance by the publisher, of a subscription fee which varies according to the country of residence of the potential subscriber. Airmail (per year): Singapore - S$60; Malaysia and Brunei - S$105; Rest of Asia - S$155; Japan, Australia, New Zealand, Middle East, Europe and USA - S$185 (Incl. 7% GST Reg: M2-0108708-2).

Printed in Singapore by Fuisland Offset Printing (S) Pte Ltd.
MCI (P) 019/06/2021 • ISSN 2345-7082 (Print) and ISSN 2345-7090 (E-Periodical) • KDN No: 1560 (1271)-(6)

INTERNATIONAL SALES OFFICE:
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SMEC secures wind farm project in Vietnam

SMEC has been engaged by Gia Lai Investment and Development Wind and Power Joint Stock Company to undertake the Environmental and Social Impact Assessment (ESIA) for the 100-MW Hung Hai Gia Lai Wind Farm Project in the Gia Lai Province, central Vietnam.

Demand for electricity in Vietnam is increasing and is predicted to grow at an average rate of 8% until 2030. Renewable energy, including wind, is an increasingly important part of meeting this energy demand and helping to alleviate power shortages in the country.

SMEC will prepare the ESIA to meet the International Finance Corporation (IFC)'s environmental and social performance standards and associated guidelines. The ESIA will identify and assess potential effects on the full range of environmental, social and cultural aspects that may be impacted during all phases of the project, and also identify mitigating measures to avoid or reduce impacts and enhance benefit.

"We are proud to bring our global expertise to this project, contributing to Vietnam's renewable future through supporting the development of wind farms," said Libby Paholski, functional group manager, Social Development and Environment Group SEA and the Pacific at SMEC. "Our specialists collaborate with clients and stakeholders to realise project outcomes, supporting the delivery of efficient, environmentally sustainable and cost-effective systems for a broad range of renewable projects and technologies." ■

ABOVE AND BELOW: **SMEC will conduct the Environmental and Social Impact Assessment (ESIA) for the 100-MW Hung Hai Gia Lai Wind Farm Project in the Gia Lai Province, central Vietnam.**

Another tunnelling breakthrough for East Coast Rail Link project

Malaysia's East Coast Rail Link (ECRL) project recently marked another milestone with a tunnel breakthrough at the 871 m single-bore Terowong Dungun in Terengganu, six months ahead of schedule, announced Malaysia Rail Link Sdn Bhd (MRL).

The final blast at Terowong Dungun on 29 May 2021 broke through the last barrier some 12 m from the tunnel's entrance portal. "This achievement is a culmination of approximately 641,520 man-hours and the adoption of the drill-and-blast method of tunnelling that bored through the moderately weathered schist rock," stated MRL.

The company said tunnel excavation work for Terowong Dungun had progressed to 97.4% prior to the breakthrough, while its permanent lining had rose to a decent length of 702 m. With a tunnel height of 11.8 m and width of 12.9 m, Terowong Dungun was constructed to avoid major open cutting and to preserve forest reserve when travelling across the Kuala Dungun area.

The tunnel breakthrough at Terowong Dungun had taken place less than two months from the inaugural ECRL tunnel breakthrough at the 1.1-km Terowong Paka on 9 April 2021. Upon completion of the project, the state of Terengganu will feature five ECRL tunnels. Terowong Dungun was also the event site for the ECRL project's relaunch ceremony on 25 July 2019.

Tan Sri Mohd Zuki Ali, chairman of MRL, said the dedication and teamwork of some 100 ECRL personnel at all levels had paved the way for the tunnelling work and breakthrough at Terowong Dungun to be ahead of schedule, noting that the overall infrastructure work for the tunnel is expected to be completed by the second quarter of 2022.

"The ECRL team including engineers, planners, and construction workers at Terowong Dungun ought to be congratulated as the tunnelling work which excavated some 98,111 cu m of soil and rock have been completed safely and with minimal ground movement," he said, adding that Terowong Dungun is expected to be completed months ahead of schedule barring any unforeseen circumstances.

Tan Sri Mohd Zuki further explained that the ECRL project has 58 tunnels encompassing different lengths and landscape to be constructed along various sections of its 665-km rail alignment, and he anticipates that the strong collaboration and knowledge sharing between MRL and China Communications Construction (ECRL) Sdn Bhd (CCC-ECRL) can smoothen tunnel excavation and deliver such engineering feat as per schedule or even earlier.

"We are pleased that the ECRL project is still progressing slightly ahead of schedule at 22.62% as of May 2021, despite the Covid-19 pandemic which effectively reduces work hours and manpower at project sites," he said.

MRL, a wholly-owned subsidiary of Minister of Finance Incorporated (MOF Inc), is the project and asset owner of the ECRL while CCC-ECRL is the engineering, procurement, construction and commissioning (EPCC) contractor.

Scheduled for completion by December 2026, the 665-km ECRL will traverse the East Coast states of Kelantan, Terengganu and Pahang before linking the Klang Valley on the west coast of Peninsular Malaysia. The ECRL will significantly cut travel time and connect Kota Bharu with ITT Gombak in approximately four hours. ■

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ADB supports rural road projects in Sri Lanka

The Asian Development Bank (ADB) and the Government of Sri Lanka have signed a US$200 million loan agreement for the Second Integrated Road Investment Program Tranche 3 to continue ADB's assistance to upgrade Sri Lanka's rural road network connecting vast rural populations to jobs and services.

"Economic growth is hindered by poor transport infrastructure, particularly some poorly maintained provincial and local roads," said Chen Chen, ADB's country director for Sri Lanka. "Access to markets and business opportunities, especially along agricultural value chains, can be significantly improved with better transport infrastructure and can serve as the key to poverty reduction and shared prosperity in rural areas."

Secretary to the Treasury and Ministry of Finance S.R. Attygalle signed the loan agreement for the Government of Sri Lanka and Mr Chen signed on behalf of ADB. A project agreement was also signed between ADB and the implementing agency, Road Development Authority, represented by chairman C. P. Athuluwage.

Despite the present challenges of the coronavirus disease (Covid-19) pandemic, the project is being implemented while adhering to health guidelines and the well-being of its workers. It is expected to support the post-pandemic economic recovery in rural areas through job opportunities and by obtaining services from rural populations, such as the hiring of vehicles, buildings, equipment, etc.

"Providing all-weather road access will help link rural communities to socioeconomic centre in Sri Lanka, thereby enabling rural communities to reap and enjoy the fruit of inclusive economic growth," said Mr Attygalle. "This is very much in keeping with the government's development policy and will contribute to the government's development plan."

This loan is the third of five tranches under the Second Integrated Road Investment Program, which was approved by ADB's board of directors in 2017. The programme will deliver a total financing of US$900 million to rehabilitate and improve about 3,400 km of rural access roads and 340 km of national roads in the eastern, northern, Uva, and western provinces. It will improve the capacity of the country's road agencies on road safety, maintenance, research, road design, and construction. The programme is due for completion in 2027. ■

© ADB

Road construction work being undertaken under the Second Integrated Road Investment Program in Sri Lanka.

Gomaco appoints new managing director for Asia Pacific region

The Iowa, USA-based global concrete construction equipment manufacturer, Gomaco, has appointed Kelly Steeves (left) as its new managing director for Asia Pacific. He will be responsible for the sales of the company's products and managing the distributor network within the region.

Mr Steeves has been involved in the concrete construction industry his entire career, starting out as a labourer, to becoming concrete paving manager on the state of Utah's (USA) largest construction project ever undertaken. He has been working for Leica Geosystems as a paving account manager in 3D stringless paving for the last eight years before joining Gomaco in March 2021.

Kent Godbersen, Gomaco's vice president of worldwide sales and marketing commented, "Kelly is going to be a great asset to our customers and distributors in the Asia Pacific region. He brings with him tremendous knowledge about concrete paving, 3D guidance systems, and Gomaco's concrete paving equipment, along with communication and trouble-shooting skills gained as an experienced veteran in the construction industry." ■

New residential project in Klang Valley

© Setia Awan

Malaysian company Setia Awan is developing a new condominium project in Klang Valley, about 10 km from the Kuala Lumpur city centre. It consists of four building blocks with 660 home units ranging in size from 1,073 to 1,953 sq ft.

Named Brezza One Residency (pictured), it is located in the Brezza Hill hillside enclave surrounded by the famous Bukit Ampang and Hulu Langat Forest Reserve. The project was first launched in the fourth quarter of 2019, and is expected to be completed in the second quarter of 2024.

According to Setia Awan, the company will also launch Astrum Ampang, a new 6.75-acre mixed development located near Jalan Ampang and Jalan Jelatek. ■

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Turning food waste into robust construction materials

A research team from the Institute of Industrial Science (IIS) at the University of Tokyo, Japan, has developed a new method to reduce food waste by recycling discarded fruit and vegetable scraps into robust construction materials.

Worldwide industrial and household food waste amounts to hundreds of billions of pounds per year, a large proportion of which comprises edible scraps, like fruit and vegetable peels. This unsustainable practice is both costly and environmentally unfriendly, so researchers have been seeking new ways to recycle these organic materials into useful products.

"Our goal was to use seaweed and common food scraps to construct materials that were at least as strong as concrete," said Yuya Sakai, the senior author of the study and associate professor at IIS. "But since we were using edible food waste, we were also interested in determining whether the recycling process impacted the flavour of the original materials."

In its statement, the university explained that the researchers borrowed a 'heat pressing' concept that is typically used to make construction materials from wood powder, except they used vacuum-dried, pulverised food scraps, such as seaweed, cabbage leaves, and orange, onion, pumpkin, and banana peels as the constituent powders.

The processing technique involved mixing the food powder with water and seasonings, and then pressing the mixture into a mould at high temperature. The researchers tested the bending strength of the resulting materials and monitored their taste, smell and appearance.

"With the exception of the specimen derived from pumpkin, all of the materials exceeded our bending strength target," said Kota Machida, a senior collaborator. "We also found that Chinese cabbage leaves, which produced a material over three times stronger than concrete, could be mixed with the weaker pumpkin-based material to provide effective reinforcement."

The new, robust materials retained their edible nature, and the addition of salt or sugar improved their taste without reducing their strength, according to the university. Furthermore, the durable products resisted rot, fungi and insects, and experienced no appreciable changes in appearance or taste after exposure to air for four months.

© Institute of Industrial Science, The University of Tokyo

Researchers at IIS have developed a new method to recycle food waste - such as cabbage leaves, onion and orange peels, etc - into robust construction materials.

The university emphasised that it is crucial to develop methods for recycling food scraps, given that food waste is a global financial burden and environmental concern. "Using these substances to prepare materials that are strong enough for construction projects, but also maintain their edible nature and taste, opens the door to a wide range of creative applications from the one technology."

This innovative method will be published in the proceedings of the 70th annual meeting of the Society of Materials Science, Japan as 'Development of Novel Construction Material from Food Waste.' ■

Arup-ODE awarded offshore wind farm project in South Korea

Arup, in association with Offshore Design Engineering Limited (ODE), has been commissioned by Hyundai Engineering Corporation as the technical consultant for Korea Wind Energy Co Ltd's 220-MW Anmado Offshore Wind Project in South Korea.

Located at the coast of the South Jeolla Province (Jeollanam-do), the project is one of the initial offshore wind projects to support the country's energy plan released in 2017 to have at least 20% of electricity produced by renewables by 2030 and 30-35% by 2040.

Arup–ODE team will assess the local conditions to determine the most appropriate foundation system, turbine technology and site layout for the chosen site in order to facilitate the early project planning works.

Leveraging its long-established expertise from the European offshore wind market and further project experience in Japan, Korea, Taiwan and Vietnam, Arup and ODE's multidisciplinary teams in Europe and Asia have an in-depth understanding of the specific challenges to be faced and how they can be applied to the local conditions and regulatory framework. Through its strategic network of offices across the region, Arup–ODE will deliver world-class engineering services to the project.

"We're excited to be able to contribute our expertise to the project, drawing upon our combined experiences for the development of offshore wind farms in the UK, Europe, Japan, Vietnam and Taiwan. We look forward to engaging with the Korean offshore wind industry to utilise these skills," said Peter Thompson, energy business leader for East Asia at Arup.

"With extensive experience of the offshore wind industry globally and regionally, we are delighted to be working in partnership with Arup to support Wind Energy Co in the development of the Anmado offshore wind farm. This project will play an important role in the Korean offshore wind power generation. It is an exciting opportunity and we are proud to be a key part of it," said David Robertson, director and head of renewables at ODE. ■

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Mitsubishi joins first onshore wind project in Laos

Japan's Mitsubishi Corporation will be participating in the development of a 600 MW onshore wind farm in Laos, set to be the largest in Southeast Asia. The company recently announced its investment in Impact Energy Asia Development Limited (IEAD), the developer of the project.

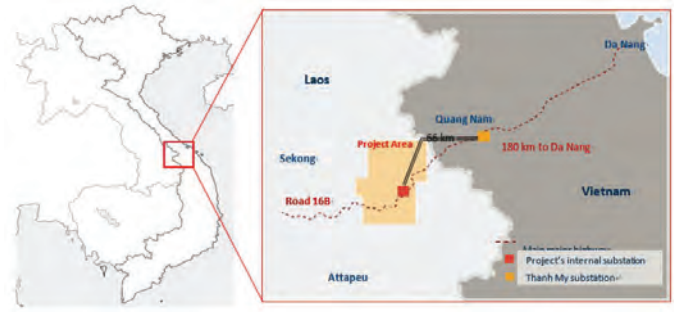
The new wind warm – the first in Laos – will be located in Sekong and Attapeu Provinces, southeast of the country. A dedicated transmission line to Vietnam will also be built, and the power generated from the facility is planned to be sold to Vietnam Electricity (a Vietnamese state-owned electric power company) for 25 years.

The project is being developed as part of an agreement on power sharing signed between the governments of Vietnam and Laos in October 2016. It is expected to be the first cross-border electricity sharing from wind power generation in Southeast Asia, said Mitsubishi.

In Vietnam, there is a demand for additional power supply to support its growing economy, especially in the dry season when hydropower generation is limited, explained Mitsubishi. Hydropower is one of Vietnam's main sources for electricity.

The new onshore wind farm in Laos is intended to operate at a high rate during the dry season, and would help stabilising Vietnam's power system while making the country's energy mix greener.

"We will continue to contribute to the realisation of a decarbonised society by striving to achieve both a stable supply of electricity in Vietnam and addressing the environmental challenges for the stable society," stated Mitsubishi. ■



The new wind farm will be built in Sekong and Attapeu Provinces.

© Zhang Fengsheng/Unsplash

Renewable energy projects such as wind power are becoming more widespread across Asia.

Black & Veatch strengthens power transmission and distribution team

Global engineering and construction company, Black & Veatch, has appointed Jerin Raj (left) as its Asia power transmission & distribution business director. He is based in Bangkok, Thailand.

"With the share of renewable energy in Southeast Asia's power generation mix increasing, the region will need more integrated power solutions to improve grid efficiencies and resilience. One critical step will be to expand its transmission and distribution networks. Jerin's deep knowledge of the regional power transmission sector will further enable Black & Veatch to help clients achieve profitability, reliability and compliance targets through cost and schedule certainty," said Narsingh Chaudhary, Black & Veatch's executive vice president and managing director, Asia Power Business.

According to Black & Veatch's Strategic Directions: Electric Industry Asia 2021 Report, the most significant investments in new capacity over the next three to five years is expected in renewable energy. Solar (land), energy storage, solar (floating), wind (offshore) and microgrids represent the top five categories.

Regional energy industry leaders caution that underinvestment in more reliable transmission networks is one of the key threats to reliable grid operations and performance across Asian electricity markets.

Mr Raj has over 17 years of global experience in project delivery, business development, sales, proposals, contracting, operations, change management and project management primarily in the power transmission sector. In his previous roles, he organised and ran operations in Southeast Asia and helped to deliver power transmission infrastructure across the East Asia Pacific region.

A market leader in power transmission and distribution infrastructure, Black & Veatch offers a full range of new and operating asset services from consulting, engineering, to full engineering, procurement and construction (EPC) in areas including substations, overhead and underground transmission lines, renewables integration, high voltage direct current (HVDC) transmission and flexible alternating current transmission systems (FACTS).

Black & Veatch has been engaged in transmission and substation work since the 1940s. In 2019 alone, the company completed more than 1,900 substation and 500 transmission projects globally. Its full EPC experience in Asia for gas insulated substations (GIS) is supported by architectural, civil and structural and full transmission capabilities. ■

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Caterpillar reaches 5000th tractor milestone in Thailand

The Caterpillar Rayong Thailand Tractors (CRTT) facility covers 21.12 ha of land and has hundreds of employees. On 12 May 2021, CRTT celebrated a major milestone with the production of its 5000th tractor.

The monumental machine is a Cat D8T track-type tractor, which has been shipped to Azerbaijan at the end of May. "This tractor is a demonstration of CRTT's collective dedication and engagement in delivering on commitments as well as contributing to the business success of the enterprise," said Caterpillar.

Cat track-type tractors have been helping customers throughout Southeast Asia in multiple industries for more than five decades. The machines are suitable for use in projects such as road construction, forestry, general construction and mining. Caterpillar asserted that the company is committed to offering customers in Southeast Asia with a wide range of quality products and services that help make progress possible.

Caterpillar began its presence in Thailand over 40 years ago to provide its technical services and product knowledge to the authorised Cat dealer, Metro Machinery. To better serve construction customers, Caterpillar (Thailand) Limited was incorporated in April 1998.

Caterpillar has also made significant investments in its manufacturing footprint in the country, including the construction of two new facilities that began in 2011 in Rayong province. The company's Underground Mining Facility started production in October 2012, while Rayong Tractor Facility Caterpillar (Thailand) Ltd (CRTT) was established in Hemaraj Rayong Industrial Land in 2012.

CRTT produces medium track-type tractors for many countries worldwide, specifically in Asia Pacific, CIS, Africa and Middle East. In 2021, the facility started supplying the Cat D6 Next Generation track-type tractors to Japan, Australia, New Zealand, South Korea and North America, making Thailand among the company's largest manufacturing footprints globally.

CRTT maintains a continuous improvement process that practises safety, quality and velocity improvement to ensure that Caterpillar delivers world-class products consistently to its valued customers. The facility is well-positioned to meet long-term customer demand in the region and beyond. ■

LEFT: **The 5000th machine is a Cat D8T track-type tractor, which has been shipped to Azerbaijan at the end of May.**

LEFT AND BELOW: **CRTT produces medium track-type tractors for many countries worldwide. The facility covers 21.12 ha of land and has hundreds of employees.**

RIGHT: **Thailand is among Caterpillar's largest manufacturing footprints globally.**

Procore Technologies enters Southeast Asian market

Procore Technologies, a US-based global provider of construction management software, has announced its expansion into Southeast Asia (ASEAN). This follows the company's rapid growth across Australia and New Zealand (ANZ) over the past four years.

Procore's first Asia Pacific (APAC) office was opened in Sydney, Australia in 2017. Singapore will serve as the company's ASEAN hub, to meet the region's growing need for construction technology. The Singapore-based team will include sales, marketing, product implementation and customer success professionals, enabling local customers to receive timely support.

Founded in 2002, Procore has seen significant demand across ASEAN for its mobile-first construction management platform, built specifically for the industry. The company is investing in the region, including the appointment of two leaders: Chris Yio, head of ASEAN, and Clare Wharrier, senior director - global channel.

"Procore builds software for the people who build the world. Demand is growing for our platform in APAC, and we are excited for our next phase of growth across ASEAN," said Tooey Courtemanche, founder and CEO of Procore.

"Procore is already used in over 125 countries, and expanding globally will enable us to better partner with construction leaders around the world. Our mission is to connect everyone in construction on our global platform, so that our customers can build faster, safer and smarter. In addition to ASEAN, we are entering the Middle East and North Africa region."

Tom Karemacher, vice president for APAC at Procore added, "We have seen a significant pull effect into ASEAN off the back of the growth in our ANZ business, with demand coming from construction leaders looking for a construction management platform that enables them to better manage the construction lifecycle. We are also seeing a number of multinationals looking to extend their use of Procore globally.

"ASEAN is a high-growth market, and we are looking forward to partnering with the industry to uplift its digital capability and provide value to all stakeholders in construction. We already have talented people based in Singapore and are accelerating hiring in the region to better serve the industry."

Procore already has a growing customer and partner base across ASEAN. Regional customers include Obayashi Corporation, Sime Darby Property, Precise Development, and a core channel partnership has been established with CS Global Group.

"CS Global Group is constantly exploring and evaluating solutions to help our clients implement transformational technology to drive productivity and add value to their business. There is growing demand for collaboration platforms in this region. Procore's APAC expansion is timely and CSG is honoured to partner with Procore for its next phase of growth," said Eugene Low, CEO of CS Global Group. ■

Lintec partners with Fudan University to make its asphalt plants more environment-friendly

In recent years, China has been a leading global voice in the push for better air quality, culminating in its latest legislation, the Atmospheric Pollution Prevention and Control Law (2018 Amendment). As part of a wider range of measures within this legislation, there are strict requirements for the use of industrial machinery. This states that companies that discharge dust, sulfides and NOx during the production of building materials must adopt cleaner processes to limit the discharge of pollutants.

For contractors, it means that any equipment in their fleets that fails to meet the required standards is prohibited from working in urban areas. For manufacturers, it follows that they must produce equipment that operates within the legislative limits to ensure customers can guarantee the timely delivery of asphalt to projects.

Solutions for Lintec plants

Lintec & Linnhoff has a long-running track record of developing equipment that delivers superior environmental performance. So, to demonstrate its Lintec plants would not only meet, but exceed Chinese legislative requirements the company partnered with Fudan University to put its equipment through a series of real-world and lab-based tests to verify the performance.

Fudan University is a major public research university, based in Shanghai, approximately 150 km from the Lintec & Linnhoff plant in Jiangyin. It is widely recognised as one of the most prestigious and selective universities in China. Its expertise includes playing a leading role in research around industrial pollution over a period of many decades, and it was also involved in the development of the Atmospheric Pollution Prevention and Control Law (2018 Amendment), making it an obvious partner for Lintec & Linnhoff.

"Working with a team of scientists and PHD students from Fudan, we were able to independently verify the performance of our Lintec asphalt plants and also identified some potential areas for improvements," explained Tony Liu, CEO of Lintec & Linnhoff China Ltd. "Following a comprehensive analysis of all the dust and emissions, the team provided guidance on how to make improvements to ensure even stronger legislative compliance."

Working with Fudan University, Lintec has put its asphalt plants through a series of real-world and lab-based tests to demonstrate that the equipment would not only meet, but exceed Chinese legislative requirements.

Improvements and results

After the initial testing, Lintec & Linnhoff fine-tuned a number of elements of the environmental protection systems on its Lintec plants. This included inside the pollution control packages that not only ensure clean air is released into the atmosphere, but recycle the dust and dirt that is filtered out - allowing it to be used as reclaimed filler.

After design adjustments, further testing at the research facility showed just how successful the modifications were. On one of the Lintec's highest-capacity models, the CSM4000 HS20-SE, sample collections found bitumen fume levels of <4.1 mg/cu m, far below the permitted concentration limit of 75 mg/cu m. Particulate levels were well below permissible limits and levels of benzopyrene were <1.2x10-4 mg/cu m, almost a third of the 3x10-4 mg/cu m limit.

Outside the lab, testing was conducted on a simulated jobsite with levels for fugitive emissions of suspended particulates measured at the north, south, east and west boundaries of the site. The recorded levels ranged from 0.267 mg/cu m to 0.433 mg/cu m, again well within the regulation 1.0 mg/cu m.

The end result of this research and design work is that Lintec asphalt plants manufactured at the company's facility in China offer some of the best environmental performance around. When powered with light oil or natural gas, the company's plants can now comfortably deliver dust content levels below 20 mg/cu m. This performance can be improved even further, with the addition of optional attachments, dropping emissions down below 10 mg/cu m.

Further benefits

The impressive environmental performance (and improvements) of the Lintec plants is vital for China, which is a key market for Lintec & Linnhoff. The company has a large manufacturing facility in Jiangyin, where it builds Lintec asphalt plants, as well as concrete batching plants under both the Lintec and Eurotec brands.

According to Lintec & Linnhoff, the company will harness the advantages of the collaboration with Fudan University and apply it to its production facilities worldwide. Also, as many Chinese contractors undertake major infrastructure projects throughout Asia and Africa, the benefits will inevitably be felt further afield.

"As evidenced by our LEP 95 Warm Mix solution which reduces fume emissions and energy use by up to 35% and 40% respectively, Lintec is determined to lead the industry in providing sustainable, environmentally-friendly solutions for asphalt production," said Mr Liu. "By ensuring our plants perform far better than the official Chinese standards required, our collaboration with Fudan University has already helped us meet our goal on this stage of our journey. But this is not the end of our mission to lead the industry in environmental and production performance. It is just the beginning – there is much more to come." ■

JTC and Shell to explore developing solar farm on Semakau Landfill

JTC Corporation and Shell Singapore have signed a non-binding memorandum of understanding (MoU), supported by the National Environment Agency (NEA) and Energy Market Authority (EMA), to jointly explore developing a solar farm on part of Semakau Landfill, south of the Singapore mainland.

In a joint statement, the companies announced that if successful, the solar farm would reduce the country's carbon emissions and meet its growing clean energy needs. It will be the first large-scale solar project in Singapore where a sanitary landfill is also used for clean energy generation. This project is aligned with Singapore's target to increase solar deployment to at least 2 GWp by 2030.

The solar farm is expected to take up an area of 60 ha and have a capacity of at least 72 MWp, sufficient to reduce CO2 emissions by 37,000 t/yr. The energy produced can power up to 17,500 households for a year.

"JTC is piloting new sustainable energy innovations with Shell to maximise the use of renewable energy solutions for our industries. This project is an example of how we are tapping available land to double up for solar generation to maximise renewable energy generation. Such close collaborations is part of our SolarLand initiative to optimise available land for solar generation in support of Singapore's clean energy switch," said Tan Boon Khai, CEO of JTC.

"This multi-agency-corporate partnership is a great showcase of the creativity and collaboration that are vital to success in energy transition. With a common goal of enabling more and cleaner energy, we look forward to exploring with our partners this opportunity to maximise the use of Semakau in a way that is compatible with its primary purpose as a landfill," said Aw Kah Peng, chairman of Shell Companies in Singapore. "This project is aligned with our 10-year plan to repurpose our core business, cut our own CO2 emissions in the country and help our customers decarbonise."

Shell's Pulau Bukom Energy and Chemicals Park is close to Semakau Landfill, located about 2 km northwest of it. Working together allows an innovative integration of an intermittent renewable source to Bukom.

"NEA is happy to support the deployment of a solar farm on Semakau Landfill. It will contribute towards the national solar deployment target and complement NEA's resource sustainability initiatives," commented Luke Goh, CEO of NEA. "Semakau Landfill remains Singapore's only operational landfill. To preserve its capacity for as long as possible, we are redoubling efforts to reduce waste and close the waste loop."

"Our energy sector is moving towards a cleaner and more sustainable future. Solar is our most promising renewable energy source and is a key switch for decarbonisation," added Ngiam Shih Chun, chief executive of EMA. "Given our limited land space, EMA has been working with government agencies and industry players on innovative ways to harness more solar energy. I look forward to the successful implementation of this offshore solar farm on Semakau Landfill, which will demonstrate how we can be creative in our solar deployment."

© Michael Wilson/Unsplash

JTC and Shell were jointly conducting a Request for Information (RFI) exercise on 24 June 2021 to source for innovative solutions from the market. ■

Singapore aims to increase solar deployment to at least 2 GWp by 2030.

Manitou unveils new brand for attachment line-up

Manitou Group has revealed a new brand dedicated to its attachments, called Manitou Group Attachments. The move is intended to simplify and harmonise its attachments offer for users.

Now designated under the 'Manitou Group Attachments' brand (previously Edge and Manitou), attachments designed in Italy, the US and India are adapted to the many markets targeted by the group. In particular, the offering addresses agriculture, construction, mining and logistics applications.

This single brand will equip the forklifts, telehandlers, compact loaders, articulated loaders and backhoe loaders manufactured by the group for the three brands: Manitou, Gehl and MustangbyManitou.

Wim Roose, global product line manager for attachments at Manitou said, "Our goal is to respond to all of our users' needs in a more coherent way. Providing a complete solution with quality service and the perfect attachment for their needs is our priority. Thanks to our design office, which is dedicated entirely to attachment design, we are able to respond to all requests, including on the niche markets."

The offer is now identifiable with a new logo on all 1,300 references across 17 product categories. ■

Massive industrial investment plan for Manitou

Manitou Group has announced an €80 million industrial investment plan for the redevelopment and expansion of its production sites in France - located in Ancenis, Candé and Laillé. This is part of the group's effort to achieve the objectives set out in its 'New Horizons 2025' roadmap.

"The dynamics of our markets observed since the last quarter of 2020, and the need to industrialise our future electric and hybrid models, reinforce our decision to invest in this innovative equipment, in line with our determination to accelerate our green transition," said Elisabeth Ausimour, president of the product division at Manitou.

"These installations will enable us to better absorb our activity peaks, as we are currently seeing with an order book at an historical level, to sustainably increase our production capacities in France and to improve the safety of our employees."

The telehandler production units in Ancenis and Laillé, as well as the new aerial work platform unit in Candé — which will start operating at the end of 2021 — are impacted by these future investments. The projects include the construction of new buildings on each of the sites, and also the reorganisation of existing infrastructures to optimise flow management.

Ms Ausimour added, "The design of these new facilities will be consistent with our CSR commitments to an eco-responsible industry. This will enable us to reduce our environmental footprint and strengthen our local presence." ■

Astec launches major rebranding; all subsidiaries now under one name

The US-based global manufacturer of specialised equipment for asphalt road building, aggregate processing and concrete production, Astec Industries, is launching a new modern look with a rebranding initiative to coincide with its business model. The rebrand includes a new logo, colour palette and website. The launch comes while the organisation streamlines its internal structure and operations to improve efficiency and drive growth.

The organisation's former brands - namely Astec Inc, Astec do Brasil, Astec Australia, BMH Systems, Breaker Technology, Carlson Paving, Con-E-Co, Heatec, KPI-JCI and Astec Mobile Screens, Osborn, Peterson, RexCon, Roadtec and Telsmith - will no longer operate as separate subsidiary companies and will all take on the Astec name. This unification is a significant part of the company's OneAstec business model including its 'Simplify, Focus and Grow" strategy.

"We made the decision to unify to make it easier for our dealers and customers to do business with us. By coming together as one organisation, we can offer greater customer service and drive innovation," said Barry Ruffalo, president and CEO of Astec Industries. "The rebrand enables us to build our strength together under one common name and purpose. We can better leverage our growth as one Astec team rather than individual brands."

The new logo represents the company's purpose – 'Built to Connect' – and vision to connect people, processes and products. The new website replaces the previous subsidiary websites. Dealers, customers, suppliers and consumers will now be able to find information about the company, its product offerings and other resources in one location. ■

Bentley Systems offers education programme

Bentley Systems has launched its education portal (https://education.bentley.com), aimed to encourage the development of future infrastructure professionals for careers in engineering, design and architecture. It is initially available in the UK, Australia, Singapore, Ireland and Lithuania, with plans to expand to the US, Canada, Mexico, Latin America and India by this year.

The programme's student and educator entitlements allow no-cost learning licenses for Bentley infrastructure engineering applications and proven learnings through the new Bentley Education portal. Students and educators from around the globe can register on this portal and also connect to infrastructure organisations and resources to prepare for and recruit for infrastructure engineering careers.

The Bentley Education portal provides a single source for an on-demand, frictionless, and fun experience for students as they build and enhance their digital design skills. Students and educators have access to comprehensive resources, including: insights from leading architecture, engineering and construction (AEC) professionals, sharing what the industry has to offer students and what skills are in high demand; the latest news and emerging trends in the AEC industry; and first-hand perspective of current engineering students, mentors, and women in infrastructure engineering.

The programme is open to students and educators at community colleges, technical institutes, polytechnics, universities, secondary schools and home-schooled students. They can have full access to learning licenses of over 40 of Bentley's most popular applications used by infrastructure professionals globally, including ContextCapture, MicroStation, OpenRoads Designer, STAAD.Pro and Synchro.

The programme adopts a role-based learning approach, enabling future infrastructure professionals to focus on specific capabilities needed for specific professions. Students can go beyond mere product proficiency and develop a comprehensive understanding of skillsets required to excel in various roles in infrastructure engineering.

"With many nations and institutions committing to infrastructure and digital education initiatives as top priorities for a post-pandemic world, we are excited to launch this much-requested and responsive programme now," said Katriona Lord-Levins, chief success officer at Bentley Systems.

"We want to inspire and encourage students to learn about infrastructure engineering as a possible career path, and to introduce these young minds to the vast opportunities that lie ahead, with infrastructure going digital."

Future Infrastructure Star Challenge 2021

The Bentley Education portal also serves as a gateway for individual students or teams of two to submit their innovative concepts for Bentley's inaugural Future Infrastructure Star Challenge 2021. This global competition is open to students from community colleges, polytechnics institutes and universities.

Students advancing in the Challenge, based on their ideas that improve quality of life, will work on modelling, simulation and visualisation to develop a design model. The winner will be announced during the Going Digital Awards at the Year in Infrastructure 2021 Conference.

The Future Infrastructure Star Challenge is divided into: Stage 1 (Conceptualisation), and Stage 2 (Design and Visualisation).

The Bentley Education programme helps students develop digital skills, which are critical for a qualified talent pipeline to support infrastructure growth and resilience worldwide.

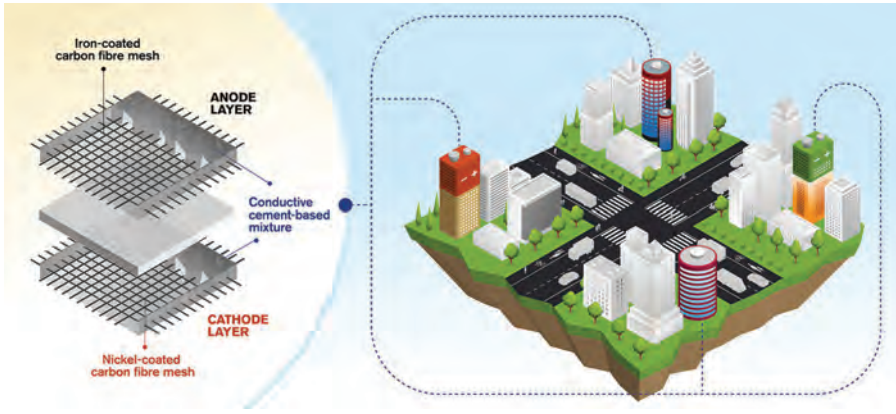
The top 20 judged projects from Stage 1 will each win US$500, with the top 10 projects moving on to Stage 2. Here, each such entry may take advantage of opportunities to work with infrastructure professionals, and/or attend masterclasses with Bentley experts, to bring their ideas to life using Bentley applications.

In addition to being announced and introduced at the Year in Infrastructure 2021 Conference, the winner of the Future Infrastructure Star Challenge 2021 will receive a cash prize of US$5,000 and recognition in Bentley's 2021 Infrastructure Yearbook. ■

World's first concept for cement-based batteries

Researchers from the Architecture and Civil Engineering Department of Chalmers University of Technology in Sweden have developed a prototype of rechargeable battery made of cement. This new concept has also been recently published in a scientific journal.

Doctor Emma Zhang, formerly of Chalmers University of Technology, joined Professor Luping Tang's research group several years ago to search for "the building materials of the future". Together they have now succeeded in developing a world-first concept for a rechargeable cement-based battery.



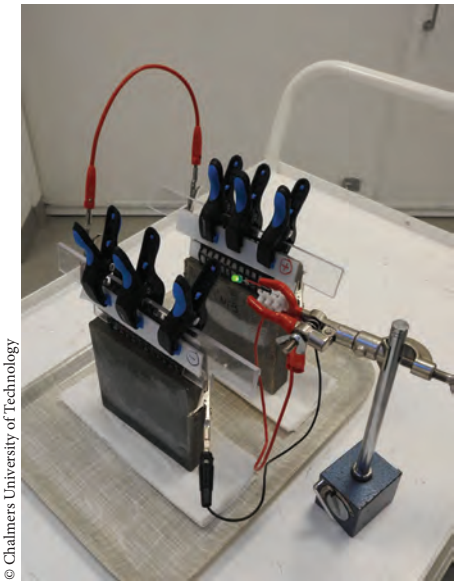
© Yen Strandqvist/Chalmers University of Technology

The concept involves a cement-based mixture, with small amounts of short carbon fibres added to increase the conductivity and flexural toughness. Then, embedded within the mixture is a metal-coated carbon fibre mesh – iron for the anode, and nickel for the cathode. After much experimentation, this is the prototype which the researchers now present.

"Results from earlier studies investigating concrete battery technology showed very low performance, so we realised we had to think out of the box, to come up with another way to produce the electrode. This particular idea that we have developed – which is also rechargeable – has never been explored before. Now we have proof of concept at lab scale," explained Ms Zhang.

Mr Tang and Ms Zhang's research has produced a rechargeable cement-based battery with an average energy density of 7 Watthours per sq m (7 Wh/sq m) or 0.8 Watthours per litre (0.8 Wh/l). Energy density is used to express the capacity of the battery, and a modest estimate is that the performance of the new Chalmers battery could be more than 10 times that of earlier attempts at concrete batteries.

According to the researchers, the energy density is still low in comparison to commercial batteries, but this limitation could be overcome thanks to the huge volume at which the battery could be constructed when used in buildings.



© Chalmers University of Technology

ABOVE: **Researchers at Chalmers University of Technology have developed a new concept for a rechargeable cement-based battery. It involves a cement-based mixture, with small amounts of short carbon fibres added to increase the conductivity and flexural toughness.**

LEFT: **The battery prototype.**

A potential key to solving energy storage issues

The fact that the battery is rechargeable is its most important quality, and the possibilities for utilisation if the concept is further developed and commercialised are almost staggering, highlighted the researchers. Applications could range from powering LEDs, providing 4G connections in remote areas, or cathodic protection against corrosion in concrete infrastructure.

"It could also be coupled with solar cell panels for example, to provide electricity and become the energy source for monitoring systems in highways or bridges, where sensors operated by a concrete battery could detect cracking or corrosion," suggested Ms Zhang.

The concept of using structures and buildings in this way could be revolutionary, because it would offer an alternative solution to the energy crisis, by providing a large volume of energy storage.

Concrete is the world's most commonly used building material. From a sustainability perspective, it is far from ideal, but the potential to add functionality to it could offer a new dimension, explained the researchers.

"We have a vision that in the future this technology could allow for whole sections of multi-storey buildings made of functional concrete. Considering that any concrete surface could have a layer of this electrode embedded, we are talking about enormous volumes of functional concrete," shared Ms Zhang.

Challenges remain with service-life aspects

The idea is still at a very early stage, stressed the researchers. The technical questions remaining to be solved before commercialisation of the technique can be a reality include extending the service life of the battery, and the development of recycling techniques.

"Since concrete infrastructure is usually built to last 50 or even 100 years, the batteries would need to be refined to match this, or to be easier to exchange and recycle when their service life is over. For now, this offers a major challenge from a technical point of view," said Ms Zhang.

Regardless, the researchers are hopeful that their innovation has a lot to offer. "We are convinced this concept makes for a great contribution to allowing future building materials to have additional functions such as renewable energy sources," concluded Mr Tang.

This research project was funded by the Swedish Energy Agency (Energimyndigheten). The researchers' article 'Rechargeable Concrete Battery' has been published in the 'Buildings' scientific journal. ■

Robert Hauser named CEO of Doka

The international formwork and scaffolding company Doka has welcomed its new CEO, Robert Hauser (left). He has also taken over as chairman of the executive board, as of 1 July 2021. Mr Hauser succeeds current CEO Harald Ziebula, who is retiring from the company after 21 years.

Mr Hauser joined Doka in 2018 and has been a member of the executive board responsible for the Middle East & Africa and East Asia & Pacific regions since last year.

As the company's new CEO, Mr Hauser will put strategic emphasis and focus on internationalisation and growth, as well as innovation leadership, digitalisation and talent management. "Our customers' satisfaction is our top priority," he stressed.

Mr Hauser intends to move Doka even closer to the market under his leadership and to accelerate digitalisation in the sense of intelligent methods and efficient processes.

Previously, Mr Hauser served as a division head at the industrial services provider Bilfinger SE, where his responsibilities included the Scaffolding division. Prior to that, Mr Hauser spent a total of 12 years with formwork manufacturer Peri and also worked at an international management consultancy for five years.

Both images © Doka

Under his leadership, Mr Hauser intends to move Doka even closer to the market and to accelerate digitalisation in the sense of intelligent methods and efficient processes.

At Peri, Mr Hauser had gained extensive experience in the formwork business in various roles. His remit included responsibilities at the corporate headquarters, such as setting up and managing in-house consulting services, as well as managing the Controlling and IT departments. He was also responsible for sales activities in direct contact with the customers, for example through regional management of the Middle East and Africa region and of Southern and Western Europe and the management of the Canadian branch. ■

CALENDAR OF EVENTS

// Events in Asia

BCT Expo 2021
1 to 3 Sept 2021
Digital Platform (Thailand)
Tel: +662 833 5198
Email: info@bct-construction.com
Website: www.bct-construction.com

Cambuild 2021
16 to 18 Sept 2021
Diamond Island Exhibition & Convention Centre
Phnom Penh, Cambodia
Tel: +855 023 901 579
Email: somaly@ambtarsus.com
Website: www.cambuildexpo.com

Worldbex 2021
23 to 26 Sept 2021
World Trade Centre Metro Manila
Metro Manila, The Philippines
Tel: +632 8656 9239
Email: inquire@worldbexevents.com
Website: www.worldbex.com

OS+H Asia 2021
29 Sept to 1 Oct 2021
Marina Bay Sands
Singapore
Tel: +65 6332 9620
Email: osha@mda.com.sg
Website: www.osha-singapore.com

MBAM Onebuild 2021
20 to 22 Oct 2021
Kuala Lumpur Convention Centre
Kuala Lumpur, Malaysia
Tel: +603 7981 0288
Email: info@mbamonebuild.com
Website: www.mbamonebuild.com

ASEAN Super 8
9 to 11 Nov 2021
Malaysia International Trade & Exhibition Centre
Kuala Lumpur, Malaysia
Tel: +603 9771 2688
Website: www.super8asean.com

Work Safe Asia 2021
10 Nov to 9 Dec 2021 (virtual event)
24 to 26 Nov 2021 (physical event)
Marina Bay Sands
Singapore
Tel: +65 6278 8666
Email: wsa@cems.com.sg
Website: www.worksafeasia.com.sg

Trenchless Asia 2021
16 to 17 Nov 2021
Kuala Lumpur Convention Centre
Kuala Lumpur, Malaysia
Tel: +44 1923 723990
Email: pharwood@westrade.co.uk
Website: www.trenchlessasia.com

Natural Disasters Expo Asia
1 to 2 Dec 2021
Singapore Expo
Singapore
Website: www.naturaldisastersshowasia.com

bauma China 2022
22 to 25 Nov 2022
Shanghai New International Expo Centre
Shanghai, China
Tel: +49 89 949 20252
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// Events outside Asia

World of Concrete 2022
18 to 20 Jan 2022
Las Vegas Convention Centre
Las Vegas, Nevada, USA
Tel: +1 972 536 6368
Email: contactus@worldofconcrete.com
Website: www.worldofconcrete.com

Hillhead 2022
21 to 23 Jun 2022
Hillhead Quarry
Derbyshire, England, United Kingdom
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bauma 2022
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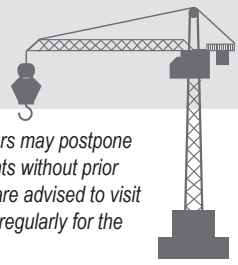

Note: *The organisers may postpone or cancel their events without prior notice, so readers are advised to visit the event websites regularly for the latest updates.*

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WOC 2021: Reconnecting the global concrete industry

World of Concrete (WOC) 2021 concluded its 46th edition successfully on 10 June, featuring more than 650 exhibitors across just under 300,000 net sq ft of exhibit space, announced the show organiser Informa Markets.

This postponed edition of WOC from January was the first large-scale event to take place in Las Vegas, soon after the city's full reopening to 100% capacity on 1 June 2021.

The Las Vegas Convention and Visitors Authority (LVCVA) debuted the Las Vegas Convention Centre's (LVCC) US$1 billion, 1.4 mil sq ft West Hall expansion with a ribbon cutting ceremony, followed by doors opening to WOC 2021, the first major convention to return to Las Vegas and to the US post-pandemic.

The addition of the West Hall brings the total square feet of meeting space in the destination to 14 million and makes the LVCC the second largest facility in the country. During a normal year, the meeting and convention industry represents US$11.4 billion in economic impact to the area.

The arrival of WOC 2021 signals the return of meetings and conventions to Las Vegas, named the number one trade show destination in North America for 26 consecutive years by the Trade Show News Network (TSNN).

"We are thrilled to be returning to the live event format, especially in the home of the exhibitions industry in the US, Las Vegas," said Nan Walsh, president, North America at Informa Markets. "There is an unparalleled magic about in-person connection – from sharing laughs with old friends, creating new ones, learning from industry experts, and seeing and feeling the latest products and innovations.

"We are so happy to be the first large-scale trade show to return to the show floor in the US, and the first to use the Las Vegas Convention Centre's incredible new West Hall, and through that partnership I believe we are signalling a return to business and connection that is needed now more than ever."

"World of Concrete is grateful for the support of all the participating exhibitors and attendees who braved the heat of a June event and paved the way for an even larger and stronger return in January 2022," said Jackie James, group director of World of Concrete.

ALL IMAGES: **WOC 2021 drew more than 650 exhibitors across just under 300,000 net sq ft of exhibit space. It was the first major convention to return to Las Vegas and to the US post-pandemic.**

"We would like to thank them along with our cosponsoring associations and media partners who supported this endeavour throughout a very challenging 15 months leading up to this important industry event."

The Concrete Industry Management (CIM) programme held its 16th annual unreserved silent and live auctions at WOC 2021 and simultaneously online as a hybrid auction event. The silent and live auctions raised just over US$1.175 million, with a total of over US$13 million to the CIM programme in the past 16 years.

The CIM programme is a business programme that has been developed specifically for the concrete industry to provide students with a four-year Bachelor of Science degree in Concrete Industry Management. The programme gives students entering the concrete workforce industry experience early in their careers.

At the Spex Mix Bricklayer 500, mason David Chavez and mason tender Guadalupe Hernandez with Ranch Masonry in Houston, Texas teamed up to earn the title 'World's Best Bricklayer.' This is the second time Mr Chavez has earned the World Champion title, winning it all in 2018.

A total of 20 of the best masons and tenders in the world came together at WOC to test their skill, speed and stamina by battling to determine who can build the largest and best 26-ft-long brick wall, with the least amount of errors, in one hour.

It was an action-packed competition featuring some of the most decorated craftsmen in North America. Mr Chavez's winning earned him the keys to a new Ford F250 4×4 super duty truck, US$5,000 in cash, a Multiquip Essick Pro12 mortar mixer and other great prizes.

With over US$125,000 in cash and prizes to be earned, masons from across North America were invited to Las Vegas to compete in the Spec Mix Bricklayer 500 after winning a regional series qualifying event. A total of 16 regional series competitions were held in 2020, shy of the typical 24, due to local restrictions during the Covid-19 pandemic.

With workforce development being the primary battle cry for the skilled trades, the Spec Mix Bricklayer 500 is a tool designed to create interest from a new generation of masons in the rewards and opportunity possible in masonry and construction.

The next World of Concrete exhibition is set to return from 18 to 20 January 2022 (education: 17-20 January), back at the Las Vegas Convention Centre. ■

Website: www.worldofconcrete.com

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Next bauma rescheduled to October 2022

The next edition of bauma has been postponed to 24 - 30 October 2022, following discussions with top industry representatives and the advisory board, announced Messe München. "Considering the particularly long planning times for exhibitors and organisers at the world's largest trade show, the decision had to be made soon. This would provide exhibitors and visitors a secure planning basis for preparing the upcoming bauma," said the organiser.

Held every three years in Munich, Germany, bauma is the world's leading trade fair for construction machinery, building material machines, mining machines, construction vehicles and construction equipment. The last edition of the show took place in April 2019, attracting 620,000 visitors from more than 200 countries and 3,700 exhibitors from 63 countries, on an exhibition area of 614,000 sq m.

Initially, the next bauma was to take place from 4 to 10 April 2022. "Despite the pandemic, both the industry's response and the booking level was very high," explained Messe München. "However, in numerous discussions with customers, there was a growing recognition that the April date involved too many uncertainties in view of the global pandemic. The prevailing opinion was that it is currently difficult to assess whether worldwide travel - which is crucial for the success of the trade show - will be largely unhindered again in a year's time."

Messe München added that the global exhibitors in particular, who expect customers from all over the world to attend bauma and make correspondingly high investments in stand construction, logistics and hotel capacity, advocated a postponement. "They saw the decisive benefit of the trade show – which would bring together the entire industry and to be a hub for all markets - as being jeopardised if the April date were to be adhered to."

Klaus Dittrich, chairman and CEO of Messe München commented, "The decision to postpone bauma was not an easy one for us, of course. But we had to make it now, before the exhibitors start planning their participation in the trade show and make corresponding investments. Unfortunately, despite the vaccination campaign that has been launched around the world, it is not yet possible to predict when the pandemic will be largely under control and unlimited worldwide travel will be possible again.

"This makes participation difficult to plan and calculate for both exhibitors and visitors. Under these circumstances, we would not have been able to fulfil our central promise that bauma, the world's leading trade fair, represents the entire spectrum of the industry and generate international reach like no other comparable event. After all, bauma's last edition welcomed participants from over 200 countries around the world. Hence, the decision is consistent and logical."

Joachim Schmid, managing director of the Construction Equipment and Plant Engineering Association in the German Engineering Federation (VDMA) echoed the sentiment, saying that "the decision is tough, but it gives all parties the planning basis they need. The industry will now do everything it can for a strong bauma in October 2022. Even without a health crisis, companies need to overcome challenges such as digitalisation, autonomous construction sites and sustainability, and stay abreast of changes to avoid falling behind. For this, they need bauma as an innovation barometer and networking platform. In next year's October, we will all meet again in Munich."

TOP AND ABOVE: **The last edition of bauma took place in April 2019, attracting 620,000 visitors from more than 200 countries. In 2022, the show will be postponed to 24 - 30 October due to the pandemic.**

Regardless of the postponement, the technical and organisational planning for bauma 2022 continues, affirmed Messe München. The core of the show will be the face-to-face event, augmented and expanded by digital offerings. "This allows customers from all over the world to participate in bauma, even if they can't or don't want to travel to Munich," said Mr Dittrich.

According to Messe München, in consultation with the industry, the most important industry topics have already been defined for bauma 2022. Reflecting the megatrends of digitalisation and sustainability, the show will focus on: The road to zero emissions; Digital construction site; Construction methods and materials of tomorrow; The road to autonomous machines; and Mining - sustainable, efficient, reliable.

"These topics will not only play a central role in the exhibitors' presentations, they will also be illustrated in special areas such as the VR experience and will be a central theme in the supporting programme," said Messe München.

The categories of the bauma Innovation Award have also been adjusted accordingly. For the first time, applicants can participate in the categories of digitalisation and climate protection. ■

Website: www.bauma.de

OS+H Asia 2021 postponed to 29 Sept–1 Oct

The 12th edition of Occupational Safety and Health Exhibition for Asia (OS+H Asia), initially scheduled for 28 – 30 July 2021, is now planned to be held from 29 September to 1 October. As the region's leading exhibition focusing on workplace safety and health, OS+H Asia plans to go hybrid in the upcoming edition, with the physical event taking place at Marina Bay Sands, Singapore.

"The calculated move will provide a more opportune backdrop with greater market confidence alongside eventual easing of Covid-19 measures, and therefore provide a better position for occupational safety and health professionals, as well as the trade exhibition to deliver customer expectations and performance success," stated Messe Düsseldorf, the show organiser.

"As part of our efforts to adapt to the new landscape, OS+H Asia 2021 will feature a hybrid format, organising a parallel digital platform for stakeholders and participants unable to attend the physical exhibition. These measures will provide the online connection and professional matchmaking between interested professionals and exhibiting companies, further optimising new business opportunities and augmenting the capacity for global networking."

The organiser added that this postponement represents "an unprecedented scenario for all concerned and OS+H Asia will continue to take every possible measure to carry over the successful status of the trade fair to the new dates. The OS+H Asia team would like to extend our appreciation to all industry partners, exhibitors and visitors for your continued support as we adapt to shifting conditions together. We will be in touch with all exhibitors and partners to discuss event logistics and planning." ■

Website: www.osha-singapore.com

ABOVE AND TOP RIGHT: **OS+H Asia 2021 is scheduled to take place later this year.**

IPAF ePAL app set to revolutionise training certification

The launch of a new mobile app for operators of mobile elevating work platforms (MEWPs) and mast-climbing work platforms (MCWPs) aims to bring training certification into the digital era and reduce the environmental impact involved in issuing the International Powered Access Federation's (IPAF) PAL Card and all training certifications.

IPAF's new ePAL app is free to use and features the first ever digital IPAF PAL Card, operator log book and operator safety guide. It also allows operators to receive the latest best practice tips and safety information, and means operators can share their qualifications with site managers quickly and easily.

The ePAL app is a major step forward in IPAF's ongoing drive to boost sustainability, as it shifts away from issuing plastic, credit-card sized PAL Cards via the post to every training candidate successfully completing or renewing an IPAF operator course.

The new ePAL app also phases out paper certification of qualifications and logging of machine time and replaces the printed paper version of IPAF's operator safety guide; it speeds up the processing time and resource required to issue training candidates with their PAL Card and certification.

The IPAF ePAL app is currently available in the UK and Ireland. It is initially offered in English with other languages to follow, and is available for Apple iOS and Android devices. The app will be updated with additional features as usage demands and developing technology allows. ■

IPAF Global Safety Report highlights need for near-miss data

The IPAF Global Safety Report 2021 analyses the main causes of serious injuries and fatalities occurring when using powered access machines to conduct temporary work at height, highlighting the need to gather more near-miss data from across the industry worldwide to help avoid the most common types of serious accident in future.

While the report, based on incidents logged in IPAF's accident reporting portal (www.ipafaccidentreporting.org), indicates the main causes of serious injuries and deaths while using powered have not changed significantly across the most recent two years of data, electrocutions have increased slightly to become the joint most common cause along with falls from the platform.

Over the whole five-year period 2016-2020, the most common causes of fatal incidents were falls from the platform and electrocutions, both accounting for 23% of deaths, followed by entrapments (19%), MEWP overturns/tip-overs (12%), MEWPs being struck by another machine or vehicle (6%) or hit by falling object(s) (5%).

In the early days of the accident reporting project, which launched in 2012-2013, the majority of reports were received from IPAF's UK membership. As the project enters its second decade, reports are now coming in from around the world, with reports received from 19 countries across the most recent two years of data gathering, and more than 25 countries worldwide in the past five years.

This year the report has been presented a different way than it was previously, with an executive summary giving a global overview, followed by detailed data spreads looking at each of the six main accident types broken down by location, machine type, industry sector, including lost-time-incident analysis specific to each incident classification.

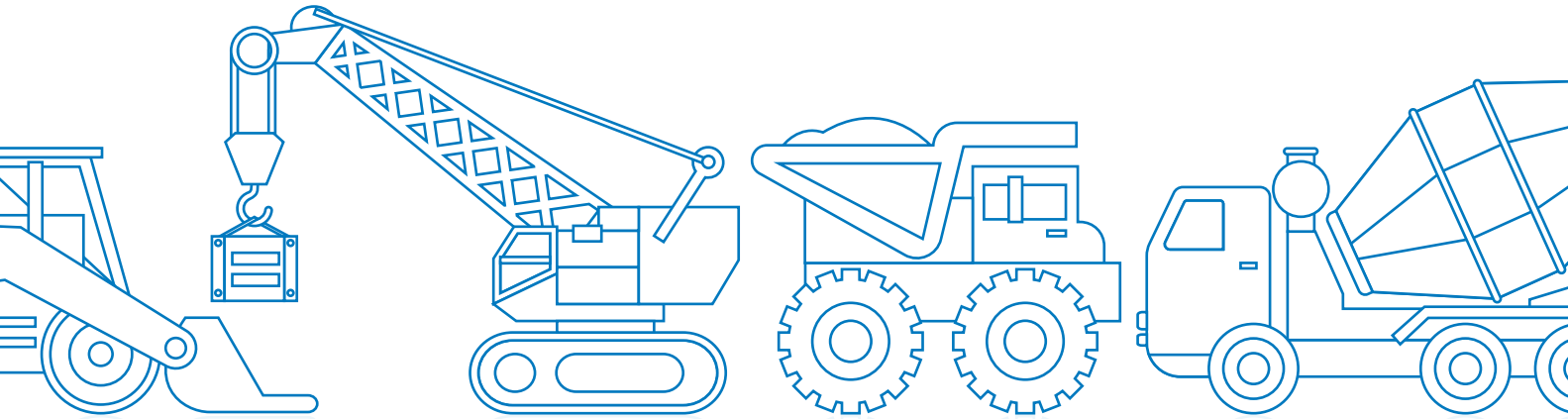
"It may be statistically interesting to compare the number of accidents occurring around the world and between industry sectors, but it is more relevant and informative to be able to take a detailed look at electrocutions and falls from the platform, for example, to see what machine type, configuration, location or industry sector these are occurring in, to consider what some of the underlying factors may be and to plan ahead accordingly," explained Brian Parker, IPAF's head of safety & technical.

"This new approach allows us to present some key recommendations to factor in when planning powered access use, linked to specific references – be those technical guidance information, the free IPAF Andy Access safety posters and Toolbox Talk series, or relevant training courses that operatives are managers are advised to undertake to mitigate the specific risks identified leading to certain types of accident."

He added, "One thing that we all agree on is we must now focus on areas we know we need more data from; this means gathering more information about near misses – we are getting comprehensive reporting of serious injuries and deaths but need more reports of the seemingly innocuous mistakes that might have led to a serious outcome but didn't.

"Near misses are important in understanding trends and preventing serious accidents in future. We hope that direct access to the reporting portal from the newly launched IPAF ePAL mobile app for operators and supervisors will empower more people to record these sorts of incident – quickly, easily and anonymously if so preferred.

"Likewise, we are getting some reports about mast climbing work platforms (MCWPs) and construction hoists, but our database is not quite complete enough regarding these machine types to draw meaningful statistical conclusions. We will work with our members and relevant technical committees to improve reporting from the MCWP sector to enable us to give useful insights into key accident trends in future." ■



SOUTHEAST•ASIA CONSTRUCTION

Southeast Asia Construction (SEAC) is a trade magazine based in Singapore, published bi-monthly since 1994 and distributed to a qualified readership all over Asia. The magazine features various construction projects in the region and globally. It also covers the latest on construction equipment, materials, technology and management, as well as major regional and international trade shows.

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Imer IM R 15 DA platform with double articulated boom

Imer has extended its range of tracked platforms. Among the new models is the IM R 15 DA, which has a working height of 15.10 m and double articulated boom with active jib.

The IM R 15 DA offers a maximum payload capacity of 230 kg and single working curve. Its compact dimension, featuring a stabilised machine footprint of 2.92 x 3.08 m, ensures maximum accessibility in any work environment.

The standard set-up provides automatic stabilisation with an electronic inclinometer, resulting in quick and easy positioning of the machine. Hydraulically expandable tracks are also standard, which enable movement on inclined planes and better distribution of the machine weight so as not to damage the ground below.

A notable feature of the IM R 15 DA is its double articulated boom with active jib, making the machine ideal for all construction site conditions. According to Imer, this double-articulation boom design "allows a climbing over height and outreach (up and over) at the top of the category." The side outreach is 7 m / 230 kg.

Another highlight is the flush-to-wall working capacity from 2.4 m to 4.6 m, which is said to be the highest in the category. Moreover, the articulation height of 7 m enables the machine to easily overcome any obstacles at height. With these features, the IM R 15 DA is suitable for use in construction projects and various other applications such as building maintenance, gardening, and interior maintenance.

The total rotation of the turret (180° + 180° not continuous) and the basket rotation of ± 62° ensure good aerial accessibility and complete positioning of the machine in all conditions. The total weight of the machine is 2,030 kg. It can be powered by a 11-hp Honda GX390 petrol engine (@3,600 rpm) or a 9.9-hp Yanmar L100N diesel engine (@3,600 rpm).

Following the introduction of the IM R 15 DA, Imer plans to showcase its new IM R 23 DA soon, which has a working height of 23 m and also comes with a double articulated boom.

These new double-articulated boom models represent a new generation of tracked platforms from Imer, characterised by low weight, a compact structure and a reduced stabilisation area. In addition, the new design of the boom allows for excellent protection of the hydraulic system, especially of the telescopic section of the boom during operation. ■

Website: www.imergroup.com

ALL IMAGES:
Imer IM R 15 DA tracked platform features a working height of 15.10 m and double articulated boom with active jib. The machine has a maximum payload capacity of 230 kg.

New Mobicone MCO 90(i) EVO2 mobile cone crusher

The recently introduced Mobicone MCO 90(i) EVO2 mobile cone crusher from Kleemann offers a feed capacity of up to 270 t/hr. Ideal for daily use, primarily in the second or third crushing stage, the machine is capable of handling medium-hard to hard materials.

Thanks to its improved diesel-direct drive concept, the new cone crusher "achieves good consumption values and thus works efficiently," said Kleemann. Its conveyor belts are driven electrically.

The continuous feed system (CFS) uses a probe to monitor the crusher level, thereby regulating the material supply so that an optimum volume is always loaded. This ensures the best possible crusher feed and high material quality.

The new Mobicone MCO 90(i) EVO2 mobile cone crusher complements the new Mobicat MC 110(i) EVO2 mobile jaw crusher, which was unveiled earlier this year.

To simplify the operation of these brand-new crushing plants in the EVO2 generation, Kleemann has developed an intelligent control system – Spective. It has an intuitive structure and extensive features, including a 12-in touch panel that has been optimised with regard to user guidance and visualisation.

Furthermore, new components such as a large and small radio remote control have been integrated into the Spective system. The new Spective Connect digital solution sends all important plant data to the smartphone, resulting in less downtime, higher productivity and more revenue.

ABOVE:
The new Mobicone MCO 90(i) EVO2 mobile cone crusher (on the left) has a feed capacity of up to 270 t/hr. The machine can be used together with the Mobicat MC 110(i) EVO2 mobile jaw crusher.

The Mobicone MCO 90(i) EVO2 cone crusher covers a wide gap range of 6-45 mm, making it suitable for various applications. The improved crushing tools with geometries contribute to the material quality as well as the plant's output. All crushing gap widths are set via a radio remote control.

Other features of the cone crusher include additional maintenance openings, standardisation of the clamping wedge position for crushing tools, and the automatic positioning of the inlet hopper during a tool change.

The Mobicone MCO 90(i) EVO2 crusher also comes with an intelligent and effective overload system, to ensure safety and stable processes even under difficult conditions. The tramp release system provides protection with uncrushable materials such as wood or metal. Another function is a software-supported overload system, Ringbounce Detection, which consists of two modes that allow users to choose whether to focus on product quality (Precise Mode) or product volume (Mixture Mode). ■

Website: www.wirtgen-group.com

Large electric rough-terrain scissor lifts from Dingli

Chinese aerial platform manufacturer Dingli has introduced its large electric rough-terrain scissor lifts, the JCPT2814DC and JCPT3214DC, offering maximum working heights of 28 m and 32 m respectively.

These new models feature a compact design and narrow overall width of 1.39 m. They are suitable for both indoor and outdoor applications, and can operate in areas that are normally hard to reach by traditional large rough-terrain scissor lifts.

Both the JCPT2814DC and JCPT3214DC scissor lifts are equipped with 80 V/520 Ah high-capacity lithium battery pack, delivering zero emission and low noise. The machines have a maximum load capacity of 600 kg (for two people) and can drive at full height.

The JCPT2814DC provides a standard working platform of 5.08 m x 1.2 m, with a 1.9-m-long extension platform. The machine features an overall weight of 18,060 kg, overall length of 5.69 m and maximum platform height of 26 m. The turning radius for this model is 2.5 m (inside) and 3.3 m (outside).

The JCPT3214DC's standard working platform can be up to 5.85 m x 1.2 m. It is also fitted with a 1.9-m-long extension platform. The machine's overall weight is 22,200 kg, overall length is 6.41 m, and maximum platform height is 30 m. The turning radius for this model is 2.6 m (inside) and 3.5 m (outside).

The overall height for the electric scissor lifts is 3.17 m (rails down) and 4.16 m (rails up). Their ground clearance is 0.20 m (stowed) and 0.024 m (raised).

The two models offer a gradeability of 25% and travel speed of 0.1 km/hr (raised). When stowed, the travel speed is 1.6 km/hr for the JCPT2814DC and 1.4 km/hr for the JCPT3214DC.

The new scissor lifts are equipped with 4x4 drive steering, U-turn steering and crab steering. With the introduction of these latest models, Dingli said the working heights of its electric scissor lifts now range from 5.9 to 32 m. ■

Website: www.cndingli.com

Dingli JCPT2814DC electric rough-terrain scissor lift has a maximum working height of 28 m, and a maximum platform height of 26 m.

ABOVE AND LEFT: **Dingli JCPT3214DC electric rough-terrain scissor lift offers a maximum working height of 32 m. Its maximum platform height is 30 m.**

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Manitou launches MLT 961 NewAg XL telehandler

Manitou has expanded its NewAg XL telehandler range with a new, high-performance model designed for very intensive applications – the MLT 961-160 V+ L. The machine has a lifting capacity of up to 6 t for a lifting height of 9 m.

The MLT 961-160 V+ L is currently the most powerful model in the NewAg XL range. It is available in two versions: with a Stage V / Final Tier 4 engine (MLT) for European and American markets, and with a Stage IIIA engine (MLT-X) for the rest of the world.

Equipped with a 156 hp engine delivering 805 Nm of torque at only 1,350 rpm and a hydraulic flow of 200 l/min, the new telehandler gives a very high performance, even at low engine speeds, said Manitou. A new 4,500-l bucket, specifically designed and approved for the MLT 961-160 V+ L, boosts the machine's performance. Featuring a width of 2.70 m, this bucket allows users to avoid driving over the material while increasing work output.

The CVT M-Vario Plus transmission offers users the choice of two modes with a maximum speed of 40 km/hr. Comfort mode provides a smooth ride for more precision, and dynamic mode generates faster acceleration for greater productivity. The drawbar pull has also improved, increasing by more than 30% (compared with the previous MLT 961 version) for higher efficiency.

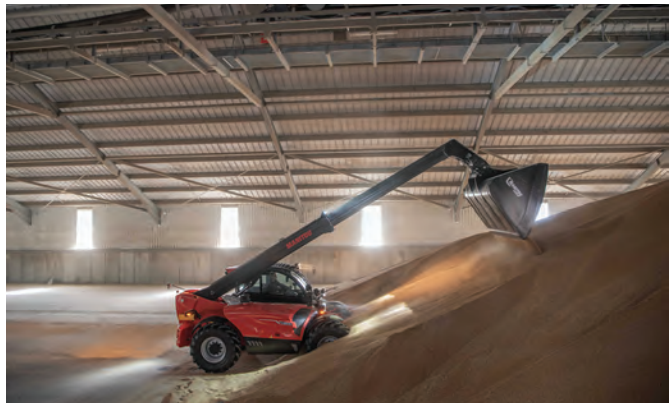
"The new engine delivers 10% more power than the previous version and a torque increase of 50%. Combined with the high-capacity 4,500-l bucket, this comprehensive machine/attachment solution ensures a very high work output in the most intensive loading and recovery applications," explained Arnaud Sochas, Manitou's product manager. There is also a High View camera option, fitted to the boom head, providing a perfect view inside the trailer to optimise filling operations.

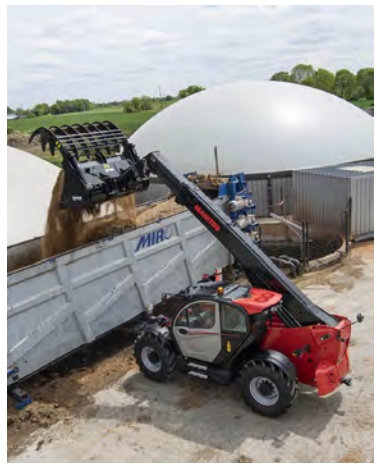
To minimise noise pollution and fatigue experienced during intensive operations, the MLT 961-160 V+ L comes with a quiet cabin. Comparable to those of high-range tractors, this cabin cuts down noise levels to just 69 dbA. Safety is enhanced as well, with lighting under the door, thus improving visibility on the Easy-Step when getting in and out of the cabin, even in the dark. Furthermore, the cabin has been repositioned higher up for an excellent view all around the machine.

Available optionally or as standard on the Platinum finish, a new adaptive air suspension seat with heating and electric lumbar adjustment reduces vibrations by more than 50% for optimal protection of the operator's back. To further minimise fatigue in the cabin, the JSM Autopower function allows the operator to control the engine speed directly with the joystick without using the accelerator pedal or the manual accelerator. Specific storage spaces are provided to enhance operator comfort, including a tool box fitted under the cabin for easier access.

For peace of mind while working, users can rest assured that their machine is connected as standard, allowing the dealer to easily carry out diagnostics remotely. As such, users can benefit from improved service and have better control over the costs related to the use of their machine. In addition, Manitou offers a comprehensive range of services associated with this model, including a maintenance contract on all parts and even a warranty extension of up to six years or 6,000 hours.

Thanks to its various innovations, the MLT 961-160 V+ L offers one of the lowest TCOs (total cost of ownerships) on the market, with savings of €500/yr compared to the previous model, according to Manitou. This is calculated based on 1,000 hr/yr of use, in accordance with standard EN 16796-4 (comparison tests were carried out between Stage V and Stage IV engines).





ALL IMAGES: **The MLT 961-160 V+ L is currently the most powerful model in Manitou's NewAg XL range. The machine has a lifting capacity of up to 6 t for a lifting height of 9 m.**

The decrease in fuel consumption is significant, with 10% less compared to the MLT 961 Stage IV, added Manitou. Maintenance is simplified with a rapid-opening cleaning hatch in front of the radiator. For lower maintenance costs, an integrated air pre-filter is positioned on the engine hood and hydraulic oil change intervals are now 2,000 hours. To further reduce the TCO, options such as Ecostop (configurable automatic engine stop) and the centralised automatic greasing system are also available.

Like the MLT 841/1041 models, the MLT 961 NewAg XL model is also available in four levels of finish: Classic, Premium, Elite and Platinum. ■

Website: www.manitoucenter.com.sg

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Cat GC-series hammers expanded with new models

Cat GC-series hydraulic hammers have been expanded to include the H160GC and H180GC models, in addition to the existing H110GC, H115GC, H120GC, H130GC and H140GC. They are designed for high production in a wide range of demanding applications – such as quarry, road construction, demolition and general construction – while keeping the user's owning and operating costs at a minimum.

The GC-series has a simple design that ensures reliability, long-term durability, ease of use and ease of maintenance. Ideal for hydraulic excavator carriers weighing 11 to 52 t, each hammer is tested per the ISO quality control system before customer delivery to guarantee optimum quality.

Whilst the H110GC, H115GC, H120GC, H130GC and H140GC have the same features, the H160GC and H180GC come with additional features of standard automatic shut-off and auto lube option. Major components of the hammers (cylinder, back head, front head, piston and tool) are manufactured with high-quality materials and processes.

The housings are fitted with bottom reinforcement plates that protect against breakage and wear. The high-pressure accumulator is field-serviceable, protects the carrier's hydraulic system by absorbing pulsation spikes created during the firing stroke, and is also sized to provide optimum breaking power and to absorb piston-recoil shock for improved tie-rod life.

The long piston transfers long shock wave into material. The piston diameters are matched for maximum energy transfer, and the piston's design and surface finish provide superior oil retention and seal life.

The oil-control valve is the outer type, allowing easy setting, reduced pulsation and low maintenance costs. The side rod (though bolt) is specially heat treated for durability, and the side-rod nut is protected from thread damage.

The stroke-control valve allows adjusting for primary or secondary breaking chores and for breaking different material hardness more effectively .

Additionally, the full-length side plate enables easy access to service points, including tool and bushings, with the lower tool-bushing replaceable in the field. Easily accessible pressure check point allows quick monitoring of the hammer's operating condition.

Tool-type options for the hammers include moil, pyramidal, chisel and blunt. This selection allows effectively adapting the hammer to an extensive range of applications, which might include secondary breaking of blasted rock in quarries and mines, trenching in tunnels, breaking refractory linings in steel-making furnaces, concrete demolition, rock excavation for foundations, breaking frozen ground, and separating rebar from concrete for recycling.

The design, features and construction of the GC-series hammers combine to deliver optimum life-cycle value for the user's investment. All units are available with Cat standard warranty (one year unlimited hours) and Cat dealer support. ■

Website: www.cat.com

ABOVE: **Cat GC-series hydraulic hammers are designed for high production in a wide range of demanding applications, such as quarry, road construction, demolition and general construction.**

LEFT: **The GC-series hammers feature a simple design that ensures reliability, long-term durability, ease of use and ease of maintenance. They are suitable for hydraulic excavator carriers weighing 11 to 52 t.**

Goldhofer upgrades Stepstar semi lowloaders

The Stepstar series, Goldhofer's new generation of self-tracking semi lowloaders launched in 2020, provides many benefits for haulage companies including an efficient load securing system combined with user-friendly operation and a practical range of accessories. These three- to five-axle semitrailers have been upgraded and they are now available with wheel recesses and the new Mega gooseneck.

"There is no change, of course, with regard to the existing and proven advantages of the Stepstar family," said Robert Steinhauser, sales director for Europe / North Africa at Goldhofer, "but the wheel recess version and the Mega gooseneck make for an even wider range of applications."

The new Stepstar semi lowloaders feature a very low deadweight, resulting in much higher payloads. Thanks to the use of premium components, maintenance intervals are longer and total cost of ownership is lower than that of comparable trailers, said Goldhofer. This leads to significant savings on overall fleet operations.

With an intelligent lashing system, easy operation and flexible set-up options, all the vehicles in the Stepstar family provide a high level of safety plus cost-effective operations. This applies even more to the new version with wheel recesses and Mega gooseneck.

The new Stepstar series comes with a choice of one or two pairs of wheel recesses. Thus extremely high construction machines can be transported where maximum height regulations would otherwise be a problem. The wheel recesses have a low entry angle and cross ribs for safe loading with wheeled vehicles with a low approach/departure angle.

The depth of the wheel recesses can also be adjusted to the ground clearance of the machine to be loaded. A simple and well-designed recess cover ensures fast set-up times when other cargos are to be carried. With the extendable variants in particular, aluminium spacers can be used to facilitate transportation of wheeled vehicles with different wheelbases.

The flat approach angle of the folding ramps is ideal for vehicles with low ground clearance, such as screen and crusher plants. The optional TraffideckGO low-wear, anti-slip polymer decking offers a high coefficient of friction for maximum safety when loading and travelling.

TOP AND ABOVE: **The newly upgraded Stepstar semi lowloader from Goldhofer comes with a choice of one or two pairs of wheel recesses. This enables extremely high construction machines to be transported where maximum height regulations would otherwise be a problem.**

The new optional Mega gooseneck is an additional benefit, which allows more different loads to be transported with Stepstar than ever before, as the height difference between the loading area and the gooseneck is reduced to a minimum. This permits transportation divided loads, general cargos, and even a 40-ft or two 20-ft containers for a total rig length of 16.5 m. ■

Website: www.goldhofer.com

Ammann asphalt plant sets production record in China

The A2 section of the Beijing-Harbin Expressway expansion project is currently under construction in northeast China. Handling the work is Longjian Road & Bridge Group and some of its subsidiaries, with the help of an Ammann ABP 400 Universal asphalt plant.

The expressway connects the city of Harbin in Heilongjiang Province with the national capital Beijing, passing through several main cities. It is one of the busiest of the six major southbound routes in the province and must be kept open during the expansion.

In order to get the project back on track, following its delay due to the Covid pandemic, Longjian Road & Bridge Group put the ABP 400 Universal plant into operation. The challenge was to meet production demands that would get the A2 section on schedule.

Longjian Road & Bridge Group is one of the largest, most comprehensive construction companies in northeast China. It is mainly engaged in highway, bridge, tunnel and municipal construction and engineering. The company has tackled a number of crucial transportation infrastructure projects at home and abroad, with 28 self-invested and 44 holding subsidiaries – and more than 3,000 units of construction equipment.

One of the company's subsidiaries, Longjian Equipment Engineering Co, operates 13 asphalt plants and six pavers. On 1 September 2020, the 18.5 km pavement of the K1172+000~K1190+500 section was completed – right on schedule. It is thought to be the most difficult and urgent section of the Beijing-Harbin Expressway project.

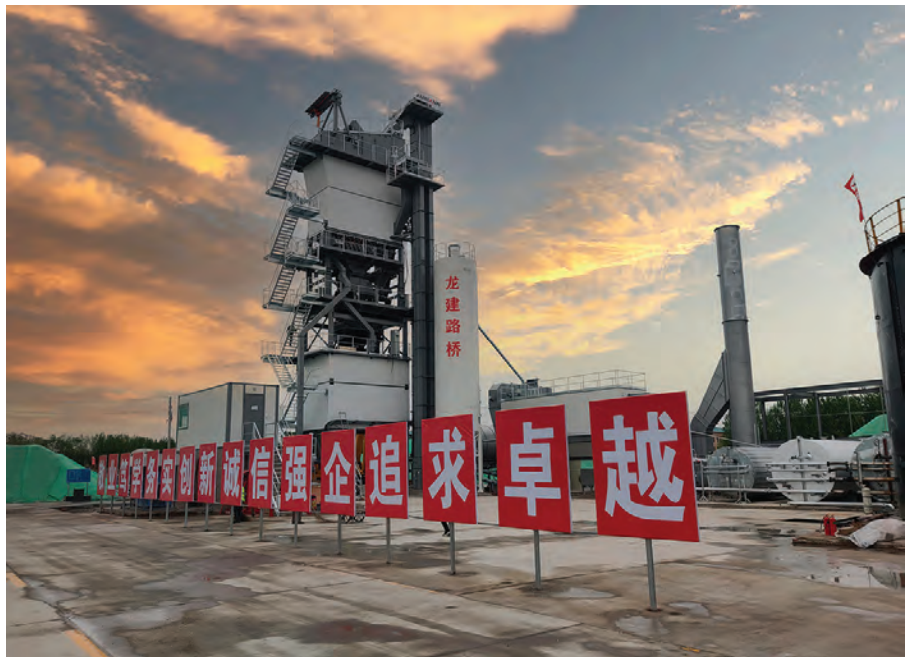
As the pace of the project heated up, the ABP 400 Universal set a single-day production record in Heilongjiang Province with 8,544 t of asphalt in only 21 hours, revealed Ammann.

"The ABP 400 Universal also became the province's first asphalt plant with a capacity of 400 t/hr to use natural gas. This confirmed that high production and low fuel consumption can be achieved simultaneously, drawing high praise from the leaders of Heilongjiang Province, Harbin City and governmental transportation departments," said the manufacturer.

Tian Yulong, chairman of Longjiang Road & Bridge Group, said he believes that advanced technology is the driving force behind the success of the Ammann asphalt plant. He thinks it is the foundation of its excellent performance and reliability. Mr Tian reportedly made the statement after assessing the advantages of the plant installation, which saves both time and effort. He also praised detailed reports that meet all needs for production data, efficient energy usage that lowers production costs, sound reduction efforts that create a better working environment, and the as1 control system – which he described as both powerful and convenient.

Longjian Road & Bridge Group has purchased an additional Ammann ABP 400 Universal plant for another section of the A1, the Suihua-Daqing Expressway. Plus, two more of the Ammann ABP 400 Universal plants have been acquired for the A9 and A5 sections of the Harbin-Zhaoyuan Expressway. ■

Website: www.ammann.com



ABOVE AND BELOW: **The Ammann ABP 400 Universal plant has set a single-day production record in Heilongjiang Province, China, providing 8,544 t of asphalt in only 21 hours. It is believed to be the first asphalt plant in the province with a capacity of 400 t/hr to use natural gas.**

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Wirtgen SP 1600 paver sets world records in India

The Vadodara-Mumbai Expressway is currently under construction. It forms part of the longer 1,350 km Delhi-Mumbai Expressway linking India's capital New Delhi and Mumbai.

Initially, the highway was to be widened to eight lanes, with four lanes in each direction. However, sufficient space has now been set aside in the middle of the road to allow four additional lanes to be added.

Local contractor Patel Infrastructure Ltd has been involved in the project, setting new world records with the help of a Wirtgen machine. The record attempt started on 1 February 2021 at 8:00 am. Using the modified Wirtgen SP 1600 slipform paver, the company succeeded in completing a four-lane highway, including hard shoulder, with a 18.75 m working width over a distance of 2.56 km (1.28 km in both directions) within 24 hours – a new world record.

A total of four world records have been entered into the India Book of Records and the Golden Book of World Records in connection with the project. These include: the largest quantity of pavement quality concrete (PQC) paved in 24 hours (14,613.30 cu m); the largest volume of PQC produced in 24 hours (14,370 cu m); the longest continuous section with a width of 18.75 m paved with PQC in 24 hours (1,280 m); and the largest area of a motorway paved with PQC in 24 hours (48,711 sq m).

The Wirtgen SP 1600 slipform paver has been modified to achieve a paving width of up to 18.75 m (from the original 16 m). This required additional extension elements for each component, including the extremely complex dowel bar inserter. Moreover, the machine has to be able to compensate for the enormous amount of additional weight while still being capable of high-precision levelling.

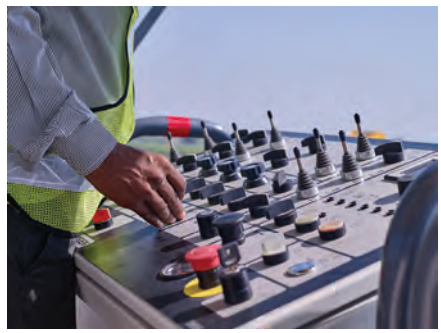
The Wirtgen TCM 180 texture curing machine was also adapted to the working width of 18.75 m, so that it could apply a dispersion to the concrete surface behind the slipform paver as protection against evaporation.

The construction project was supported by four Wirtgen technicians to ensure that the customised machine always ran smoothly. Every hour, a total of 45 transport vehicles delivered concrete to the job site to provide the slipform paver with sufficient material.

ABOVE AND LEFT: **Local construction company Patel Infrastructure has set some new world records with the help of a Wirtgen SP 1600 slipform paver.**

BELOW: **The operating system on the SP 1600 paver.**

BELOW LEFT: **For this project, the SP 1600 paver has been modified to achieve a paving width of up to 18.75 m.**



In order to process the huge quantity of concrete in such a short time, the paving process had to be carried out at an average speed of 1.8 m/min. Approximately 30,000 dowel bars and tie bars were inserted using the built-in automatic dowel bar inserter (DBI) and the central tie bar inserters (CTBI), providing the structure with the necessary stability and ensuring that the slabs are bonded together properly to withstand traffic loads for many years to come.

Patel Infrastructure has more miles to go on this major project and the company continues to rely on the SP 1600 paving train. "We are ecstatic to have achieved this colossal task and be a part of the history books in the Indian road construction industry. The nature of constructing a civil project involves many factors that are to be aligned. We endeavoured not only to set a benchmark in the segment of road and highway construction, but also to do it in a responsible manner," said Arvind Patel, managing director of Patel Infrastructure Ltd. ■

Website: www.wirtgen-group.com

Bauer builds cut-off wall in hot ground conditions

One of the largest gold deposits in the world is located on the volcanic island of Niolam, the main island in the Lihir archipelago of Papua New Guinea (PNG). The mine was discovered in 1982 and the sought-after precious metal has been extracted in open-cast mines for nearly 25 years – now reaching a depth of up to roughly 300 m below sea level.

For a planned expansion of the mine, an impermeable protective wall is required around the new extraction area because of its close vicinity to the Pacific Ocean. According to the plans, a 1.8 km long cut-off wall will be built as part of a seepage barrier structure and will advance into the geothermally active foundation with temperatures of up to approximately 150°C at a depth of 60 m.

The seepage barrier has two primary functions: sealing off the new extraction area or open pit against ocean and ground water ingress by the cut-off wall; and protecting the mine from immediate inrush of water to the open pit in the event of an extreme earthquake, causing liquefaction of foundation sediments and failure of the cut-off wall.

Due to the unique location of the mine in a geothermally active Lihir Island, Bauer Engineering PNG Ltd, a subsidiary of Bauer Spezialtiefbau GmbH, was commissioned by the owner Lihir Gold Limited, a member of the Newcrest Mining Group, in collaboration with Klohn Crippen Berger (KCB), Newcrest's seepage barrier cut-off wall design consultant, to execute two test cut-off wall elements with three diaphragm wall panels per element up to a depth of 55 m below the ground surface.

"For the first time in the history of diaphragm wall construction, cut-off wall elements are being constructed in geothermally active foundation conditions with ground temperatures between 120°C and 150°C," explained Gebhard Dausch, project manager at Bauer Engineering PNG Ltd. "Standard equipment combined with a unique slurry circulation system cooled by sea water was used for the work – without customisation or special technical protection of the Bauer equipment against the unprecedented high temperatures within the foundation."

The work included the construction of six diaphragm wall panels in two cut-off wall elements. All six panels were constructed through approximately 30-35 m of loose blasted mine waste rock fill consisting of fine and course soil, gravels, cobbles and boulders up to 2-3 m in diameter, underlain by 15-20 m of marine sediments comprising silt and sand as well as 5-10 m of highly altered – by high temperatures – of volcanic rock.

Five panels were keyed into the volcanic soil strata at a depth of 55 m below the ground surface and one panel reached a depth of 60 m. To determine the temperature and electrical resistance in the concrete, reinforcement cages with temperature sensors and multi-ring electrodes were lifted into the cut-off wall elements. A grouted body was also constructed around the diaphragm wall by means of pre-treatment grouting to prevent slurry loss and trench collapse of the panels, and a plastic concrete specified by KCB with a high temperature resistance was used.

A Bauer MC 128 duty-cycle crane with BC 30 cutter unit, an MC 96 duty-cycle crane with grab unit, and a Bauer BG 45 drilling rig with double-walled casing were all used on this project. During the diaphragm wall works, a special cooling unit developed for oil drilling was used along with the usual equipment. The heated bentonite flows through this mud cooler, thereby cooling back down to ambient temperature.

Bauer Engineering PNG Ltd executed two test cut-off wall elements up to a depth of 55 m below the ground surface.

Both images © Bauer Group

In addition to a Bauer MC 128 duty-cycle crane with BC 30 cutter unit, an MC 96 duty-cycle crane with grab and a Bauer BG 45 rig with double-walled casing have been used on this project.

"The execution of diaphragm wall works in hot ground conditions poses an extreme challenge and represents a new innovation in the field of specialist foundation engineering," said Mr Dausch. "No one could predict the temperature development and its influence on the equipment in advance. The advantages of combining cutter technology with the unique properties of the bentonite suspension only became apparent when carrying out the works."

As for the work process, the hot soil rock cuttings are taken up into the cutter box then conveyed together with the bentonite suspension to the desanding plant, so that the bentonite suspension provides both cooling and insulation. Thanks to the addition of fresh bentonite in the trench, the slurry flowing down to the cutter cools the diaphragm wall panel. Even after reaching the final depth, the constructed diaphragm wall panel only heats up very slowly, making it possible to carry out installation of the reinforcement cage and the subsequent concreting works without significant risk for the employees.

Work by Bauer Engineering PNG Ltd began in September 2020 and was scheduled to conclude in April 2021. ■

Website: www.bauer.de

Microwave moisture sensors for cost-efficient concrete production

THE CURRENT WORLDWIDE HEALTH CHALLENGES HAVE FORCED MANY CONSTRUCTION COMPANIES TO ADJUST THEIR WORKING PRACTICES TO MINIMISE THE STAFF INVOLVED IN A SITE WHILST STILL MANAGING FULL PRODUCTION SCHEDULES. WITH AUTOMATION BEING ONE OF THE CRITICAL COMPONENTS IN THIS EFFORT, A GLOBAL MANUFACTURER OF MICROWAVE MOISTURE MEASUREMENT SENSORS, HYDRONIX, EXPLAINS THE IMPORTANCE OF USING AUTOMATED SYSTEMS TO IMPROVE EFFICIENCY IN CONCRETE PRODUCTION.

Inconsistency in both ready-mix and precast concrete production is often caused by the varying moisture content of the sand and aggregates. "Water content changes can originate from different parts of the concrete production process with differing effects. These include: natural moisture content variation in aggregates; uncovered material transport or storage systems, which allow increments of water content by rainfall or their reduction by evaporation; and accuracy of the water and admixture dosing systems into the concrete mixer," explained Hydronix.

"The most significant source of moisture variation is the natural aggregate moisture content. A variation of 1% moisture content in the dry aggregates by weight results in an error of 10 kg of aggregate loaded into the mixer for every 1,000 kg of dry aggregate weighed.

"Obviously, the greater the variation of moisture and the greater the weight of aggregate used, the more serious this condition becomes and, as the water content in aggregates can be as high as 16%, this has large repercussions to the economics of trading in this material."

Size	Moisture %
Fine Sand	0 to 16
Course	0 to 12
8mm	0 to 10
10mm	0 to 4
12mm	0 to 3
20mm	0 to 2

Typical moisture ranges for aggregate.

Hydronix moisture sensors have been developed using microwave technology.

Many common mix designs have larger proportions of fine materials, so, for best results, Hydronix advised that concrete producers should concentrate on initially measuring moisture in the sand and coarse stone materials for the biggest return on investment.

Microwave moisture measurement

Today, there are numerous products available in the market that allow the measurement of the moisture content of aggregates and fresh concrete with a good degree of accuracy.

"The microwave technique has emerged as the most suitable for the measurement of moisture in concrete production," said Hydronix. "Microwave technology is superior mainly due to its high accuracy (usually in the range of +-0.2% depending on the quality of the calibration), its lack of influence by dust or colour, and the competitive cost-benefit relationship of this type of equipment."

In ready-mix concrete, varying moisture content affects the yield achieved for a given amount of cement, the slump and the strength of the concrete produced. Thus, a modern ready-mix plant usually has microwave moisture sensors installed at the gates of each of the aggregate bins, revealed Hydronix.

"Once the sensor has been set up correctly, average moisture readings can be taken in real-time during each batch and used by the control system to adjust the dosing targets of the aggregates.

"The sensor enables the system to ensure that the correct dry weight of each aggregate is loaded into the mixer.

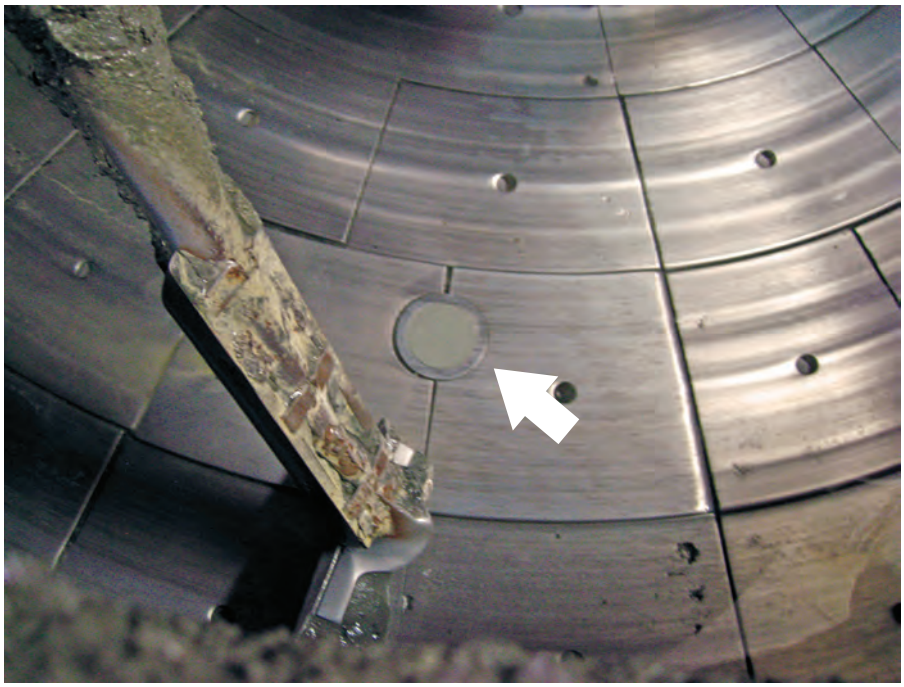
"At the end of the aggregate loading, the total water in the material can be calculated from the moistures recorded during the batching. This calculation is then used to also reduce the water added into the mixer to get the correct final water/cement ratio."

The company added that a plant producing 160 cu m/day of concrete would see a typical payback period for moisture measurement equipment of three months, gaining considerable benefits in both increased yield and improved quality.

"High-quality materials and well-controlled moisture levels are critical for precast and concrete product manufacturers to ensure consistent products. Significant savings in cement, colour, and admixtures, including reductions in the number of wasted batches, are all common benefits of moisture measurement."

In addition to installing aggregate bin moisture sensors at their plants, precast and concrete product manufacturers can also use moisture control in the mixer to ensure the correct total water in the mix, batch after batch.

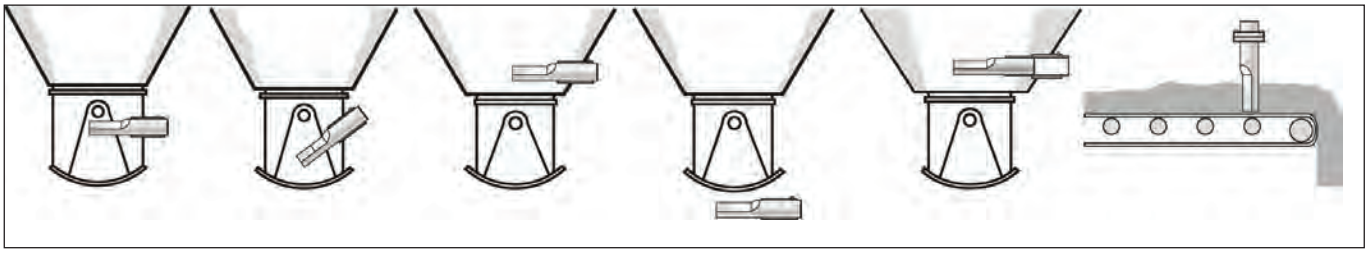
"Measuring the moisture of fresh concrete in a mixer allows the concrete producer to have full control over the final moisture content before the mix is discharged," said Hydronix. "This also ensures that variations such as unmeasured aggregates, or environmental influences (rain or evaporation from heat) during transport from the hopper to the mixer, are eliminated."



TOP: **A Hydronix Hydro-Probe moisture sensor installed under an aggregate bin. It ensures that the correct dry weight of each aggregate is loaded into the concrete mixer.**

ABOVE: **The flush-mounted moisture sensor from Hydronix is designed for use in concrete mixers. It calculates the correct volume of water in the mix to achieve constant water contents, batch after batch.**

LEFT: **A Hydronix Hydro-Mix flush-mounted sensor fitted to the floor of a mixer. It allows concrete producers to have full control over the final moisture content before the mix is discharged.**



There are normally two sensor options for measuring moisture in concrete mixers: a flush-mounted sensor, which is fitted to the floor of a pan mixer or the belly or end wall of a shaft mixer; and an 'in-mix' sensor, which either mounts on the mixer scraper arm in a static pan mixer, or is mounted statically in a rotating pan mixer.

The measurements from these moisture sensors are used to calculate the correct volume of water required to achieve constant water contents inside the mixer, batch after batch.

According to Hydronix, its latest version of the 'in-mix' sensor, the Hydro-Probe Orbiter, features a fully ceramic sensing head unit to offer producers the fastest response available in the market.

Homogeneity control

Measuring moisture to indicate the degree of homogeneity in a concrete mixer - at any mixing stage - is also possible, which can be carried out using microwave mixer sensors.

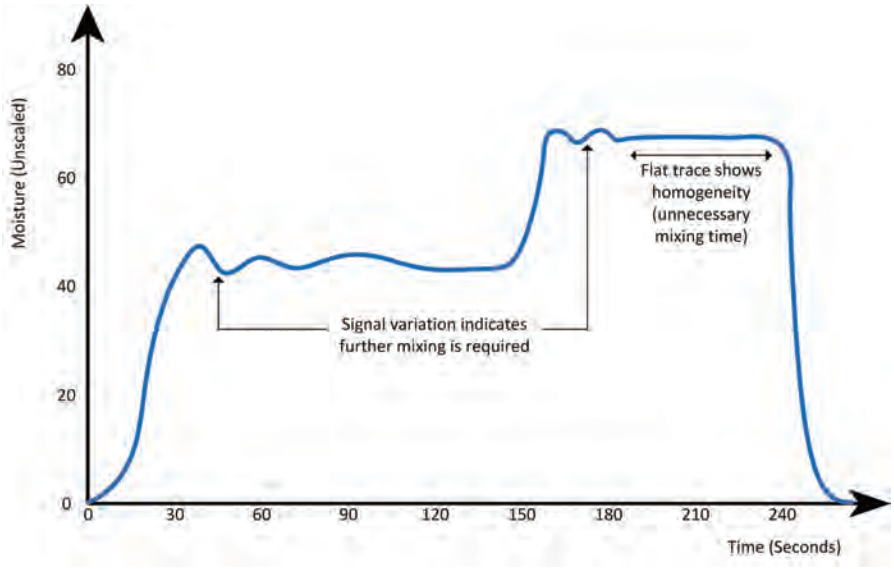
"When the raw materials are loaded into the mixer, the sensor can record the moisture variation between the wet aggregates and the dry cementitious materials. As the materials mix with the dosed water and admixtures, the moisture signal changes as the material moves in the mixer," explained Hydronix.

"As the water disperses evenly over the entire mix, the trace output from the mixer sensor flattens, indicating that homogeneity has been reached."

The company emphasised that the use of homogeneity control allows the optimisation of mix cycles. "Once the producer can evaluate whether the mix is homogenous or not, they can then adjust the mixing time to ensure that only the time required to homogenise the mix is used. Mixing for the right amount of time has considerable benefits in reduced power consumption, reduced wear of parts, and increased production output."

Cost-efficient result

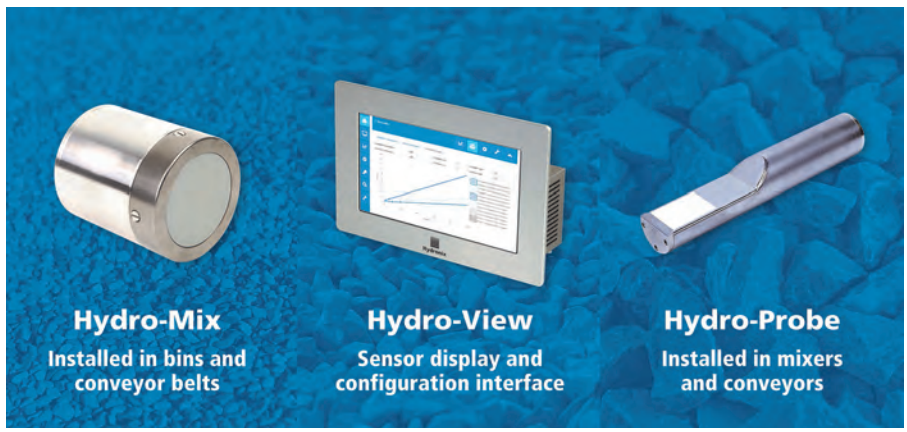
Hydronix further highlighted that besides improvements in quality, the use of moisture control also leads to improved profitability for a concrete production operation.



TOP: **Typical installation positions for a moisture sensor in aggregate bins.**

ABOVE: **Mix cycle data as seen by a Hydronix mixer sensor.**

BELOW: **Moisture sensors with microwave technology are ideal for use in concrete production, thanks to their high accuracy, lack of influence by dust or colour, and the competitive cost-benefit relationship of this type of equipment.**



"Concrete producers will reduce material costs and increase production yield. Although more difficult to quantify, the reduced number of sub-standard batches, reduced wear parts and energy savings contribute towards increased profitability. The improvement is such that over the past 30 years, many Hydronix customers have determined a return-on-investment period of between three and six months for the moisture control system."

With that, the company concluded, "If you are considering using moisture control equipment, first ensure that you choose a company with an excellent reputation. Second, the moisture control equipment needs to integrate with your current system. Finally, this company needs to have local partners who will give you the service and after-sales support you expect." ■

Website: www.hydronix.com

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Link-Belt unveils new telescopic crawler and truck cranes

TCC-550 telescopic crawler crane

Link-Belt Cranes has announced that the production of its new 45-mt-capacity TCC-550 crane will begin soon, with shipments set to commence in the fourth quarter of 2021.

The TCC-550 follows a long line of product improvements and introductions in Link-Belt's telescopic crawler crane family. Its predecessors, the TCC-500 and TCC-450, were some of the company's first telescopic crawler models to be introduced worldwide in 2006.

The TCC-550 features a full-power, 11–35 m four-section boom with two boom extend modes (EM1 and EM2) and an impressive chart. The entire boom is greaseless and incorporates Link-Belt's Teflon-impregnated wear pads for easy maintenance. Fly options include an 8.7-15.6 m two-piece bi-fold lattice fly, stowable, offsetable to 2, 20 and 40 degrees; maximum tip height is 50.44 m.

Durable textured and slip-resistant paint on all walking surfaces is new and improves footing. The vision package consists of winch-view camera, rear-view camera and right-side swing camera, giving the operator excellent jobsite visibility during setup and lifting. Anchor points are located on the work platform of the TCC-550 for personal fall arrest equipment.

TOP AND ABOVE: **The new TCC-550 telescopic crawler crane has a 45 mt capacity and can travel up to 3.2 kph.**

The standard lighting package comprises a high intensity 360-degree LED work light mounted on the house and one high intensity 360-degree LED light attached at the top of the boom base section. Both lights can be controlled remotely inside of the operator's cabin.

The TCC-550 can work at three different track widths: 4.63 m fully extended, 4.12 m intermediate, and 3.49 m retracted. The crane offers two travel speeds and can travel up to 3.2 kph.

The TCC-550 is also able to move quickly and easily on or off the jobsite. With a standard counterweight package of 11,339.8 kg, the crane transports in just one load while staying under 45,359.2 kg. On the trailer, it travels at a height of 3.01 m and a width of 3.49 m.

65|HT truck crane

Link-Belt's new 55-mt-capacity truck crane, the 65|HT, is intended to replace the company's HTC-8660 Series II model.

The 65|HT comes with a full-power, 11.2–35 m four-section boom that reaches a maximum tip height of 38.1 m. The crane boasts an all-new formed boom riding Link-Belt's Teflon-impregnated wear pads, meaning there is no need to grease the boom – reducing the time and cost of upkeep.

The 65|HT features the next generation of emission standards with an EPA 2021 certified Cummins L9 engine that provides 260 hp at 2,000 rpm. Improved capacities over its predecessor are delivered through three optimised boom extend modes and an increase in maximum counterweight to 8,482 kg. Operator controls are available in either a dual or single axis configuration and have a fine metering feature for precise operation.

The Link-Belt Pulse operating system utilises an in-cab display as a readout and operator interface with on-board diagnostics including the rated capacity limiter, wind speed, boom length and angle, radius of load, and crane configuration, just to name a few.

Moreover, durable textured and slip-resistant paint on all walking surfaces improves durability and footing. The vision package consists of cameras for winch-view, right-side swing view, rear-view backup, and right-side turn, giving the operator excellent jobsite visibility during travel, setup, and lifting.

The optional lighting package offers a high-intensity LED work light mounted on the operator's cab, two fixed LED lights and a remote-controlled articulating spotlight mounted on the boom base. A fully equipped 65|HT can reduce its transport weight to less than 29,483 kg with all counterweight removed. ■

Website: www.linkbelt.com

TOP AND ABOVE: **The new 65|HT truck crane offers a 55 mt capacity. It is intended to replace Link-Belt's HTC-8660 Series II model.**

Kuwait's first in-situ cantilever bridge project

Section RA217 of Nawaseeb Road, also known as Route 40, is one of Kuwait's most important transport infrastructure projects and part of the Kuwait Development Plan 2015-2020. Covering a stretch of 37 km, it includes the reconstruction and expansion of the highway into a six-lane dual carriageway (three in each direction) with nine interchanges and three bridges.

The ultimate goal of this development is to improve access and safety on the roads by eliminating U-turns and replacing them with roundabouts at all interchanges. Main contractor on the project is Freysinnet.

Doka was engaged to find a casting solution for the two main bridges featuring a total combined length of 940 m – including pier-to-pier spans, which at their longest measure 110 m each – as well as one ramp bridge with a length of 893 m and a maximum span of 95 m between piers. In doing so, 300 casting sections up to 250 t were required to deliver the project successfully.

TOP AND ABOVE: **Nawaseeb Road is an important element of Kuwait's transport infrastructure. The bridge project is a special case for two reasons: not only is it currently the country's first cantilever bridge project, but it is also the first time a bridge is cast in-situ.**

Innovative formwork systems

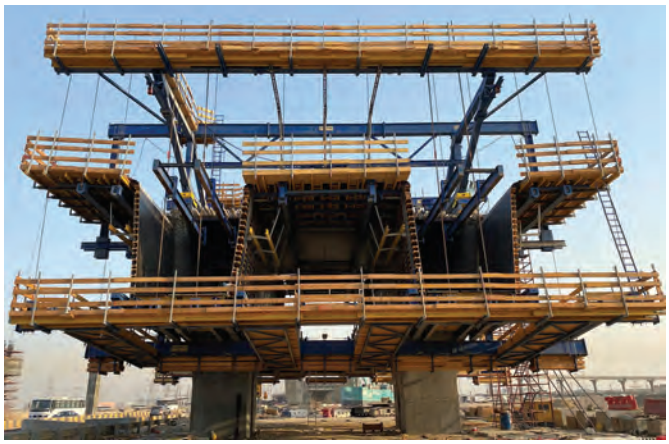
Doka applied its internal, digital planning tools to design the right solution. This included detailed designs that helped accelerate the planning process, while providing the client with an overall visual representation of the project. In addition, a 3D model was developed with DokaCAD for Revit to give more precise visualisation of the cantilever forming traveller (CFT) system.

In total, six Doka CFTs, supplemented with approximately 2,000 sq m of Top 50 large-area formwork were chosen for both the main bridges and ramp bridge at interchange five. Approximately 825 t of Doka material was used during this process.

Employing Doka CFTs, the client was reassured by its high-performance precision and how its modular components enabled it to adapt flexibly and quickly to the bridges' varying geometrics. Thanks to the system's ergonomics and a small number of separate parts, the construction process was optimised, meaning a shorter construction schedule to reduce cost.

Speaking on behalf of the Arab Contractors, Mohamed Dackrory, deputy executive manager said, "In using Doka's cantilever forming traveller solution, the project benefited from

ABOVE, MIDDLE AND FAR RIGHT: **The virtual formwork planning of the cantilever forming traveller (CFT) system using the DokaCAD for Revit software supported project implementation on the actual construction site.**



The Doka CFT system offers formwork and shoring from a single source. The ideal balance between support structure and formwork enables the construction of 470 m of the main bridge.

having an all-in-one solution that was easy for our site teams to use while remaining flexible in terms of versatility for the project's varying challenges. Given the complexities of this project, we were reassured by Doka's extensive experience and expertise in bridge construction and were very satisfied with our partnership."

Due to the limited space available on-site, hydraulic cylinders were used to strip the inner wall formwork. As the bridge deck geometry was required to be reduced at every casting step as part of the agreed planning process, the formwork and components of the CFT had to be continuously adjusted. Various hydraulic cylinders and other integrated functions allowed for an easy adjustment process without using chain hoists or additional workforce.

The CFT has special slide bearings to enable safe and controllable shunting while preventing unwanted movement along its longitudinal gradients. Thanks to this feature, the construction team's safety was ensured in every phase of the project through fully-enclosed working platforms and an integrated ladder system at all levels.

Doka also supplied the formwork for the pier heads which measured up to 20 m in height, 12 m in length and was erected onto d3 load-bearing towers with Top 50 large-area formwork.

Using 3D modelling techniques, Doka provided an accurate rendering of the CFT in action, prior to erection on site.

With the restrictions of existing gas pipelines, the piers' location was predefined, resulting in different spans that led to an in-balance in construction delivery. To support the bridge deck during this phase, Doka UniKit towers were deployed to safely transfer up to a maximum force of 3,800 kN. Thus it restored balance to the process and ensured the safe delivery of the piers.

This project is believed to be the first in-situ cantilever bridge in Kuwait. Doka formwork instructors provided support on-site by ensuring that the formwork was used effectively and that the work ran smoothly from start to finish. The formwork operation started in January 2020 and ended in February 2021. ■

Website: www.doka.com

‘Strengthening’ Mui Trau twin tunnels

The new La Son-Tuy Loan Expressway in Vietnam, featuring 77.5 km long, is a link between Thua Thien-Hue Province and Da Nang City. When fully operational, the road would play a fundamental role in the economic and social development of the two regions.

With four lanes of traffic, the new expressway connects La Son Town in the Phu Loc District of Thua Thien-Hue Province and the intersection with the Da Nang-Quang Ngai Expressway in Da Nang’s Tuy Loan Village. The project forms part of the 3,000-km Ho Chi Minh Highway that passes through 28 towns and cities.

Construction work on the La Son-Tuy Loan Expressway is being carried out by local contractors, Song Da 10 and Son Hai Group. It commenced in 2015, including various tunnels along the route. Among them are the Mui Trau twin tunnels in the Hoa Vang District, which are believed to be one of the most modern road tunnels ever built in Vietnam. Both tunnels are 2,260 m in total length, 10.8 m wide and 7.2m high, providing two lanes of traffic.

The Mui Trau twin tunnels in the Hoa Vang District (top), each featuring 2,260 m long, are part of the new La Son-Tuy Loan Expressway (above).

The article courtesy of Realta Mapei International no. 83

Strengthening the concrete structure

In this project, Mapei was commissioned to supply its admixtures to enhance the quality of the concrete used for the tunnels. The company provided the Mapequick AFK 888 accelerator along with the Mapefluid N 100 SP, Dynamon Easy 11 and Dynamon SR2 VN superplasticisers.

The Mapequick AFK 888 is an alkali-free, inorganic salt-based liquid accelerator for producing shotcrete characterised by rapid setting times and a quick development of its strength. Concrete mixed with this system can adhere better to surfaces on which it is applied, offers a higher capacity to penetrate between the various layers and reduces waste.

The Mapefluid N 100 SP is a liquid superplasticising admixture for quality concrete (watertight, durable and high-strength). Due to the high workability obtained without excess water in the mix, concrete with Mapefluid N 100 SP admixture is easy to place while fresh and has high performance characteristics when hardened. This system is mainly used for ready-mix concrete, pumped concrete and mass concrete.

The combination of Easy 11 and SR2 VN represents a new and innovative improvement in concrete admixture technology, compared to the use of just one admixture in a traditional concrete mix.

The Mapequick AFK 888 and Mapefluid N 100 SP systems were used to produce shotcrete, which was sprayed on the tunnel walls. The Dynamon Easy 11 and Dynamon SR2 VN systems were applied on the tunnel linings. In total, the four products covered an area of 2,260 m long. Mapei was involved in the project from 2015 to 2019. ■

Website: www.mapei.com.sg

Mapei admixtures were chosen for this project. Two of them were used to produce shotcrete - which was sprayed on the tunnel walls (top and above) - and the other two for the tunnel linings (right).

Ream City project set to transform Sihanoukville

The masterplan for Ream City in the Sihanoukville province of Cambodia was recently unveiled, set to transform the region into an exciting destination. With a beachfront stretching beyond 6 km, this large-scale development will incorporate a sustainable ecosystem of tourism, commercial and residential activity that has the potential to house up to 130,000 residents.

Developed by Canopy Sands Development, a member of a Cambodian conglomerate Prince Holding Group, the 834-ha project is envisioned to be another iconic landmark in the country featuring family attractions, condominiums, landed and beachfront homes and affordable housing estates, shopping malls, business hubs, beach resorts, hotels, condotels, yacht and marina club.

The completion of the masterplan – which was undertaken by Singapore-based Surbana Jurong Group – is a major step in turning the vision of Ream City into reality.

"We are currently preparing for downstream developments, including utilities and road infrastructure as well as secondary developments. This will require sourcing the right consultants to assist us in conceptualising and designing what will be an iconic development. We will make announcements at a later stage," said Khong Weng Fook, managing director of Canopy Sands Development.

Ream City is planned to be built in three phases over a period of more than 20 years, according to Mr Khong. Phase 1 – or the start-up phase – consisting of a 50-ha project is envisaged to be completed in 2025. "It will comprise the main components of our Integrated Resort complex, including MICE facilities and hotels. Residential developments are also planned to cater to the expected demand."

Phase 2 is a 357-ha project slated for completion in 2035, while Phase 3 covering 427 ha is scheduled to be finished in 2045.

Sustainable development that 'benefits local community'

Mr Khong further explained that Ream City will take into account the principles of sustainable design, such as environmental protection and resource recycling. "For example, there will be areas set up to capture rainwater among other green infrastructure efforts, ecological restoration and urban infill, and a transit-oriented development (TOD).

"This approach will lead to the creation of sustainable, healthy and economically vibrant neighbourhoods in order to deliver a high quality of life to residents and benefit the environment, the economy and the local community."

"In our pre-qualification process for design consultants, we've placed an emphasis on their experience on designing green initiatives amongst other design-related aspects," said Mr Khong.

"Building orientation would take into consideration not only views offered by the sea and golf course but the sun as well. The most appropriate material for the developments would then be proposed for eventual use during construction."

Mr Khong added that amenities would be built within "comfortable walking or cycling distances for each phase of

development. To encourage residents to adopt non-motorised forms of transport, appropriately designed tracks or footpaths are planned. The usage and promotion of environment-friendly vehicles will also be considered."

In the long term, the development of Ream City is expected to benefit the local community a great deal. "Our organisation's mission is to develop sustainable and enduring real estate projects that effectively and holistically serve the needs of local communities. Sihanoukville is one of the best examples where we can abide by our mission," said Mr Khong.

"Apart from the infrastructure improvements, as one of the most important gateways into Cambodia, lined with pristine beaches and the heritage of Sihanoukville, Ream City has the potential to be a major tourist attraction not just for locals but also regional visitors or new residents from overseas.

"The ripple effect on the community will be positive. As an illustration, more training centres could be established for the hospitality sector – especially given the close distance to the airport – providing the community with good jobs and opportunities."

Strengthening Cambodia and ASEAN

In recent years, Cambodia has become an attractive market in the ASEAN region for business investments. The Regional Comprehensive Economic Partnership (RCEP) – a free trade agreement signed between Asia Pacific countries in 2020 – would make Cambodia even more accessible.

"Generally, RCEP – which accounts for a third of the world's population – seeks to encourage cross border collaboration, boosting foreign investments into ASEAN's emerging economies, strengthening ASEAN's regional trade flow and fostering stronger trade relations within ASEAN," explained Mr Khong.

"Manufacturers in the mature ASEAN countries are identifying means to minimise production and manufacturing costs by outsourcing finishing work to the emerging economies within the ASEAN region. We are hoping to see an expansion of foreign direct investment and foreign participation in new and existing industries in Cambodia, benefitting the country's overall economic development and growth, thereby increasing the local population's disposable income."

Mr Khong pointed out that supporting functions for such new and existing industries will also bring about a need for both

Khong Weng Fook, managing director of Canopy Sands Development, shares the company's plan for Ream City and explains why Cambodia has become an attractive market in the ASEAN region for business investments.

new and upgraded infrastructure in the country, plus real estate like special economic zones, warehousing, logistics facilities and housing, to name a few.

"As one of the largest and fastest growing conglomerates in Cambodia focusing on three core areas, namely real estate development, financial services and consumer services, Prince Group believes that Cambodia will need to rely on the right local players who aim to be a force for good for Cambodian development."

He shared that Canopy Sands Development is currently exploring a number of development projects in other parts of Cambodia. "We will make suitable announcements at the right juncture."

When asked about the company's plans on expanding into neighbouring countries, Mr Khong said, "Rising foreign direct investments, free trade agreements with leading economic blocs, and future participation in the RCEP are expected to act as key drivers for neighbouring countries such as Thailand, Vietnam and Laos, supported by pro-industry policy initiatives.

"While various challenges need to be addressed, Thailand, Vietnam and Laos are expected to bounce back strongly, according to the World Bank. Further, ASEAN will become the fourth-largest economic bloc in the world by 2030.

"Strong companies with diversified revenue streams across sectors will become attractive investment targets as they will act as a proxy for broader economic performance. We are dedicated towards exploring real estate opportunities and are open to any kind of expansion opportunities as long as the development plans satisfy our mission statement." ■

OPPOSITE IMAGE: **Ream City is expected to be built in three phases over a period of more than 20 years, with Phase 1 envisaged to be completed in 2025.**

LEFT: **The project will take into account the principles of sustainable design, and is aimed to benefit the local community in the long term.**

Note: The unveiling of Ream City masterplan has been announced in the Mar/Apr 2021 issue of Southeast Asia Construction.

Artist's impressions of the project © Surbana Jurong

Keeping Southeast Asia's tallest building on track

ABOVE: **At 644 m, the Merdeka 118 tower in Kuala Lumpur is set to become Malaysia's and Southeast Asia's tallest building upon completion.**

TOP RIGHT: **A distinctive feature of the building design is the use of an 800-mm-thick, 76-m-diameter cofferdam wall as an embedded retaining system. This enabled 17 m of obstruction-free excavation down to the pile cut-off level, and creating this intelligent feature required the supply of a large amount of high-quality concrete.**

The crystalline tower of Kuala Lumpur's Merdeka 118 is set to become Malaysia's and Southeast Asia's tallest building once complete. At 644 m, it will dwarf the nearby 452-m-tall Petronas Twin Towers and overtake Vietnam's 461.5-m-tall Vincom Landmark 81.

This new mixed-use development stands on 19 acres near several of Kuala Lumpur's historically important landmarks, including Stadium Merdeka, where independence was declared in 1957. The tower reflects that concept in both name – Merdeka being Malay for 'independent' or 'free' – and design, with its off-centre spire being inspired by the iconic photograph of Malaysia's founding father Tunku Abdul Rahman and his raised right hand from that famous day.

The project was originally scheduled for completion late last year but was hit by Covid-19 shutdowns that have unsurprisingly pushed back completion to the second quarter of 2022. Of its 118 stories that provide 292,000 sq m of floor space, 83 will be devoted to office use, being situated below the 16 floors of the planned six-star Park Hyatt hotel, and the dual-level observation deck and restaurant.

Designed by Australian architects Fender Katsalidis for PNB Merdeka Ventures Sdn Berhad, the RM5 billion (US$1.2 billion) development is expected to be the first in Malaysia to satisfy the triple green building platinum index accreditations locally and internationally. Phase 3 of the development, which will conclude the project, will see the construction of three separate residential towers scheduled for 2024/2025.

On this high-profile jobsite, a Eurotec concrete batching plant plus flake ice plant are working in tandem to ensure the project remains on course to meet its revised completion date.

Customised concrete plant

One of the first challenges for Lintec & Linnhoff Concrete on the jobsite was installing the Eurotec MZ 6750Ti concrete plant, together with the flake ice plant within the tight confines of the downtown location. To do this the company had to make some key modifications to meet the space constraints, while simultaneously ensuring the plant's high production rate remained unaffected.

"Despite the challenges, our in-house design team came up with a customised engineering solution that met all of our customer's requirements," explained R. Sakthi, CEO at Lintec & Linnhoff Concrete.

"The size and number of the cement-weighing hoppers was increased to produce high-grade concrete based on the customer's mix recipe. In addition, there were four geardrives attached to the shafts of the concrete mixer to enable the plant to handle high-grade concrete with maximum productivity.

"These customisations ultimately increased the plant's efficiency, and improved the consistency of the concrete while maintaining its homogeneity. It also means the plant is able to produce top-grade M105 concrete."

One of the initial tasks for the Eurotec MZ 6750Ti was mixing concrete for the 118-storey tower's foundations. This required pouring 137 reinforced concrete bored piles, each measuring 60 m deep and

2.2 m in diameter. To optimise such a mammoth task, the Eurotec plant worked in near continuous operation. This set the tone for the rest of construction, which has continued at a high pace since construction began in 2014.

A distinctive feature of the building design is the use of an 800-mm-thick, 76-m-diameter cofferdam wall as an embedded retaining system. This enabled 17 m of obstruction-free excavation down to the pile cut-off level, and creating this intelligent feature required the supply of a large amount of high-quality concrete.

"The Eurotec concrete plant is still running at high capacity, typically producing anything up to 200 cu m of concrete per hour to serve the project," said Mr Sakthi. "This is now largely being produced for the upper levels of the development as it progresses through the latter stages of construction."

Eurotec flake ice plant

Working alongside the Eurotec MZ 6750Ti to keep the project on track is one of the company's flake ice plants, which has the capability to produce anything from 10 t to 40 t per day.

Flake ice has low surface moisture and a thin profile which neither sticks nor forms blocks during transportation. This is critical for trouble-free delivery to the mixing plant, explained Lintec & Linnhoff Concrete. The dosed ice also maintains the temperature of the poured concrete within the design limits required during the curing process. This not only allows for faster pouring, but most critically ensures that the concrete used in the Merdeka 118 development cures to the desired strength and quality.

"Having the ice plant is an important part of keeping such a large construction project on schedule and moving forward to the highest quality standards," continued Mr Sakthi. "In the hot climate of Kuala Lumpur, our high-quality flake ice from the plant is able to mix quickly and completely with the concrete. There is no delay in mixing time and no large ice particles introduced into the mix that can otherwise cause voids or quality issues with the concrete."

Mr Sakthi pointed out that "both the Eurotec MZ 6750Ti and the flake ice plant haven't missed a beat in five years of operation, which is a great testament to their productivity and reliability." ■

Website: www.lintec-linnhoff.com

TOP AND ABOVE: **The Eurotec MZ 6750Ti concrete batching plant and the flake ice plant are working in tandem to ensure the project remains on track. One of the initial tasks for the MZ 6750Ti was mixing concrete for the tower's foundations. This required pouring 137 reinforced concrete bored piles, each measuring 60 m deep and 2.2 m in diameter.**

NOTE: More information on the construction of Merdeka 118 tower will be published in the next issue, covering the structural, civil and geotechnical engineering aspects of the project - which were carried out by Arup. The firm has also co-developed a unique high-performance concrete (HPC) with record-breaking pumpability that enhanced the tower's overall constructability, in collaboration with the contractor, SUJV. The HPC also enabled more usable premium space for the client and saved hundreds of tonnes of structural steel, reducing both environmental impact and cost.

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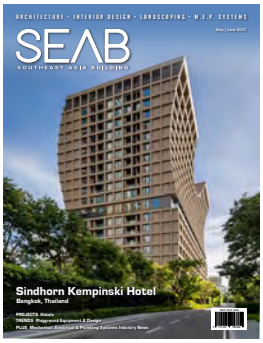

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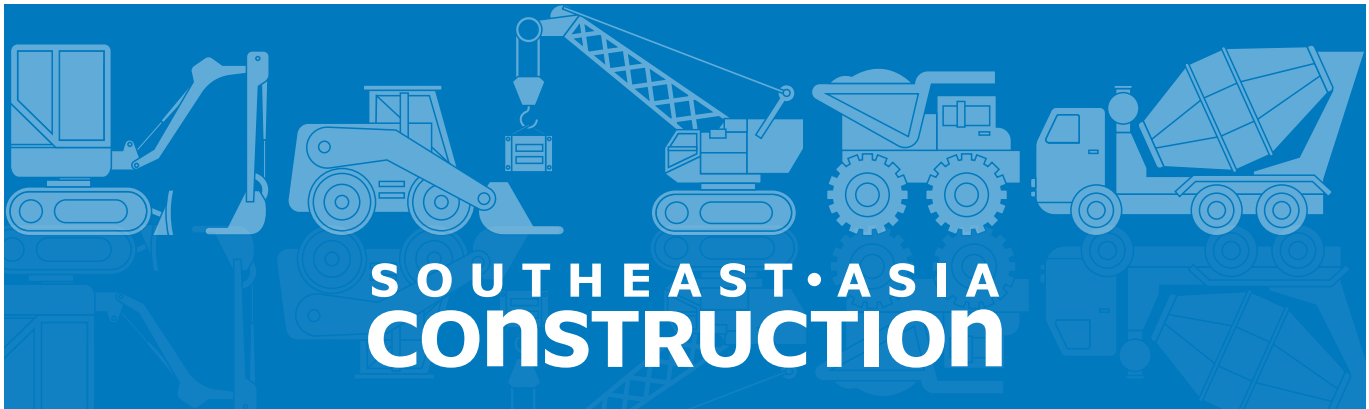

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