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international construction

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REGIONAL REPORT

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COMMENT

All change

I recently attended a conference on digital construction and I have to say that the 'star' of the show was BIM – this is the topic that generated the most conversation and some of the speakers at the event made numerous excellent points. Nick Tune, digital engineering director at Atkins, mentioned that he thought BIM should be short for Better Information Management and talked about the problems with BIM, but also the possibilities. He commented, "It is the Titanic we are moving – a lot has already happened but it does take time. There is no stopping BIM though, it is the future."

Tune said that 30 to 40% of construction costs are due to work having to be redone, which is an area BIM can greatly help with. He estimated that BIM could, quite conservatively, save the construction industry 20% in costs. However, too many companies are said to be using BIM because they feel they should without any clear understanding of what they want to get out of it, and there is often a disconnect in the supply chain, with different sub-contractors using different software. In case you missed it, then have a look at our May issue where we featured BIM in our first construction technology supplement.

This issue of the magazine has our regular regional report, this month on Latin America, and a bonus report on Japan. Both Latin America and Japan have experienced difficulties in recent years but there are reasons to be (cautiously) optimistic about both, although just as this issue was being sent to press it was announced that the M&T Expo in Brazil has been postponed due to a national truck driver strike which has affected a number of essential services.

This is obviously a blow for the construction industry in Latin America, and to all of the companies which had already made their plans to attend the event and booked flights and hotels. Brazil is a region of great potential but there is no doubt that the political situation there is not as stable as it might be – it will certainly be interesting to see the results of the country's general election in October this year and whether a new government can push through the investment in infrastructure the country so desperately needs.

Andy Brown
Editor



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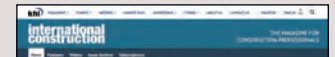
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Japan has endured some tough times but, thanks to Abenomics and the 2020 Olympics, the construction industry is in decent shape, reports Mike Hayes.

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Working in quarrying and mining sites places unique pressures on construction equipment. Manufacturers are responding by producing bigger and more durable machines than ever before, discovers Andy Brown.

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An essential part of many job sites, Andy Brown reports on the latest innovations in the pump sector.

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Following the launch of a new range of hydrostatic bulldozers, Andy Brown spoke to Will Zhu, general manager at Shantui, about future plans.

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An overview of the global equipment market for mining and quarrying.



HIGHLIGHTS

DUBAI The Shindagha bridge project, worth AED 394 million (US\$107 million), has been launched. The bridge – the design of which is based on the infinity sign – will be located in the Shindagha area of Dubai. It is reported that it will be 295m long, 22m wide and have six lanes of traffic on either side.

The bridge is part of the wider Shindagha Corridor project, which is a US\$1.3 billion scheme to improve transport links in Dubai.

US Plans worth US\$1.6 billion to extend the Washington State Convention Centre (WSCC) in Seattle, US, have been given the go-ahead. It is set to be the largest development in downtown Seattle's history.

The design of the WSCC addition will integrate mixed-use developments to enrich the urban diversity of the site, and in support of the local community \$38 million will be spent on affordable housing, \$26 million on improving pedestrian and bicycle paths, and \$10 million towards the nearby Freeway Park. Estimates suggest that up to 6,000 jobs will be created during construction.

INDIA At least 18 people have been killed in Varanasi, India, after a flyover collapsed, crushing vehicles beneath it. The flyover was still being built when portions of its cement structure fell on the road being used under it. It is reported that around a dozen people have also been injured.

The bridge was being constructed by UP State Bridge Corporation. Following the incident, four officials of the UP State Bridge Corporation have been suspended. Issues with buildings and infrastructure collapsing are not uncommon in India – in September 2017 33 people died when a six-storey Mumbai building toppled.

BRAZIL M&T Expo 2018, the largest construction show in Latin America, has been postponed. It was due to take place June 5-8 in São Paulo, Brazil. The decision has been made following a national truck driver strike in Brazil which has affected the majority of essential services in the country, including fuel and food supplies.

Messe Munchen, the organisers of Bauma, have run M&T for the last 30 years as part of an agreement with Sobratema, the association of construction and mining equipment in Brazil that launched M&T Expo.

GLOBAL

San Francisco 'world's costliest place to build'

US-based cities dominate world's most expensive places to build

The US city of San Francisco has been named as the most expensive city in the world for construction projects, according to a report by Netherlands-based consulting engineer, Arcadis.

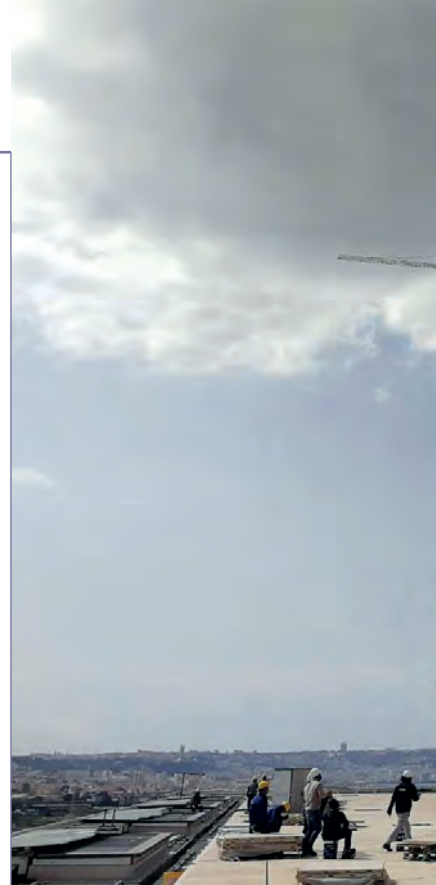
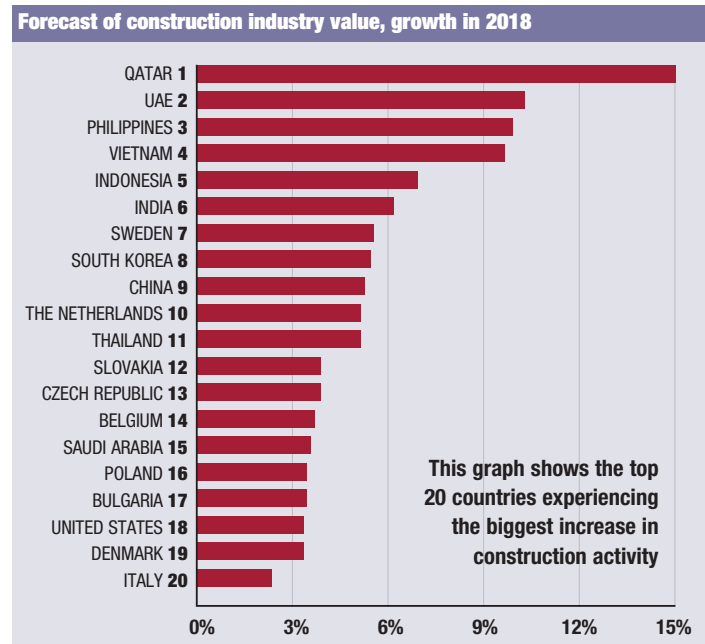
The second most expensive city on the list is New York, with Hong Kong at number three and Toronto and Boston making up the rest of the top five. With four cities in the top five of the list, North America is the world's most expensive region in which to build, according to the report.

In 2017 the table was topped by New York followed by Hong Kong, Geneva, Central London, Macau, Copenhagen, Stockholm, Frankfurt, Paris and Vienna – a more diverse geographical list than this year.

The report stated: "The relative strength of the U.S. dollar is a key factor influencing the positioning of cities in the index this year. The strong dollar places North American cities higher in the index compared to markets where the domestic currency is relatively weaker against the greenback.

"Construction demand growth has also played a key role. Markets where demand is strong typically see price inflation, increasing the costs."

The report also looked at the fastest growing construction markets in 2018. The clear market leader was Qatar, where year-on-year expansion is running at 15% with the UAE second, where growth is 10%. Number three on the list was the Philippines, with the rest of the top ten consisting of: Vietnam, Indonesia, India, Sweden, South Korean, China and the Netherlands at 5.1%.



UK Carillion post-mortem

Reckless greed among Carillion's board members and a "rotten corporate culture" have been blamed for the company's collapse in the final report of the inquiry into Carillion's failure. The contractor employed 43,000 people and its operations were in the UK, Canada and the Middle East.

The report was published by the Work & Pensions and BEIS (the UK government's Department for Business, Energy & Industrial Strategy) committees.

Since the firm's liquidation more than 2,000 jobs have been lost. According to the Official Receiver, PricewaterhouseCoopers, just over 3,000 employees are retained to enable Carillion to deliver the remaining services it is providing for public and private sector customers until decisions are taken to transfer or cease these contracts.

The 30,000 suppliers, sub-contractors and other short-term creditors are unlikely to get back much of the £2 billion (US\$2.6 billion) they are owed.

The report suggested the board of directors were culpable for the company's failure because the problems that caused the collapse were long in the making. The system of internal and external checks and balances completely failed.



EVENTS DIARY

**2018
Bauma CTT Russia**

June 5-8, 2018
Moscow, Russia
www.bauma-ctt.ru

Tower Cranes North America

June 18-19, 2018
Miami, US
www.khl-tcna.com

Hillhead

June 26-28, 2018
Buxton, UK
www.hillhead.com

Intermat ASEAN

Sept 6-8, 2018
Bangkok, Thailand
www.asean.intermatconstruction.com

Concrete Asia

September 6-8, 2018
Bangkok, Thailand
www.concrete-asia.com

**SC&RA
Crane & Rigging
Workshop**

September 26-28, 2018
Louisville, KY, USA
www.scranet.org

**International Rental
Conference (IRC)**

November 26, 2018
Shanghai, China
www.khl.com/irc

Bauma China 2018

November 27-30, 2018
Shanghai, China
www.bauma-china.com

Bauma ConExpo India

December 11-14, 2018
Delhi, India
www.bcindia.com

**2019
World of Concrete**

January 22-25, 2019
Las Vegas, US
www.worldofconcrete.com

Executive Hire Show

February 6-7, 2019
Coventry, UK
www.executivehireshow.com

World of Asphalt

February 12-14, 2019
Indianapolis, US
www.worldofasphalt.com

ALGERIA The Great Mosque of Algiers, which will be one of the largest mosques in the world when finished, is nearing completion.

Featuring the world's tallest minaret, at 265m, the Djamaa El Djazair will offer a 20,000m² prayer hall and a 50m diameter dome.

Construction started in 2012 and is set to be completed this year. Many countries are represented in the build, including Canadian designers and a Chinese contractor. For the 50m dome, Palazzani has supplied a XTJ 52 tracked platform, customised so that it can be fixed on a separate platform, which is mounted on rails attached to the roof of the Mosque. The unit's 52m working height and 19.5m outreach grants access to the dome while the facade is being attached, and for the maintenance and cleaning.

SRI LANKA

China to fund Sri Lankan road

It has been reported that the Chinese government has approved a US\$1 billion loan for a major highway project to be constructed in Sri Lanka.

After a meeting between Cheng Xueyuan, China's ambassador to Sri Lanka, and the Sri Lankan Prime Minister, Ranil Wickremesinghe, it was announced that the funding had officially been agreed. The finance will be provided through the Export-Import Bank of China.

In a statement, the Sri Lankan prime minister's office said Xueyuan had requested that the administrative and legal formalities be expedited by the Sri Lankan side.

After being delayed for more than two years due to lack of foreign funding, construction of the first section of the road will be able to commence imminently. It will link Sri Lanka's capital Colombo with the hill resort of Kandy, which is a popular tourist destination located in the middle of the country. Colombo is approximately 117km away from the capital.

Colombo is recognised as a key hub for Indian cargo. Beijing has been accused of developing facilities around the Indian Ocean in order to secure its own economic interests and increase its influence in order to counter that of India.

AUSTRALIA

Australia backs infrastructure

The Australian Government has announced a \$75 billion (US\$56 billion) investment in infrastructure and transport projects focused on building local communities, connecting regions and cities, boosting productivity, and creating local jobs.

This Budget includes \$24.5 billion (US\$18.5 billion) in funding for new major projects and initiatives that, the government say, will benefit every state and territory. It will be funded by a combination of grant funding, loans and equity investments.

New investments in this Budget include \$1.6 billion (US\$1.2 billion) for new projects in Western Australia, including \$700 million (US\$528 million) towards the Metronet rail project.

There is also a \$1 billion (US\$755 million) infrastructure package for the state of Victoria, including \$500 million (US\$377 million) for regional passenger rail.

In Queensland \$844 million (US\$640 million) has been given for additional projects on the Bruce Highway.

The Government is also establishing a \$10 billion (US\$7.5 billion) transformational National Rail Program to fund rail projects across the nation.

ITALY

New orders for Salini Impregilo

New orders of around €1 billion (US\$1.2 billion) have been acquired by Italian-based contracting group Salini Impregilo since the start of the year. The group's total pipeline of tenders and project initiatives is reported to be over €52 billion (US\$61.9 billion).

Of the new orders acquired in 2018, €450 million (US\$536 million) is accounted for by projects to be finalised, and €150 million (US\$178 million) for variation orders and share increases in ongoing projects.

Among the main projects for Salini Impregilo are the extension of line 14 South, Paris Metro, which is worth €203 million (US\$241 million). The firm also won a contract to extend the Metro line to Orly airport south of Paris.

Lane Construction, part of the group and based in the US, won the contract for the I-85 in South Carolina. The \$181 million contract entails rebuilding and widening Interstate 85. The work is expected to be completed by October 2021.

The €52 billion (US\$60 billion) pipeline of tenders and project initiatives already identified for the company consists of 19% roads and highways, 42% railways, 28% dam, hydro and water, and 11% infrastructure and others.

GLOBAL

Growth for earthmoving equipment

The latest Samoter Outlook report, developed by the Veronafiere trade show, suggests that one million earthmoving machines will be purchased globally in 2020, with North America and China vying for top place.

The Samoter Outlook report, developed in collaboration with Prometeia and Unacea, was presented during the fourth edition of Samoter Day. North America was expected to see 9% more orders in 2020, backed up by investments in buildings increasing by 2.5% per year on average.

In Europe, thanks to average growth in demand for construction equipment of 5% between 2018 and 2020, a return to 2007 levels is expected. The outlook for emerging markets sees construction accelerating in Latin America, with the relative demand for construction machinery estimated at a 17% increase between 2019 and 2020.

The report said that China – the second world market with a 21% market share – was expected to stabilise at around 180,000 units sold, for an average growth rate of 2-3%, effectively bringing it level with North America.

Central and Eastern Europe will post a record of 44,000 machines in 2020 – a rise of 11% – half of which will be bought by Russia. Good growth of approximately 12% is also assumed for India, with 50,000 units expected to be bought in 2020.

CHILE/MEXICO

Astaldi wins contracts in Chile and Mexico

Astaldi Group has been awarded two new construction contracts worth a combined total of €193million (US\$231 million) for projects in Chile and Mexico.

The new construction contracts relate to two projects, the first of which is an Intermodal Hub at Mexico City's new International Airport. The engineering, procurement and construction (EPC) contract is worth US\$350 million, of which €120 million (US\$143 million) refers to Astaldi

US

Strong first quarter from Cat

Sales and revenue jump by 31% and profit per share reaches record level

Caterpillar has announced a 31% rise in its sales and revenues, from US\$9.8 billion in first quarter of 2017 to US\$12.9 billion in the first quarter of this year.

Also, profit per share rose to \$2.74, which was said to be a first-quarter record. Profit per share was \$0.32 in the same period of the previous year. Adjusted profit per share more than doubled, from \$1.28 in the first quarter of 2017 to \$2.82 in the first quarter of 2018.

During the first quarter, Caterpillar's Machinery, Energy & Transportation operating cash flow was \$948 million, and the company repurchased \$500 million of Caterpillar common stock.

CEO Jim Umpleby said, "The combination of strength in many of our end markets and our team's continued focus on operational excellence – including strong cost control – helped us deliver improved margins and a record first-quarter profit.

"Based on our strong first-quarter results and higher demand across all regions and most end markets, we are raising our outlook for 2018."

Compared to the outlook provided in January, Caterpillar increased its profit per share outlook by \$2, to a range of between \$9.75 and \$10.75. This was prompted primarily by growing demand for the company's products and services.

In Caterpillar's construction industries segment, broad-based growth has been forecast in all regions for 2018. This is expected to come predominantly from the continued strength of construction activity in North America and infrastructure development in China.



FINLAND

New CEO at Metso

Finland-based equipment and services supplier Metso Corporation has named Pekka Vauramo as its new president and CEO. The company says he will take up the role by November at the latest.

Most recently president and CEO of Finnair, his CV includes more than 20 years at Sandvik and various senior management positions.

"Pekka Vauramo has a proven track record in leading businesses facing competitive global markets, and he has long and extensive experience in the mining industry and in an international business environment," said Mikael Lilius, the chair of Metso's board of directors. "His experience is a good fit for Metso, which has achieved solid momentum this year with its new and goal-oriented organisation and management team."

Eeva Sipilä, who has held the interim CEO role since February, will continue in that position until Pekka Vauramo joins Metso before returning to her post as CFO.

US

\$1 billion residential plan

A joint venture between Canada-based Brookfield Properties and US-based Park Tower Group is set to co-develop two new rental properties in New York City, US, for US\$1 billion.

The development will be located in Brooklyn at Greenpoint Landing, a nine-hectare site along a 0.8km stretch of East River.

The buildings will house 1,240 units, a third of which will be affordable housing, and as part of the project the waterfront promenade will be extended.

With construction work expected to begin in 2019, Brookfield Properties said the aim was to create a fully-integrated community with housing units, public spaces, parks and a public school.

This development will add to the companies' existing footprint along the waterfront. In total, the two firms are now developing more than 2,000 units across four sites.

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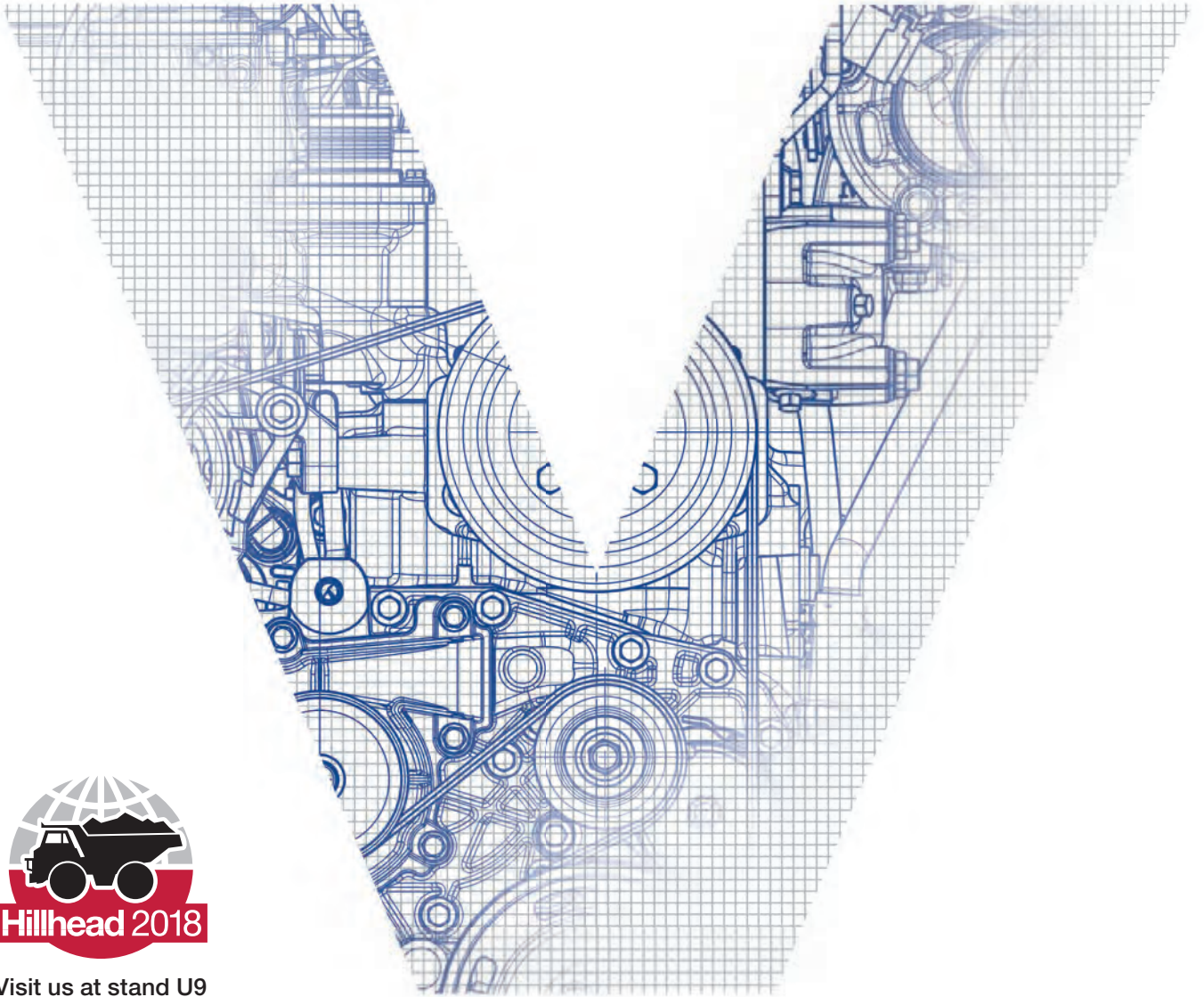
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HIGHLIGHTS

UK UK-based contractor Mace has announced the appointment of its first ever chief technical officer, Stephen Jeffery.

This new role will report directly to Mace's chief executive Mark Reynolds, and will oversee a single technical team that will work across Mace's development, consultancy, construction and operations divisions.

PAKISTAN The Central Development Working Party (CDWP) of Pakistan is reported to have approved 24 development projects worth approximately PKR 19.6 billion (US\$169 million). A further 12 projects worth PKR 781 billion (US\$6.7 billion) have been referred to the Executive Committee of National Economic Council (ECNEC) for further proceeding.

The projects approved include the construction of joint intelligence directorate, while among the projects referred to ENCEC is a plan to improve Pakistan Railways existing main line.

US The American Rental Association (ARA) has projected that the US equipment and event rental industry revenue will grow consistently on an annual basis, resulting in total revenue of \$64 billion in 2022. "The economy is growing somewhat faster than expected and much of that is related to capital spending," said Scott Hazelton, managing director, IHS Markit.

According to ARA, US construction rental revenues are forecast to grow by 6.1% to reach \$36.2 billion in 2018 and to increase by another 5.7% in 2019.

CANADA

Canada gov blocks Aecon acquisition

The proposed purchase of Aecon by CCCI has been rejected by the Canadian government due to national security concerns

A bid by CCCI, a subsidiary of China Communications Construction Company (CCCC) – to buy Canada-based construction firm Aecon has been blocked by the Canadian government.

The Governor in Council issued an order under the Investment Canada Act directing CCCC not to implement its proposed acquisition of Aecon.

John Beck, president and CEO of Aecon, said, "While we are disappointed with the government's decision, Aecon is and will continue to be a leading player in the Canadian construction and infrastructure market."

Through the proposed acquisition, Aecon had hoped it would better position itself to compete with many large global construction companies working in Canada

In a statement made by the Honourable Navdeep Bains, minister of innovation, science and economic development, it was said that the government had listened to the advice of its national security agencies.

"Based on their findings, in order to protect national security, we ordered CCCI not to implement the proposed investment," he said. "Our government is open to international investment that creates jobs and increases prosperity, but not at the expense of national security."

Although Aecon was disappointed by the government's decision, the company said it would be proceeding from a strong position.

"Over the past several months Aecon has secured numerous large-scale projects, has a record backlog, and a significant pipeline of opportunities ahead of it," Beck said.

At the end of the first quarter of 2018, Aecon reported a backlog of CAD\$4.6 billion (US\$3.57 billion) and the company said it expected revenue growth and adjusted EBITDA (earnings before interest, taxes, depreciation and amortisation) margin improvements in 2018.



NEPAL

Work starts on hydro plant

The foundation stone of the 900MW Arun-3 hydroelectric project in Nepal was recently laid by the Prime Minister of India, Narendra Modi, and the Prime Minister of Nepal, Khadga Prasad Oli.

Located on the Arun River in Nepal, the INR7,000 crores (US\$1.03 billion) project is being developed by India-based SJVN through its wholly-owned subsidiary SJVN Arun-3 Power Development Company. The project was awarded on a build-own-operate-transfer basis for a period of 30 years.

Electricity will be exported to India via a 217km-long 400kV double-circuit transmission line.

The dam itself will be 70m tall with an 11.7km-long head race tunnel. Its power house will be underground and will consist of four vertical Francis turbines with a capacity of 225MW each.

The plant is scheduled to take five years to construct, and the project is expected indirectly to boost the development of roads, bridges and other amenities in the area.

AUSTRALIA

Major road development

A consortium has been shortlisted to design and build the Rozelle Interchange and Iron Cove Link as part of WestConnex, the biggest road development in Australia at AUD\$16.8 billion (US\$12.6 billion). The contractor Salini Impregilo leads the consortium.

The Rozelle Interchange and Iron Cove Link, commissioned by the New South Wales Government, foresees the construction of an underground motorway interchange to City West Link and underground bypass of Victoria Road between Iron Cove Bridge and Anzac Bridge with links to the proposed future Western Harbour Tunnel.

This link will connect the new M4 and M5 motorways, providing underground travel for tens of thousands of vehicles every day. Construction of the M4-M5 Link tunnels is expected to start later this year and should open in 2022.

Exchange rates: June 2018

VALUE OF 1:	SYMBOL	AUS	BRL	UK£	CNY	€	INR	YEN	MXN	RUB	SAR	ZAR	KRW	CHF	US\$
Australian Dollar	AUS\$		0.36	0.570	4.86	0.652	51.1	82	14.92	47.2	2.84	9.52	818	0.748	0.758
Brazilian Real	BRL	2.80		0.203	1.73	0.232	18.2	29.4	5.32	16.8	1.01	3.39	292	0.267	0.270
British Pound	UK£	1.76	4.92		8.5	1.14	89.6	145	26.2	82.8	4.99	16.7	1436	1.31	1.33
Chinese Yuan	CNY	0.206	0.577	0.117		0.134	10.51	17.0	3.07	9.71	0.585	1.959	168	0.154	0.156
Euro	€	1.53	4.30	0.87	7.45		78.4	127	22.9	72.4	4.36	14.60	1256	1.15	1.16
Indian Rupee	INR	0.020	0.055	0.011	0.095	0.013		1.6	0.292	0.924	0.056	0.186	16.0	0.015	0.015
Japanese Yen	YEN	0.012	0.034	0.007	0.059	0.008	0.619		0.181	0.572	0.034	0.115	9.9	0.009	0.009
Mexican Peso	MXN	0.067	0.188	0.038	0.325	0.044	3.42	5.52		3.16	0.190	0.638	55	0.050	0.051
Russian Ruble	RUR	0.021	0.059	0.012	0.103	0.014	1.08	1.75	0.316		0.060	0.202	17.3	0.016	0.016
Saudi Riyal	SAR	0.352	0.987	0.201	1.709	0.229	17.973	29.013	5.253	16.600		3.35	288	0.263	0.267
South African Rand	ZAR	0.105	0.295	0.060	0.510	0.068	5.366	8.662	1.568	4.956	0.299		86	0.079	0.080
South Korean Won	KRW	0.001	0.003	0.001	0.006	0.001	0.062	0.101	0.018	0.058	0.003	0.012		0.001	0.001
Swiss Franc	CHF	1.34	3.74	0.76	6.49	0.87	68.22	110.12	19.94	63.01	3.80	12.71	1093		1.012
US Dollar	US\$	1.32	3.7	0.752	6.41	0.86	67.4	108.8	19.7	62.25	3.75	12.56	1079.9	0.988	

For example US\$ 1 = AUS 1.32

World leader once again

By prioritising its investment in infrastructure and setting ambitious goals, India once again stands as a world leader in construction growth, reports **Scott Hazelton** from IHS Global

The pace of India's economic growth will improve in 2018 as domestic demand will continue to gradually recover from the 'double shock' of the government's large-value currency ban in November 2016 and the new goods and services tax (GST) introduction in July 2017.

Tentative improvements in the industrial sector in recent months should gain momentum over the year, supported by recoveries in private consumption and investment, and the resumption of credit flow, given improving liquidity in the banking sector.

A strong rebound in fixed investment growth in the fourth quarter of 2017, combined with recent improvements in credit growth and capacity utilisation, points towards a tentative recovery in business investment that, if sustained, would jump-start a much-anticipated turnaround in the investment cycle from 2018 through to 2019.

The government's and central bank's regulatory efforts through 2016-17 and the government's capital injection plans announced in November 2017 are starting to yield positive results, with the recapitalisation of public-sector banks getting underway. Private consumption will

remain India's major growth driver. During the next five years, Indian households will become the biggest spenders among the G20 countries. A steadily rising number of middle and high-income households, rising urbanisation and improving access to credit will support India's consumer demand.

Indian rupee

However, the Indian rupee will see greater volatility during the next 12 months, as investors' expectations shift between the rising likelihood of faster normalisation of US monetary policy and the growing sense of tightening monetary policies elsewhere, including by the Reserve Bank of India.

The federal budget for the new fiscal year provides for substantial spending increases to stimulate the economy, and infrastructure is a significant beneficiary. Infrastructure has been a focus of the Narendra Modi government; the first Modi budget in 2014-15 proposed around INR1.8 trillion (US\$26.4 billion), growing to a figure of INR4.94 trillion (US\$72.8 billion) last year. The 2018-19 budget calls for a record INR5.97 trillion (US\$87.7 billion) for infrastructure upgrades.

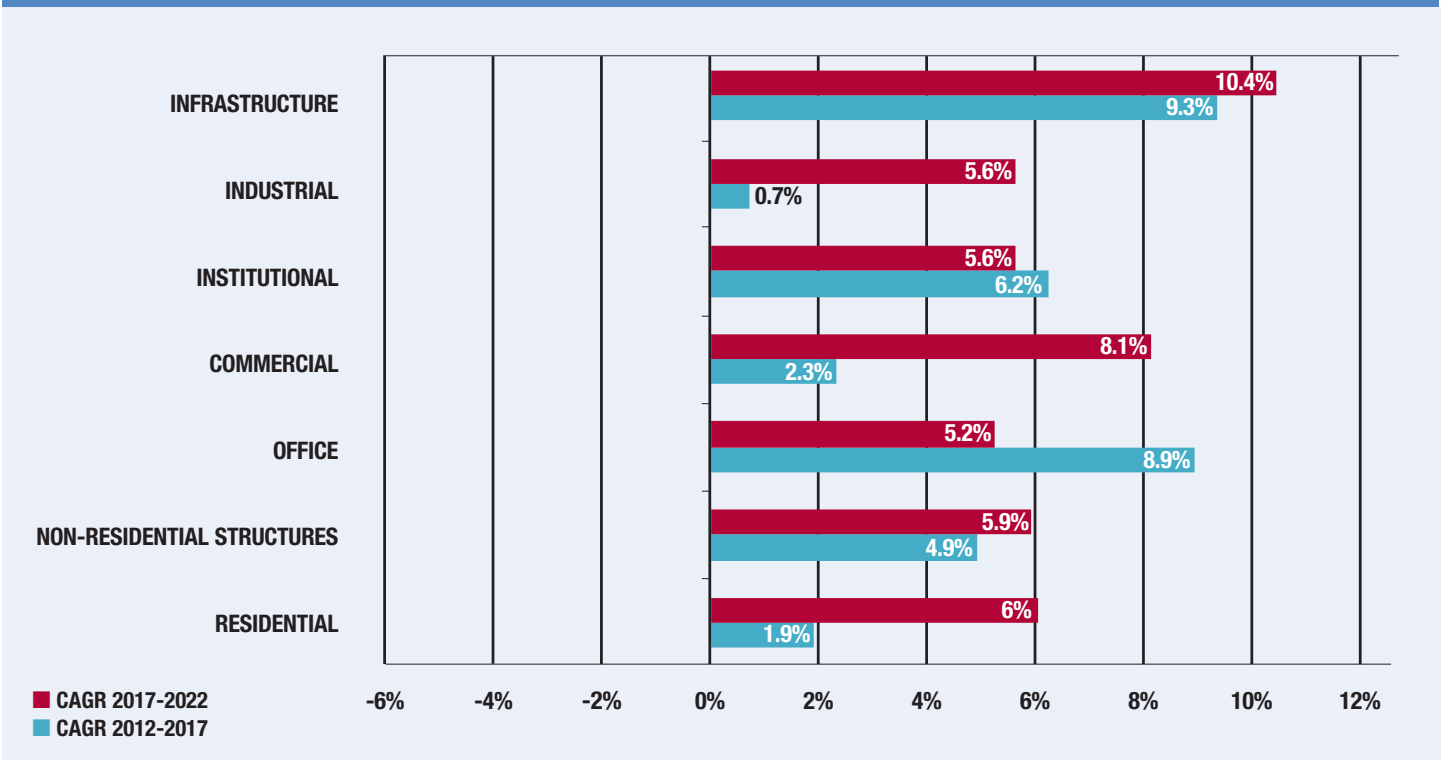
Funding will come partially from a tax on imported fuel, but state-owned firms will also use the equity and bond markets. The Finance Minister also noted that central public-sector assets, such as the Infrastructure Investment Trust (InvIT) and Real Estate Investment Trust (ReIT) would also be leveraged.

Transport investment

Railways have long been core to India's transportation network, and they are set to receive INR1.5 trillion (US\$22 billion), which includes redevelopment of approximately 600 major railway stations. The budget also calls for INR1.2 trillion (US\$17.6 billion) for roads. India's road network comprises 3.3 million kilometers — the second largest network in the world — and is being developed at an aggressive pace. These are maintained by a variety of public agencies, with a goal of 9,000km of national highways.

Given the size of India's government indebtedness, much of the ambitious road building will be completed as public-private partnerships with TOT (Toll Operate Transfer) enjoying success over BOT (Build Operate Transfer) in recent bidding. The government is

Compound Real Annual Growth (Constant US\$2010) by Major Building Type



working on a 'pay as you travel' policy for toll plazas to increase ease of use and acceptance.

India will also invest heavily in airports to accommodate one billion flights per year. India's air passenger traffic has increased at an 18% annual rate for the past three years, and Indian airlines are reported to have ordered more than 900 aircraft. Part of the plan calls for reviving 50 airports at a cost of INR1 trillion (US\$14.6 billion), with additional funds allocated to connect 56 unserved airports and 31 helipads into the national aviation network.

Transportation is not the only beneficiary of the budget with, water supply also a priority. The plan calls for 494 projects to supply water to all households in 500 cities.

The forecast for the residential sector is much improved – over the past five years it has performed at over twice the rate of the global average. The forecast is driven by India's rapid population growth, but also reflects expected strong consumer confidence and spending associated with urbanisation, improving access to credit, government spending (Housing for All), and an expanding middle class with higher demand for housing quality.

Office construction has performed better than most structure types in the country, partly due to India's IT and other service industries. Construction growth will be moderate, but continuing global demand for Indian

professional services, combined with domestic expansion in financial and business services will drive further growth.

Competition

India's industry has been hampered by adverse trade conditions, particularly imports from China, compounded by competition from other low-cost Asian competitors. However, India appears competitive in key industries such as refining and chemicals, and the power sector will become a positive.

The forecast also includes market reforms to boost India's manufacturing industries and export competitiveness to partially offset larger market forces. Commercial growth features the strongest performance in the private sector over the forecast, with expectations that improved consumer spending will boost the critical retail channel, as well as tourism and business travel.

Infrastructure has been a top performing segment over the past five years, and it will become even stronger, given current public policy. There is some risk given uncertain election outcomes in 2019, but there seems a wide understanding that delivering goods and services to the market, and even getting people to their jobs, is critical to continued economic development.

For India to realise its vast potential, the education and health care systems require

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significant investment, which is being addressed.

India's outlook has improved over the past year, as the Modi administration has re-affirmed its pro-investment and infrastructure priorities. Reforms have been slower and less wide-ranging than expected (and needed), yet the resources of India, especially its people, offer tremendous potential. While we do not expect a return to the outsized growth that the country saw a decade ago, India appears to be once again a world leader in construction growth. **IC**

When drilling and blasting isn't an option.



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Latin America has experienced some difficult years with two of its largest countries, Brazil and Argentina, both suffering recessions in recent years. Growth has returned to the region but, as **Andy Brown** discovers, investment in infrastructure is required on a large scale



Infrastructure is the key

Over the last few years, Latin America has watched from the sidelines as other regions experienced economic growth while it stagnated. Using Brazil, by far the biggest country and economy in the region, as an example is illuminating. In 2015, gross domestic product (GDP) was -3.6%, -3.5% in 2016 and in 2017 the country exited recession with growth of just 1%.

With Brazil traditionally making up a sizeable percentage of all South American construction equipment sales, the state of the largest and most populous country in the region plays a significant role regarding the health of Latin America.

The Inter-American Development Bank (IDB) has stated that for Latin America it expects a growth rate of 1.9% in 2018, well below the global growth rate of 3.9%, although this should rise to an average of 2.6% between 2018 and 2020. One of the ways for growth to increase is through infrastructure, an area in which the region, especially Brazil, is lacking.

An International Monetary Fund (IMF) report from a few years ago summed it up by stating, "Brazil's infrastructure stock and its quality rank low in relation to comparator countries. Brazil's rankings have been low over the last decade and have generally worsened over the past five years."

The Brazilian government announced at the end of 2017 an investment of approximately R\$131 billion (\$36 billion) to resume 7,000 construction projects. The scheme, known as *Agora é Avançar* (time to move forward), aims to resume and complete previously stalled works by the end of 2018. The works included in the programme cover areas ranging from education to housing and infrastructure.

One of the biggest infrastructure projects in Brazil is the construction of a 1.5GW combined cycle power plant located near Aracaju in the state of Sergipe, which will be the largest thermal power station in Latin America.

The plant will supplement hydropower during dry seasons and help to meet the increasing demand for electricity in Brazil's Northeast Region. Additionally, the plant is scheduled to deliver power to 26 committed off-takers for 25 years. It is expected to be completed by 2020.

Public-private partnerships

The economic situation is looking much improved in Argentina, with the country's GDP growing 2.9% in 2017, following a 2.2% contraction in 2016. The government's 2018 budget estimated growth this year of 3.5% and a poll conducted by the National Institute of Statistics and Censuses showed that the percentage of respondents expecting the demand in industrial production to rise increased to 45%.

In November 2016, the Argentinian government passed a law permitting public-private partnerships (PPP) for infrastructure projects that would previously have been undertaken by the state. The law includes provisions that limit the state's prerogatives under public law. For example, they limit the state's right to

The Brazilian government announced an investment of approximately \$36 billion to resume 7,000 construction projects, including roads





Brazil's infrastructure is in dire need of investment

An artist's impression of what the Extremely Large Telescope will look like when completed in 2024



Luis Caputo, Argentina's finance minister, has said that PPP construction contracts are a way for governments struggling financially to fund large-scale projects

“ The economic situation is looking much improved in Argentina, with the country's GDP growing 2.9% in 2017, following a 2.2% contraction in 2016 ”

unilaterally terminate a contract, protect private investors and favour financing.

“Argentina and many others are facing both budget constraints and financing constraints,” Argentinian finance minister Luis Caputo was reported to have said at an IMF and World Bank meeting. “It's not a surprise then that PPP programs have taken the lead now in many countries.”

Italian contractor Salini Impregilo has started work on a \$450 million tunnel project in Buenos Aires, part of the biggest public works in Argentina. The 12km tunnel will pass beneath the Riachuelo River and is intended to return urban wastewater to the river, downstream of the planned Riachuelo treatment plant.

The work to be undertaken by Salini includes a 10.5km tunnel with an internal diameter of 3.8m, a 50m-deep load shaft at one end of the tunnel, as well as a return shaft at the opposite end, and a 1.5km-long diffuser system, anchored in the river bed.

The tunnel will be dug at a depth of 40m, in the bed of the river, using a double-shielded tunnel boring machine (TBM) with an internal diameter of 4.1m. In total, Salini anticipates moving around 550,000m³ of earth and utilising 7,000m³ of concrete on the project.

The tunnel development will enable the decontamination of the Riachuelo river basin, which has been affected by industrial activities, including paper mills and tanneries, which have been dumping process by-products into it for many years.

Elsewhere in Argentina, two nuclear reactors are being built at an estimated cost of \$13 billion – the construction is scheduled to take ten years. A new Candu reactor with a capacity of 720MW will be built by Canadian company SNC-Lavalin's Candu Energy unit and Argentina state nuclear company NASA. A second project is for a 1,150MW Hualong One reactor to be built by China National Nuclear Corp (CNNC).

Financing for the projects will be provided by Chinese institutions to the tune of 85%, with 15% provided by the Argentine government.

State-run fund

Plans were unveiled at the start of the year by the Chilean government to create a state-owned company to manage capital for infrastructure projects. The company, Fondo de Infraestructura, will be 99% controlled by the treasury and 1% by the state-developed agency Corfo.

Intended to spur public works investment, by facilitating the state's participation in PPP, and kick-start the

economy, the company will initially have a fund of \$9 billion. It is expected that, by being more removed from political influences, the company will be able to proceed more quickly with contracts for large new projects.

Construction of a different kind is underway in Chile – the Extremely Large Telescope (ELT) is being built in the Atacama desert. Being built at 3,000m above sea level in Chile's northern desert, the driest in the world. The main mirror of the ELT alone will span approximately 39m.

The construction company building the mammoth telescope is ACe Consortium, which consists of Astaldi, Cimolai and sub-contractor EIE Group. Work is expected to be completed in 2024, by which time the entire machine will be 80m high. The telescope mounting and tube structure will have a total moving mass of more than 3,000 tonnes.

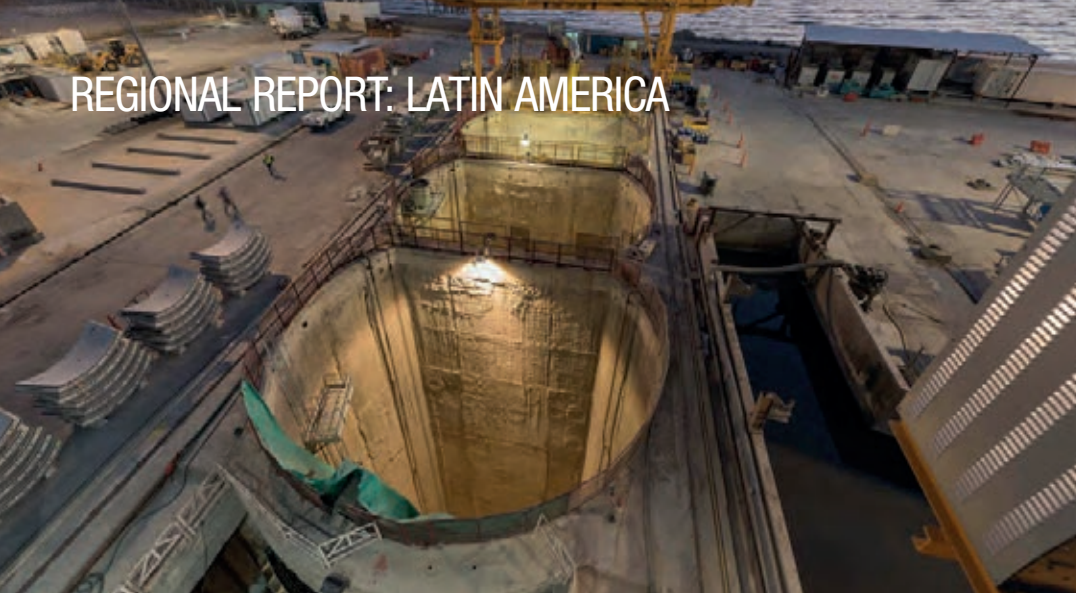
Roads

Columbia has attracted \$18 billion in investment in 32 road toll projects using PPP programmes. One of these is the Bogotá-Villavicencio road concession, which has closed with a financial package of COP1.6 trillion (\$562 million).

The project involves the operation and maintenance of the existing 85km road linking Bogotá to Villavicencio in the south-east, and the construction of

The Extremely Large Telescope is being constructed at Cerro Armazones, Chile





A region of contradictions

An overview of Latin America

Fausto Oliveira, editor of sister magazine *Concreto Latin America*, provides analysis

Latin America is a region of contrasts; construction markets will find huge variations within the range of just a few kilometers.

While the situation in Chile is looking positive since Sebastián Piñera took office for a second presidency and promises to drive capital into large infrastructure spending under PPP schemes, Brazil is still a big question mark. The biggest market in the region has emerged from its worst recession in history, but the unceasing corruption cases and political uncertainties linked to October's presidential election threaten its recovery.

Turning to the relatively big markets of Peru and Colombia, in Peru reactions to the bribery scandal motivated by Brazilian contractor Odebrecht's widespread practices were quick and fiery; in Colombia, things are happening more slowly, and their 'infrastructure revolution' looks more like a moderate reform plan.

Markets in Central America and Mexico are positive, with these countries much less affected by the Odebrecht scheme. Mexico, Panama, Costa Rica, Dominican Republic and Nicaragua have consistently been presenting strong numbers, with steady results in terms of infrastructure and housing improvements.

After almost two decades of economic deterioration, Argentinian president Mauricio Macri got to reset the country, which was translated in huge project finance contracts by the IDB, the World Bank and others. However, years of fiscal disarray and a culture of using American dollars in the internal black market are taking their toll. The current valuation of the dollar is hurting the economy, and Macri has asked the IMF for help.

The Odebrecht scandal has had a large impact on the construction market in Latin American



Italian contractor Salini Impregilo has started work on a \$450 million 12km tunnel project in Buenos Aires
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7,000km of toll roads and require an investment of around COP47 trillion (\$16.5 billion) to construct.

Staying with roads, the government of Paraguay has been granted \$160 million by the Inter-American Development Bank (IDB) for the refurbishment of National Route 9 (RN9). The 761km road – also known as La Transchaco – connects the country's capital Asuncion with the border between Paraguay and Bolivia.

It crosses the economically important agro-livestock region of Chaco and helps to connect Paraguay with the ports of Chile and Peru, making it a key corridor for both intra-regional and global trade.

On average, 1,500 vehicles use the road per day – 50% of which are mid-sized and heavy trucks. The money will be used to improve the stretch between Cerrito and Mariscal Estigarribia.

Another transport project in the region is the Bioceanic Railway Integration Corridor (CFBC). The scheme, which is expected to cost approximately \$10 billion, will depart from the

“ Plans were unveiled at the start of the year by the Chilean government to create a state-owned company to manage capital for infrastructure projects ”

west of South America, in the Peruvian port of Ilo and, after touring the center of Bolivia, will end up in the Brazilian port of Santos. It would effectively cut from west to east across Latin America.

The 3,000km route has been called by some 'the Panama Canal of the 21st century'. The project is still in the planning phase, but Bolivia, Peru and Brazil have all agreed to it, with landlocked Bolivia spearheading the necessary research into the commercial prospects, environmental impact and construction. The project would also make it far cheaper to transport commodities from Latin America to the important market of China. **ic**



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Lukas Gläser conducted a pilot project using BPO software



Ahead of the curb

The demands of clients and lawmakers are driving new technology in road construction, **Thomas Allen** writes

Along with the usual challenges posed by weather, logistics and cost pressures, roadbuilding also faces a growing number of planning and documentation requirements introduced by lawmakers and clients. In response to this, companies are increasingly turning to information technology to help streamline the roadbuilding process.

For a road project on the K2081 in Germany, construction company Lukas Gläser decided to use business process outsourcing (BPO) software from Volz Consulting after conducting a successful pilot project with the technology.

Digital planning

The pilot project was carried out over several days with the aim of seeing how the site could be planned digitally and the job could be controlled by means of a real-time model in order to optimise the logistics.

The required quantity of asphalt was predetermined, then the logistics were planned and the fleet requirements calculated based on the time allotted for installation.

During the construction process the job site, trucks and mixing plant were all connected with each other digitally. This

was done to ensure the uniform loading of the trucks and delivery to the construction site so that the laying of the road was uninterrupted.

One of the greatest advantages of the digital solution was said to be the automated calculation of things such as material consumption and the forecasting of the construction process.

The system was put to the test when the asphalt production was delayed at one point in the process. Lukas Gläser used BPO Live System's algorithms to adjust the plan, and within a few seconds

“ Digitalisation promises to make the planning process faster and the construction process more transparent ”

Milling machines working together using Topcon's 3D model



New launches

A selection of new equipment

Ammann – ART 280 hydrostatic tyred roller

The roller features a modular, easy-load ballasting system that allows a range of ballasting materials – including water, steel, concrete and sand – to be used to adjust the machine's weight from 9 to 28 tonnes in an hour with the help of just a forklift truck. This translates to a load-per-tyre adjustment from 1.125 to 3.5kg.

The machine's air-on-the-tyre system allows easy control of tyre pressure from the cab, and the front isostatic axles with oscillation were said to offer good stability and surface coverage. The front tyres are connected with an isostatic system that allows movement of plus or minus 50mm, and the front axle configuration combines with plus or minus 3° of oscillation for optimal tyre contact in difficult terrain.



A range of ballasting materials can be used with Ammann's new ART 280

Bobcat – two new self-levelling planer attachments

The PSL50 and PSL120 models are designed for use with Bobcat's high-flow compact loaders. The 50cm-wide PSL50 model offers the same features as the existing 60cm-wide PSL60 model with self-levelling, side-shift and tilting, but the size of the PSL50 planer was said to be particularly well suited to the various requirements of fibre optic projects.

The 120cm-wide PSL120 model has the same features as the 100cm-wide PSL100 model and was said to be ideal for road maintenance, where the increased width is reported to provide 20% more productivity. Both planers are fully hydraulic so that all their functions can be controlled from the operator seat. They are compatible with Bobcat's water kit, which also comes in two new versions to match the PSL50 and PSL120.



The new self-levelling planer attachments from Bobcat

Caterpillar – tandem vibratory rollers

With the new 11.8-tonne CB13, 13.6-tonne CB15 and 14.5-tonne CB16, a number of technological enhancements are provided through the Cat Compaction Control option. For instance, the pass-count and temperature mapping systems combine infrared temperature sensors with GPS mapping to keep the operator informed about the temperature of the surface, the machine's position, the pass count and the pass coverage. It was said to enhance night-time rolling pattern performance, as well as recording information that can be used for future process analysis.

The rollers' vibratory system offers a variety of vibratory options including oscillatory vibration, dual amplitude, dual frequency, Versa Vibe, and five amplitude systems. These vibratory systems are complemented by the combination of vertical vibration in the front drum and oscillatory vibration in the rear drum.



The CB15 is one of Cat's three new tandem vibratory rollers

Wirtgen – Operator comfort system (OCS)

Wirtgen's new OCS, which is available on the company's W 200i, W 200, W210, W 210i and W250i milling machines, is intended to maximise the productivity of the equipment by making sure the operator is comfortable. It features a hydraulically moving and swivelling cabin that can be adjusted to the optimum position for the machine operator to have full visibility of the work area.

The entire cabin can be moved hydraulically to the left or right edge of the machine chassis, and swivelled 110° in either direction. Furthermore, the cabin's foot-well area has a glazed floor that gives the operator a direct view of the milling edge. In addition, six cameras are installed to monitor work progress and the images are displayed on two screens in the cockpit.



Wirtgen's new operator comfort system can be swivelled 110° in either direction

the loading, unloading and installation times were automatically adjusted and, at the same time, everyone involved in the project was updated via their smartphones. In this way, digitalisation made the planning process faster and the construction process more transparent.

This was true at Frankfurt airport, where Topcon's SmoothRide 3D technology was used to resurface a 1.4km-long and 31m-wide strip of the west runway in just five days and six nights.

Strabag, the contractor responsible for the works, was faced with particularly tight time constraints since it is the busiest runway at the airport and high traffic during the day meant that milling could only be conducted at night.

The process began with a survey of the area, which was conducted using one of Topcon's RD-M1 scanners attached to the back of a vehicle. It took about three hours to scan the 45,000m² area in 2cm resolution, providing an accurate model of the runway.

The point cloud generated by the scanner was transferred first to Topcon's Magnet Collage software for processing and then to the Magnet Office Resurfacing programme, which was used for the actual planning. The data was then transferred to the milling machines.

By milling with variable depth, the milling machines could be guided by the 3D model to adjust the depth to which they were milling, taking out only as much material as was necessary. In this way, an even surface could be obtained in a single pass, meaning less time was taken and the machines sustained considerably less wear. In total, approximately 16,000 tonnes of asphalt were removed.

Mix Transfer

Elsewhere in Germany, new technology from Joseph Vögele has been successfully used to simplify the transfer of mix between feed vehicles and pavers.

For the modification of an exit road on the B271 federal highway, PaveDock Assistant was installed on a Super 1800-3i paver to simplify communication between the paver operator and the drivers of the feed trucks.

Operated from the ErgoPlus3 console on the paver, it worked on the principle of two signal lights that were used to indicate whether the feed lorry needed to reverse, stop, dump or drive away. The signal lights were positioned high up on the hardtop of the machine so that they could be seen easily by the lorry drivers at all times.

A key advantage of the system was said to be the fact that it eliminated the need for operators to use their horns to communicate, which is a widespread practice that





is not only unreliable but can also annoy local residents and confuse vehicle drivers.

It was reported that the feed lorries did not cause a single jolt on the B271 job site during docking, which could otherwise have affected the screed and left imprints on the freshly-paved asphalt course.

Fleet management

New technology is also being used to improve efficiency and decrease downtime on the \$2.3 billion reconstruction of part of Interstate-4 in Florida, US.

Flagler Construction Equipment, the Volvo Construction Equipment (CE) dealer for Florida, has been using Volvo CE's ActiveCare Direct (ACD) service to help manage the fleet of 70 Volvo excavators and rollers that it has working on the 34km stretch of road. ACD was said to provide actionable alerts that keep the company's machines working consistently hard.

For customers in North America, ACD uses Volvo CE's telematics system, CareTrack, to capture thousands of machine data points and send them, along with real-time machine alerts, to the Volvo CE Uptime Center's fully automated Case Management System in Shippensburg, Pennsylvania. At the centre a team of data analysts and a proprietary system monitor and analyse machine health in real time.

This system has been informing Flagler about machine alerts and what actions are necessary to address any issues before significant downtime or failure occurs. So far with the project, Flagler said ACD had helped it to reduce on-site visits for repairs

“ACD was said to provide actionable alerts that keep the company's machines working consistently hard”

**Vöegele's
PaveDock Assist
was used in a
road project
on the B271
in Germany**

and maintenance by 20%.

Elsewhere in the US, a 32km section of Interstate-93 between Manchester, New Hampshire, and the Massachusetts Stateline is being widened from two to four lanes in each direction, at a cost of \$750 million.

With responsibility for completing the last 19km of paving, US-based Continental Paving is carrying out a range of tasks including reclaiming, milling, on-site crushing and asphalt paving.

The company's work is divided into a number of contracts, one of which is with US-based contractor Audley Construction to lay approximately 130,000 tonnes of asphalt.

Amy Charbonneau from the company said, “We have used our Roadtec Stealth Paver with a Carlson screed for 90% of the work on the project.”

Roadtec's RP-100e Stealth Paver is designed as a low-maintenance gravity-fed paver to be used in tandem with a material transfer vehicle.

Continental Paving has been using a Roadtec SB-2500e Shuttle Buggy material transfer vehicle with a 22.7 tonne capacity to pair up with its Stealth Paver. The Shuttle Buggy



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Roadtec's RP-100e Stealth Paver in action on Interstate-93 in New Hampshire, US

ROAD BUILDING

“ This degree of smoothness was achieved on everything the GP4 paved, earning RGG United a \$70,000 bonus ”

stores and transfers hot-mixed asphalt material from a truck to the paver for continuous paving.

Charbonneau said, “We see that the Stealth is saving on fuel cost and the paver is going to save us approximately 50% in wear part replacement cost on a yearly basis, due to the reduced number of moving parts on the machine itself.”

Smooth pavement bonus

The recently-completed Devil Dog project on Interstate-40 in northern Arizona, US, was the first major project for

**A Topcon
RD-M1 scanner
surveys an area**



The new GP4 slipform concrete paver from GOMACO working on its first major project

GOMACO's new GP4 slipform concrete paver.

The Arizona Department of Transportation chose RGG United as the main contractor to do the concrete slipform paving for 8km of the road's eastbound lanes.

John Kliethermes of RGG United said, “This stretch had grades up to 12% incline and decline, so it was a unique project climbing up and going down. The GP4 handled it well going uphill and pushing the concrete.”

The Arizona Department of Transportation offers an incentive bonus for smooth pavement, for which it uses a profile index with a 2.5mm blanking band to measure smoothness. For this project, this degree of smoothness was achieved on everything the GP4 paved, earning RGG United a \$70,000 bonus.

The GP4 paver features GOMACO's next-generation technology, including a dual-telescoping roller frame with Smart Cylinders and Smart Telescoping for accurate frame widening, and Smart Pivot Arms for leg positioning.

The paver has also been engineered to be easy to transport, and the G+ Connect closed-loop control system allows all the smart accessories and guidance systems for the paver to be easily interfaced. **ic**

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Wacker Neuson's LTV lighting tower is now available in Latin America

Lights,

The spotlight is put on lighting towers and generator sets as **Thomas Allen** reports on these two enablers

While generators are busy working backstage to keep a construction site in motion, lighting towers allow the show to go on even after darkness has long since descended on a site.

According to Wacker Neuson, the two main factors that determine demand for lighting towers are reliability and total cost of ownership. However, the characteristics a customer is looking for can vary from one region to another, as the Germany-based company knows well since it operates in a number of markets around the world.

For instance, while the emphasis in North America might be on extended service intervals that improve total cost of ownership because rental is so important, in Europe there is a greater interest in new technologies and hybridisation.

This diversity is reflected in Wacker Neuson's two most recent lighting tower launches.

Let there be light

The LTS lighting tower was designed to be an affordable offering aimed primarily at markets such as the Middle East, Russia, Turkey and South Africa. It features a vertical mast with a manual winch and metal halide lights. LED lights are available as an added option and it can be fitted with either a Kohler or a Kubota engine.

Meanwhile, the new LTE light tower was said to be more progressive. Aimed at countries in the EU, it has a vertical mast with hydraulic actuation for safety and a Kubota Z482 engine with six 150W LED lights. The lights can either be activated manually, by setting a timer, or by a photocell that recognises when daylight is waning. The company's Automatic Mast Operating Safety System is also available as an option, to prevent the lighting tower from being towed with the mast up.

Aside from these two new models, Wacker Neuson has also announced that its LTV lighting tower is now available in Latin America. With its compact body design and vertical mast, it was said that 18 units could be fitted onto a 14.6m flatbed truck. It also has a service interval of 750 hours.

Since Wacker Neuson has been developing battery and hybrid technologies for other types of equipment, the company said, "Our technical teams are sharing the lessons learned from these projects and it is only a matter of time before the technology is applied to further product groups."

A new lighting tower innovation from Doosan Portable Power

“ The two main factors that determine demand for lighting towers are reliability and total cost of ownership ”

gensets, action!



is the BL600 LED balloon light, which was said to be a versatile, low-noise solution. Packaged in a small and portable bag, the balloon light weighs 12kg in total and was said to only take one person 45 seconds to install using the automatic inflation feature.

With a power rating of 600W, the BL600 requires a small 1kVA generator to operate, and it can be mounted on virtually any piece of equipment – though a tripod is available for stand-alone installation.

It provides a uniform white light that illuminates a surface area of 650m². The light intensity under the balloon at 2.5m was said to be 500 luminous flux (lux), with the maximum lux being 60,000Lm.

The balloon's strong, woven fabric envelope has been designed for use in construction, offering resistance to the effects of adverse weather. It can withstand wind speeds of up to 100km/h.

Generating power

Doosan Portable Power has also extended its range of generators with the introduction of the new G20III A and G30III A.

The G20III A has an output power of 19kVA and is driven by an 18kW Yanmar 4TNV88 diesel engine, which meets EU Stage III A engine emission regulations for generators. The G30III A, on the other hand, delivers 30kVA of power and is driven by a 31kW 4TNV98 diesel engine that also meets EU Stage III A.

During the design phase, it was a priority to offer safe and easy access for the operation and maintenance of the two generators. The electrical control and power compartment was said to be designed to meet high safety, reliability and flexibility requirements. All control functions are grouped together on the 4510 Deep Sea Electronics (DSE) control panel, which displays

critical operator parameters at a glance.

Likewise, ease of operation and maintenance are enhanced on JCB's three new generator sets – the G166QS, G201QS and G221QS. Generators above 60kVA come with JCB's recently updated LiveLink for Power telematics as standard.

Powered by Stage III A JCB six-cylinder engines, they add an emissions-compliant option to the previous G165QS, G200QS and G220GS models. They will be available in Europe until the end of 2020, when Stage V emissions standards will come into effect.

With these additions, which are available with a standard 50Hz output, JCB's standard Stage III A-powered generator range now extends from 20 to 550kVA.

LiveLink for Power allows fleet managers, owners and operators to oversee their generators' operation and health, with real-time monitoring providing data on running hours and fuel consumption. Additional fuel data is now provided for the secondary tank levels, and CO₂ and CO₂E levels can be calculated for carbon accounting.

The generators come fitted with a compact, heavy-steel canopy that has a width of 110cm, allowing two generator sets to be carried side-by-side on a trailer.

Both the canopy and base structure are phosphate-dipped and powder-coated to maximise resistance to corrosion, and the heavy-duty tie-down points, optional side lift points, fork pockets and central lifting eye all make for easier delivery and collection to and from site.

With its 400-litre fuel tank, it was said by the company that the generators can be operated continuously for 12 hours when running at 75% load.

Servicing requirements

With a focus on making maintenance and operation easier, Atlas Copco has introduced a new QAC 1450 TwinPower generator, which is the latest addition to the company's QAC range of containerised generators.

The new G30III A generator from Doosan Portable Power meets EU Stage III A engine emission regulations for generators



One of three new generators from JCB, the G201QS comes with the company's LiveLink for Power telematics



INMESOL POWER GENERATORS

POWER GENERATORS

INMESOL

OVER 30 YEARS DESIGNING AND MANUFACTURING GENERATOR SETS

It is currently present in over 80 countries in five continents with a wide range of equipment that features the latest technology for the most stringent markets, and a steady annual sales growth.

Inmesol was established over 30 years ago out of an initial business project that evolved from a small workshop into a group of companies, the Solano Group, whose flagship is Inmesol.



“ *The company has grown continuously to become one of the world’s leading genset manufacturers.* ”

PRODUCTS

Inmesol designs, manufactures, and markets **highly technically advanced** generator sets, both in open and soundproof versions, **from 2 to 3000 kVA LTP power.**

Its equipment line is diversified into five ranges to meet any energy supply need its clients may have, regardless of their geographical location, **the extreme**

conditions under which the equipment must operate at their facilities, and the **low noise and gas emissions requirements:**

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- IN** INDUSTRIAL
- SB** STAND-BY RANGE
- HR** HEAVY RANGE
- RR** RENTAL RANGE

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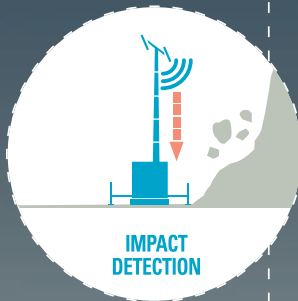
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Clever canopies

New technology used to drive advances



Inmesol's new folding canopy provides greater soundproofing, with new sound traps in the unit

Inmesol has begun to manufacture a new folding canopy, designed for its generator sets rated with prime power ratings of between eight and 15kVA, in both the company's industrial and stand-by ranges.

The new canopy was said to be sturdier and more soundproof than Inmesol's previous design, featuring new sound traps.

The control panel with its DSE controller and power sockets – in both the single- and three-phase versions – were said to remain in the same place as on the previous version, and the tilting canopy is intended to offer easy access to both the engine and alternator.

Meanwhile, Himoin's canopies use a new, heavy-duty external seal made of high-density polyurethane to seal the gaskets on its generator set canopies. This sealant was said to be extremely resistance to ultraviolet radiation, a range of chemical products and extreme temperatures between minus 30 and plus 90°C. It is intended to significantly reduce the ingress of water during heavy rain and snowfall.

Also, the conical lifting hook gaskets and backup gaskets were said to fit together in such a way that water is prevented from entering the generator set when it is working due to the backpressure exerted on the lifting hook.

One optional element is anti-rain protection, which can be included around the frames of the doors of the power board and the side maintenance door to stop water from getting into the engine compartment through the door frames.



It is a 6m-long ISO containerised unit housing two compact 725kVA generators powered by V8 Scania engines with double bearing alternators.

The service requirement was said to be less than two hours of maintenance for every 500 hours of operation, and the unit has large access doors and custom service tools. Due to the twin power concept, a user can still get 50% of the unit's total capacity during maintenance operations.

The QAC 1450 has been equipped with a centralised control and monitoring system to make it easy to use and configure. This is facilitated by two Qc4003 digital controllers that have intuitive touchscreens, and a choice of island or Power Management System modes. For enhanced flexibility, and so that it can tackle larger jobs if that is required, the QAC 1450 has the capacity to run in parallel with other generators or with mains power.

Atlas Copco has also introduced what it describes as an ultra-quiet LED light tower, designed particularly for use in urban and residential areas.

The renewed version of the HiLight B5+ lighting tower was said to produce operating noise levels as low as 55dBA. The tower's floodlights were reported to be able to cover an area of 5,000m² at an average luminosity of 20 lux.

During the equipment's design phase, maintenance and transport efficiency were said to have been a priority. The HiLight B5+ requires a service after every 600 hours of operation, and the maintenance procedure has been made easier by the introduction of wide access doors and the improved layout of key internal components. Also, the lighting tower's compact

Atlas Copco's new QAC 1450 TwinPower generator was said to be particularly well suited to Modular Power Plant applications

“ It was a priority to offer safe and easy access for operation and maintenance ”



The high-density polyurethane used to seal the gaskets on Himoin's generator sets enables them to withstand heavy rain and snowfall

PORTABLE POWER & LIGHTING

“ The system features in-built sensors that detect adverse environmental conditions and automatically lowers the vertical mast when the equipment’s stability is compromised

The renewed version of Atlas Copco’s HiLight B5+ lighting tower offers an average luminosity of 20 lux

Engines for energy

Powering construction sites

John Deere Power Systems

The company recently launched a new compact 60kVA engine as part of its new, updated range of G-Drive engines. The range now covers all recognised power nodes from 30 to 500kVA, enabling OEMs to use John Deere’s engines across their range of generator sets.

The engine’s volume was said to have been reduced by 23% compared to the previous model in this node, moving from four to three cylinders. Other downsized nodes are the 120kVA, which has been reduced from six to four cylinders, and the 250kVA, reduced from six-cylinder/9-litre to six-cylinder/6.8-litre.

This was done with the intention of lowering the cost of logistics and making it easier for equipment manufacturers to integrate the engines into their generator sets. Other new nodes introduced in 2018 include the 200kVA and 225kVA 6.8 litre.



John Deere’s downsized engines are intended to provide OEMs with more freedom in machine design

Volvo Penta

In Lebanon, the main electricity supply can be unstable and power cuts are a common occurrence, according to Volvo Penta. As a result, the company was asked by Lebanese electricity supply company Ishtirak El Hassen to help develop a generator that it could use to supply small companies, offices and homes with a reliable source of electricity.

To this end, Volvo Penta produced the new 16-litre TWD1645GE engine and then turned to its Lebanese business partner Khonaysser Motors to install it in a prototype generator set.

The generators needed to be able to operate for up to 24 hours continuously, and for a total of more than 6,500 hours per year. Field testing of the units started in 2017.

Ronald Youakimian, technical consultant at Khonaysser Motors, said, “It has been running trouble-free over the past year with only minimal intervention from our staff to cover routine maintenance. The dual-circuit cooling system is perfectly adequate for our climatic conditions. Technically supporting this product has been an easy job.”

Volvo Penta’s TWD1645GE has the same engine base as previous models but was said to leverage more power. It was designed to perform in harsh environments and was described by Volvo Penta as compact and easy to install. Its reduced fuel consumption helps to lower the total cost of ownership.



The generator set with Volvo Penta’s TWD1645GE engine, developed for a Lebanese electricity supply company Ishtirak El Hassen



Himoinsa’s new Apolo AS4005 Eco lighting tower weighs 600kg

dimensions allow up to 22 units to be carried on a single 13m-long truck.

The HiLight B5+ can be equipped with Atlas Copco’s SmartMast, which features in-built sensors that detect adverse environmental conditions and automatically lowers the vertical mast when the equipment’s stability is compromised, for example by high winds. The system is also programmed to alert users to potential obstacles and impacts, and it can provide stability assistance during installation.

A more compact lighting tower has been introduced by Himoinsa. Weighing 600kg and measuring 2331x1381x2842mm, it was said that up to 22 Apolo AS4005 Eco units could be transported on a trailer or in a 12m container.



The new lighting tower has two 500W LED spotlights that provide a light output of 120,000 lumens while consuming 0.83 litres of fuel per hour.

It is powered by a 4.5kVA Yanmar engine and a Meccalte alternator, and its 114-litre fuel tank allows the tower to run for 137 hours without the need to re-fuel.

When the generator is working at 100% load in addition to the lights being on, its fuel consumption is 1.7 litres per hour and it has a continuous running time of 67 hours. **IC**

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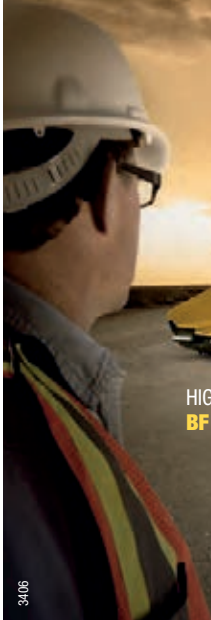
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The construction industry has embraced the use of drone technology to make their processes quicker and easier. Here are five helpful tips to consider when picking the right drone for the right project, as the team from Microdrones explains.



Picking the right drone

Compared to the majority of construction equipment which makes up a job site, such as dozers, excavators, dump trucks and wheeled loaders, drones are tiny; but they're making themselves known on the modern construction site, and maximising user value. A strong case can be made to say that drones have quickly become a flying superhero of the jobsite; before, during and after a project.

From initial planning all the way through to final inspection, drones provide a safer way to collect geospatial data and imagery when compared to conventional methods that might be dirty, dull or even downright dangerous.

The Microdrones mdMapper1000DG system has been getting some very healthy press as of late, by proving its might to both planning and construction pros alike.

If using drones for this type of work inspires you to make drones a part of your workflow, then the question becomes, 'How do I choose the right drone mapping package?'

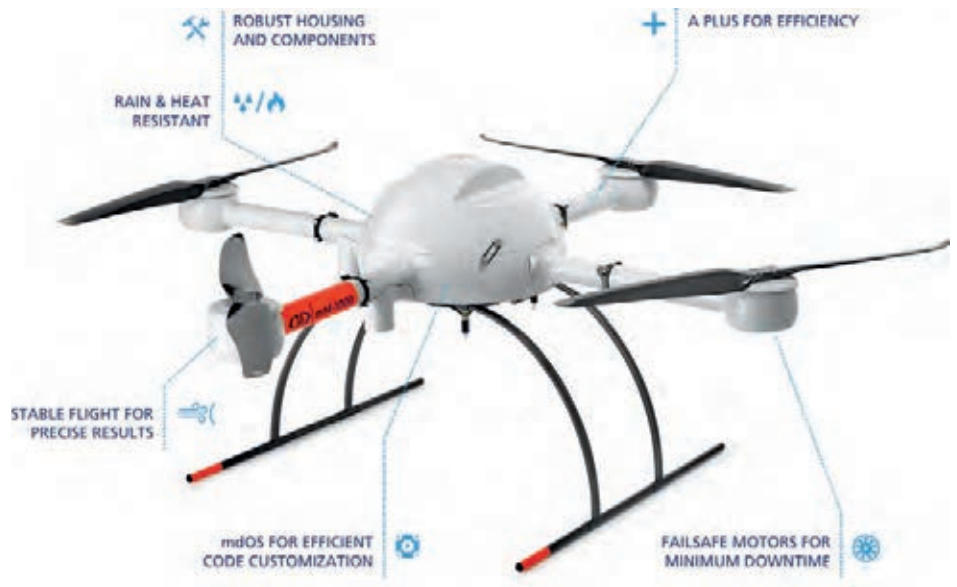
There are many things to consider when purchasing a drone mapping package for construction purposes. Here we provide an outline of five key considerations that all those involved in working on a construction site must consider before making that all-important purchase.

Key considerations

1. ENGINEERING QUALITY

Construction is tough on technology. The average building site is host to large temperature fluctuations, windy conditions, sand clouds, debris, and many other environmental challenges. That's why choosing a quality product with professional engineering standards is not just important – it is absolutely essential.

Look for drones that have long flight times and manufacturers that will demo their product for you



Key benefits of the Microdrones UAV platform make it a strong choice for the rigors of daily field use





A Microdrones mdMapper1000DG system, on the job outside of Atlanta, Georgia in the US

for your job

2. DATA ACCURACY

Not all data mapping technology is created equal. Look for unmanned aerial vehicle (UAV) solutions that have a track record of successful mapping and that have been designed and integrated for professional applications. A mapping drone package is a serious business tool, and should be purpose built for work.

3. VEHICLE DESIGN

Quadcopters are best suited for construction professionals. Microdrones systems use a four-rotor design for maximum stability and the big, low RPM motors provide plenty of power while making efficient use of battery power – absolutely essential if the drone will need to be in the air for a long period of time.

4. COST

Regardless of your business, there is a well-worn saying from Benjamin Franklin: “The bitterness of poor quality remains long after the sweetness of low price is forgotten.”

Many UAS novices try to get started with an ill-suited drone platform or mapping package



that was derived from recreational, hobbyist or ‘prosumer’ platforms. When using a drone for serious work, you need a serious solution that was purpose built to deliver a specific geospatial result. It really isn’t worth trying to take a short-cut with this.

5. FLIGHT TIME

There is a good argument to be made that this is the most important, and the most overlooked criteria of all. Right now, all drones eventually need to land for a re-charge, and you want a system that keeps track of where it left off. This makes the flight time metric extremely important because it is a direct reflection of the usability of the device.

Construction sites are often big and UAV mapping, inspection, and aerial photography takes time. Flight time can also be affected by temperature, wind, and payload among a host of other issues.

Look for drones that have long flight times and manufacturers that will demo their product for you. Many manufacturers give ‘best case’ times that often differ vastly from actual results in the field.

Conclusion

Drones are the future of the construction industry. Whether you are surveying land, monitoring a job site, or inspecting a new structure, having a reliable drone on hand makes the task quicker and safer. Microdrones is a commercial UAV leader with a detailed mapping system, the ability for long flight times and interchangeable payloads. We pioneered the commercial quadcopter and work with clients in the construction industry around the globe.

■ To find out more about Microdrones and to talk to one of their experts visit: www.microdrones.com



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A learning curve

Japan has endured tough times since its 1980s boom. Now, both economically and politically, there is a feeling that change is coming, as **Mike Hayes** reports

It is impossible to begin an overview of the Japanese construction market without recalling the horrific events of March 2011, when an earthquake measuring 9.0 on the Richter scale whipped up a tsunami that laid waste to much of the country's northeast coast.

Waves that reached heights of 18m hit low-lying areas and the cost of the destruction caused, let alone the human tragedy, is still being counted to this day. From a global perspective, the partial meltdown at the Fukushima Daiichi Nuclear Power Plant was perhaps the most devastating aspect of the disaster – an event which, along with the high cost of importing gas, led to Japan stepping up its plans to switch its focus to the development of renewable energy sources.

As early as 2013, an experimental wind turbine was installed, some 20km off the coast of the Fukushima nuclear plant – a first step on the road to what is expected to be, when completed, the world's largest offshore wind farm.

New legislation was recently introduced, aimed at identifying offshore wind energy development zones and laying out codes of best-practice for developers. Perhaps strangely, given Japan's reputation for advancing technology, a number of significant land-based wind power projects are currently being built by the US-based firm, Pattern Energy. Pattern has just completed construction of the Ohorayama Wind facility on the island of Shikoku, which comprises 11 3.0MW wind turbines. Ohorayama



The 2MW experimental wind turbine that was floated off of Japan's northeast coast in 2013



will operate under a 20-year power purchase agreement with the Shikoku Electric Power Company.

Pattern's CEO, Mike Garland, said, "Ohorayama Wind is our first wind project in Japan to complete construction and it was on schedule and under budget." He added, "Ohorayama will be followed by the Tsugaru project, which has started construction and will be the largest wind power facility in Japan when it's completed in 2020."

Including Ohorayama Wind, Pattern Energy has five renewable energy facilities in Japan, including four in operation and one currently under construction. When completed, the facilities will total 206MW

of owned capacity.

Just 20 months after the earthquake, which precipitated this race to renewable energy – and a full-blown recession – the country welcomed a new prime minister, Shinzo Abe, who promised to awaken the sleeping giant of the Japanese economy.

Early in 2013, Abe introduced what is widely known as Abenomics, a programme based on 'three arrows' of policy: monetary easing, fiscal stimulus and structural reform. Its initial goal was to boost domestic demand and the growth of gross domestic product (GDP), while raising inflation to 2%.

While the road to growth has been long, slow and not without its potholes, the International Monetary Foundation (IMF) declared Abenomics a success in June last year, with Japan having enjoyed its longest sustained run of growth in more than a decade, and seen unemployment fall to just 2.8%.

That said, many believe the original economic stimuli of Abenomics have now worked themselves out of the economy, and that a reboot is required. This could certainly be true in the construction arena, where the spike that was seen was due as much to the raft of post-tsunami reconstruction activity as to Abe's programme.

Recent figures from industry analysts Off-Highway Research (OHR) show a now fairly flat economy and equally flat sales of construction equipment in the country.

Japanese OEMs, on the other hand, have seen business picking up, although this is largely down to their interest in construction markets in other parts of the world. OHR reports, however, that total equipment sales in Japan rose 14% in 2017, thanks in no small part to a sharp rise in the crawler excavator segment.

Workers survey the ruined reactors of the Fukushima Daiichi nuclear plant



Re-construction work on a hilltop overlooking Rikuzentakata, a city flattened by the 2011 tsunami



According to *International Construction's* own Yellow Table data, Japanese companies now account for 24.8% of the total revenues from the world's top 50 manufacturers. That puts Japan behind the US, the world's largest economy – but only by 1.5%.

In fact, Japan's construction equipment manufacturers are currently in pretty good shape, with 12 of them making it into the Yellow Table: Komatsu, Hitachi, Kobelco, Kubota, Sumitomo, Tadano, Kato, Takeuchi, Aichi, Furukawa, Yanmar and Sakai.

Hitachi, ranked number three on the list, saw its revenues for the third quarter – from October to December 2017 – rise 6% year-on-year, to JPY2.3 billion (\$21 billion). Its adjusted operating income stood at JPY171.3 billion (\$1.57 billion), a 22% year-on-year increase.

Elsewhere, Komatsu's recently-published financial results also showed strong growth, with consolidated net sales of JPY2.5 billion (\$22.9 billion), representing an impressive 38.7% rise on the previous fiscal year.

Describing a successful year, Komatsu said, "In the construction, mining and utility equipment business, sales expanded sharply from the previous fiscal year". The company confirmed that it had, "capitalised on demand in China, Indonesia and many other countries".

One problem for all industries in Japan, but particularly for construction, is that the country's ageing population has led to a declining workforce. The number of people in the country aged between 16 and 64 has been shrinking for five consecutive years and the job market is now incredibly tight. The need for more construction workers is great, given the ongoing disaster-affected towns along the east coast and the huge amount of building work taking place for the upcoming Tokyo Olympic Games.

2020 Olympic Games

Another problem related to the Olympics is the spiralling cost of construction. In 2015, Abe announced that plans for the centrepiece Olympic stadium were to be scrapped, as the cost of its construction had topped \$2 billion. Whether the fact that the competition-winning stadium design had been likened to both a bicycle helmet and a "turtle waiting for Japan to sink so it can swim away" had anything to do with the decision is debatable, but the cost implications certainly caused a public outcry.

Having taken advice on the feasibility of a totally new stadium being built in time, Abe said, "I have made a decision to take the plan back to square one and reconsider."

A second contest was launched and a design from Japanese architect Kengo Kuma was selected. With its latticed timber frame, the total cost of the new stadium has been set at a slightly

Kato's good news story

Strong order book for Japan-based crane company

Japan-based crane-maker Kato insists that not all construction equipment is heading overseas.

The firm unveiled its new 300-tonne all-terrain crane, the KA-3000, last summer, and has since delivered a total of seven units, four of which went to customers in Tokyo, Hokkaido, Kyushu and Okinawa.

Kato said its current order book was challenging its production capacity.

The KA-3000R was said to be equipped with the longest fully-powered telescopic boom on the market, and boasts a hydraulic powered luffing & telescopic box type jib, as well as a lattice jib for heavy lifting.

Kato said the KA-3000R's new counter weights make the crane easier to handle, and stated it has upgraded "all popular and useful functions according to latest technologies".



Kato's KA-3000R all-terrain crane

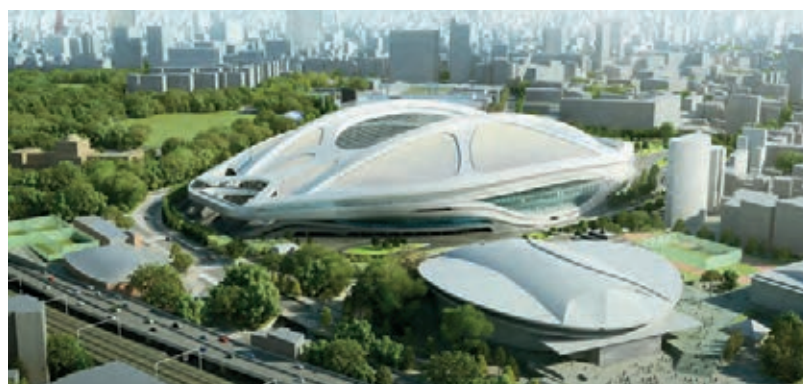
less eye-watering \$1.2 billion and, with the project having broken ground in December 2016, the government was said to be "certain" it will be completed on schedule.

Interestingly, the stadium project coincides with another in which wood has been approved as the basis of a major building. Sumitomo Forestry has developed plans to build the world's tallest wooden structure in Tokyo, the so-called W350 tower, which is slated for completion in 2041.

The 350m high-rise will have 70 storeys and a total floor space of 455,000m² dedicated to a mix of shops, offices, hotels and residential property. It will be 90% wooden and will use a braced tube structure in which steel frame vibration control braces are positioned inside a column and beam structure. In total, some 185,000m³ of timber will be used.

On the face of it, the project has clear environmental benefits but, at a total estimated cost of JPY600 billion (\$5.6 billion) – approximately double that of a similar high-rise building constructed using conventional materials and technology – the financial case cannot be so easily made. With that said, it is expected that technological development over time will bring the cost down and the merits of reducing the carbon footprint are clear.

The original design for Tokyo's 2020 Olympic stadium, which was scrapped when the budget hit \$2 billion



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JAPAN

“ With the project having broken ground in December 2016, the government is "certain" it will be completed on schedule ”



Sumitomo Forestry's W350 tower will be the world's tallest wooden structure when completed in 2041

The cost of construction in Japan has been a hot topic for a number of years, and not just for large buildings and civil engineering projects. The cost of housing in Japan has also been a cause of great concern, especially among younger buyers.

Unlike in most other countries, homes in Japan depreciate over time and become virtually worthless after around 30 years.

This is partly due to the prefab nature of the construction, but also to the constant revision of building codes to improve earthquake resilience. Many Japanese people, however, dislike the notion that their houses should be knocked down after 30

years. While there have been scandals in recent times, such as that concerning the piles driven for condominiums by Asahi Kasei Construction Materials, there is nonetheless a general sense that buyers are looking for more permanency in their homes.

Japanese homes may have a shelf-life of only 30 years, but 30 years will be too long for the Japanese economy to remain in the doldrums. Whether or not the multi-faceted approach of Abenomics can turn the tide remains to be seen. **IC**

Kengo Kuma's \$1.2 billion design for the National Stadium will have a latticed timber frame



Crisis or opportunity?

Economic confidence is growing, despite some scandals



Japan's under-fire PM, Shinzo Abe

Japan is at something of a tipping point. Shinzo Abe is under political attack and his popularity is on the wane following a recent land-sale scandal. Many of the country's major corporations have held their hands up to illegal undertakings, including Kobe Steel, Nissan, Subaru and Mitsubishi Materials.

Now, the country's top construction firms have been thrust into the spotlight, over bidding on the JPY9 trillion (\$82 billion) ultra-high-speed maglev train project. The biggest of them, Obayashi, recently admitted wrongdoing and saw 7.6% wiped off of its shares on the Tokyo Stock Exchange.

Yet, at the same time, confidence in the economy among Japanese businesses is improving. According to the Bank of Japan's December Tankan (Short-Term Economic Survey of Enterprises), large manufacturers' overall assessment of business conditions improved for the fifth straight quarter, hitting an 11-year high of +25. The confidence index among small and medium-sized businesses reached +15, the highest level recorded since August 1991.



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Serious machines



With quarrying and mining sites placing unique demands on construction equipment, manufacturers are responding by producing bigger and more durable machines than ever before, reports **Andy Brown**

Many construction sites can be harsh and unforgiving places, but quarrying and mining sites surely sit towards the top of the list when it comes to demanding conditions for equipment. The machines used must be robust enough to withstand the conditions and be able to work for long periods without a rest – all while remaining as fuel-efficient as possible.

In a recent interview conducted with Volvo Construction Equipment (Volvo CE), Chris Sleight, managing director of Off Highway Research commented that 2017 saw some signs of improvement for surface mining equipment, but that the market is still a long way off what it once was.

“If we use the global rigid hauler market as a proxy for the health of the mining segment, during the recent peak around 2012 global demand was about 5,500 units a year,” commented Sleight.

“When commodity prices collapsed,

The Liebherr L 586 XPower loading a truck at Hanson’s St George Quarry in Wales

2,100
Number of off-road rigid dump trucks sold around the world last year. In 2012 the figure was more than 5,500

SOURCE: OFF-HIGHWAY RESEARCH

this fell very steeply to barely above 2,000 units in 2015, 2016 and 2017, which looked like the bottom of the cycle. It was a deep and prolonged low – but we think that we are now seeing a slow recovery forming. Notwithstanding the huge Asia-driven surge in sales last year, we see a period of slow and steady single-digit growth – in both construction and quarrying and mining.”

One of a variety of machines designed specifically for the tough conditions of the quarrying industry is Liebherr’s series of XPower wheeled loaders for quarrying applications in highly regulated countries across Europe and North America. At the heart of the XPower machine concept is the Euro Stage IV emissions standards-compliant power-split driveline. The company also offers a separate product range for less- and non-regulated countries.

Topping the range of Liebherr wheeled loaders, the L 586 XPower has recently started to work in a number of quarrying operations in North Wales, including at Hanson Aggregates. The 33-tonne wheeled loader has been supplied with Z-bar linkage on a high-lift arm arrangement that was said to give an effective load over a height of 4.5m. The high-lift arm arrangement also enables the loader to service the 50-tonne rigid dump trucks used at the quarry should the need arise. It has also been equipped with a 6m³ straight-edged bucket with a bolt-on replaceable cutting edge.

The DL580-5 has reinforced Z-bar kinematics for heavier lifting with few moving parts

The LiuGong 950E comes equipped with a Cummins EPA Tier 4 final 6-cylinder straight Variable-Geometry Turbocharger (VGT) engine



Robust machines

When Danliz Plant Hire in South Africa took a contract to move tonnes of material per hour for Tharisa Platinum Mine, they



Milestone for Cat

The 5,000th Cat 793 Mining Truck has recently been assembled

Caterpillar recently completed assembly of its 5,000th Cat 793 Mining Truck. Caterpillar's own data shows that the figure exceeds the manufacture of any other brand of 250-ton (227-tonne) size class truck. In production since 1991, truck number 5,000 represents the fifth generation of the 793.

"The 793 Mining Truck is the core of Cat surface mining vehicles," said Jean Savage, Caterpillar vice president with responsibility for the Surface Mining & Technology Division. "The 793 has been an integral part of making Caterpillar the leading supplier of surface mining equipment."

The 5,000th 793 truck will be delivered to a mining customer in Australia. The largest numbers of 793 trucks are operating in Australia, North America and South America where the trucks work to mine iron ore, copper, coal, gold and other minerals.

The 793 has built a strong reputation for durability. One of the longest-running 793 trucks was built in 1992 and has accumulated around 173,000 operating hours in a US mine.



The longest running 793 is said to have clocked up 173,000 operating hours



The R100E is said to be built for all surface mining and quarrying applications

needed to add to their heavy construction equipment, which included four LiuGong 856 loaders. Owner of Danliz Plant Hire, Daantjie van der Merwe, commented, "That time, as the management of the company, we decided to buy the first ever LiuGong 950E in South Africa."

After purchasing two 950E excavators, Danliz added a 970E — the first ever model manufactured in that range by LiuGong. The 970E was said to be in operation for much of the working week and, according to Danliz Plant Hire, reached almost 2,000 hours in less than seven months. The excavator also has a strong air conditioning unit in the cab — something that is very important for working in Africa.

Volvo CE is seeking to become a heavy hitter in mining and quarrying with the launch of the new 95-tonne R100E, the largest hauler in the company's line-up. The R100E is built for all surface mining and quarrying applications, and Volvo CE said that customers could expect to spend less per haul with the R100E, which features a 60.4m³ capacity V-shaped body for optimum load retention and minimal material carry-back.

The R100E also focuses on operator productivity and features a ROPS/FOPS certified operator cab, which was said to offer reduced vibrations and exterior noise, and it is fitted onto



The interior of Doosan's new DA30

viscous-type isolation mounts for greater ride quality. From the operator seat, located on the left side of the cab, the operator can observe the job site and surrounding areas through the large glass area and a low rake windscreen.

New models

Doosan has launched its top-of-the-range wheeled loader, the Stage IV-compliant DL580-5. The new model has a bucket capacity of 5.7m³, an operating weight of 36030kg and higher static tipping loads (straight/full turn 40°) of 29,700 and 26,200kg, respectively.

The DL580-5 has reinforced Z-bar kinematics for heavier lifting with few moving parts. This design was also said by the company to help stabilise the loader, enabling rapid bucket movements. As with all Doosan DL-5 models, the DL580-5 is also available in a high-lift configuration, with a longer arm enabling higher dumping of materials. The DL580-5 incorporates all of the new safety and ergonomic features announced for the other six large Doosan wheeled loaders.

The company has also launched a new version of the company's DA30 30-tonne class articulated dump truck (ADT). Most of the changes are aimed at enhancing operator comfort and the controllability of the machine, but there are also changes in the driveline and electrical systems. The most important development is in the suspension, which has been upgraded to a hydro-gas self-levelling system to provide better performance and shock absorption, especially when the truck is being driven when it is empty.

With equipment working in conditions that can easily damage the machines, it is very important that they are easy to service. Doosan said that in the new version of the DA30 there will be lower running costs as there are a reduced number of service points, fewer different oil types in the driveline and increased intervals for transmission oil change.

Customer demand

Construction equipment manufacturer Bell Equipment said it had produced a new range of articulated 4x4 trucks due to customer demand. Following the introduction of the 60-tonne B60E two years ago, this year's focus was on the B30E 4x4. The new two-axle truck was said by the company to offer





advantages for operations that do not require extreme 6x6 off-road capability.

“The Bell B30E 4x4 is an alternative for smaller quarries or other operations within the aggregates sectors. Without the typical tyre scuff that a three-axle ADT experiences when operating on harder surfaces, the articulated two-axle concept guarantees substantial savings in tyre wear,” said Tristan du Pisanie,

A Hitachi ZX 350LC hard at work on a quarry in Bulgaria

11,500 units

Expected number the global off-road hauler market is expected to reach in 2018, compared to 8,500 last year

SOURCE: OFF-HIGHWAY RESEARCH

ADT product marketing manager at Bell.

Three new Caterpillar articulated trucks – the 730, 730 EJ (Ejector) and 735 – have been extensively redesigned. For instance, the design of the 730 and 730 EJ has been enhanced with automatic retarder control and a hill-start feature. The 735 retains these features from its C-Series predecessor and further incorporates significant design refinements that include a new Cat C13 ACERT engine, Cat CX31 transmission,

and structural and dimensional modifications that were said to reduce empty weight by 22%.

The cab’s new external ‘spinal-ROPS’ design incorporates a rear-quarter glass pane that eliminates a structural pillar in the C-Series design, for enhanced rear visibility. A new ‘wake-up’ feature initiates the machine’s displays when the door is opened. The door is of a lighter, stronger design with a shut-assist feature for improved sealing against dust infiltration. The overall cab design was said to result in lower inside sound levels of 72dB(A), a 7dB(A) reduction compared to previous models.

Impressive in size and scale

Three mega mines from around the world



The Kalgoorlie Super Pit was said to contribute over \$300 million to the local economy every year

Kalgoorlie Super Pit, Australia

Located in Western Australia, the Kalgoorlie Super Pit is one of the largest open pit gold mines in the country, at 600m deep, 3.5km long and 1.5km wide. Originally a series of underground mines, the Super Pit was created in 1989 by Kalgoorlie Consolidated Gold Mines. Every year, around 15 million tonnes of rock are moved using conventional drills, wheeled loaders and haulers.

Mponeng, South Africa

Located in South Africa’s Gauteng province, the Mponeng gold mine is the deepest on earth – descending almost 4km. The mine is made up of around 400km of tunnels and around 4,000 workers descend into these tunnels every day by elevator. Nearly 3,000kg of explosives are used every day to excavate approximately 6,400 tonnes of rock.

Iron ore mining, Brazil

The world’s largest iron ore mine is located in the state of Para, Brazil – the Carajás Mine is thought to hold around 7.2 billion tonnes of iron ore in reserves. In 2007, \$2.4 billion was invested in an expansion project that took three years to complete.

Long lasting

Komatsu Europe has introduced a new 142-tonne rigid dump truck, the HD1500-8. The company said that its key components, such as the mainframe, transmission and rear axle, were designed using the latest technology and durability standards to enable owners to cut down on repair expenses and prolong overhaul intervals. Power is provided by a 16-cylinder Komatsu SDA16V159-3 engine, rated at 1,175kW.

Komatsu has also made use of the latest developments in information communications technology (ICT) to improve the HD1500-8’s reliability and maintainability, increase site and operator safety, and enhance productivity and efficiency.

“We are proud to introduce the Komatsu HD1500-8 and delighted to announce that this 142-tonne rigid dump truck is CE certified and now available for sale in Europe,” said Jeroen De Roeck, product manager at Komatsu Europe. “It’s a completely new machine, redesigned using principles developed by the Earth Moving Equipment Safety Round Table (EMESRT) to ensure the highest safety standards.”



The Bell B30E 4x4 is an alternative for smaller quarries

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QUARRYING AND MINING EQUIPMENT

A quarry in Bulgaria run by Persenk Invest, a father and son team of Georgi and Ivan Georgiev, recently won a three-year contract with the national government's power station and so required investment in new equipment.

They added two Hitachi Zaxis-6 excavators and ZW-6 wheeled loaders to their expanding fleet of construction machinery. The first ZX350LC-6 – and the first Zaxis-6 machine in Bulgaria – arrived at the Kurtovo Konare quarry in April 2017, with the second delivered a year later.

The more recent acquisition moves blasted marble rock from the upper levels of the 100ha site on to the quarry floor, where 3,500 tonnes of materials per day are loaded into the primary crusher by the other ZX350LC-6. The crushed materials are moved by a ZW310-6 into two piles before being loaded onto trucks that dump them into the feeding station for the secondary crushing and screening equipment.

Finally, the other ZW310-6 loads trucks in the stockyard with the finished products for onward transportation to the power plant, 160km away, or other customer sites within a radius of 30km of the quarry.

The operator of the first Zaxis-6 in Bulgaria, Dimitar Georgiev, said, "The ZX350LC-6 is powerful and fast, as well as being easy to operate and enjoyable to work with. It is smoother than the previous model, which means that I am not as tired after a long shift. The cab is also very comfortable

Sany has delivered SY750H and SY500H excavators to a mine in Africa



and quiet – it is well-suited to the demands of a quarrying environment."

Another worksite that has recently taken delivery of new equipment is Africa's second-largest open pit copper mine, Lumwana, in Zambia, when China-based firm Sany delivered equipment to the world's largest gold mining company, Barrick Gold.

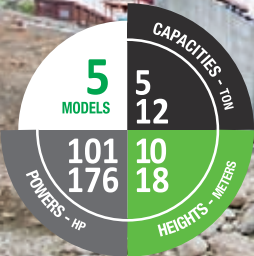
With an annual mining and stripping volume of 60 million tonnes, Lumwana copper mine is one of the company's major projects in Zambia, as well as Africa's second-largest open-pit copper mine. The batch of equipment delivered includes SY750H and SY500H excavators, an SRT95C mining truck, and an STC500 crane.

According to the head of Lumwana copper mine, the previous batch of Sany excavators delivered went into operation in mid-2017. The working conditions of mining areas are harsh compared to ordinary construction sites, but Sany excavators were said to have worked 22 hours per day to accomplish numerous mining and stripping missions. **IC**



The 142-tonne HD1500-8 Rigid Dump has been launched by Komatsu Europe

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Atlas Copco has launched a WEDA+ plug-and-play range

Pump

With a typical construction site posing a whole host of challenges, finding the right pump for the specific needs of the job is crucial. **Andy Brown** reports on this important sector and looks into some of the different options available

Pumps may not be the most eye-catching equipment on construction sites, but they are absolutely key; they need to be hardy enough to deal with the wide range of different materials contained in water and other elements, such as trash, and keep on working. A pump which fails can hold up work on a job site. Pump customers are looking for pumps that are highly efficient, easy to maintain, have good spare parts availability and for which the company offers good service.

Regarding dewatering pumps, there are several key issues to be considered including efficiency, size, versatility, durability and how easy they are when it comes to maintenance.

Atlas Copco Portable Energy has added to its family of medium and large submersible dewatering pumps with the launch of the WEDA+ plug-and-play range. The new range has undergone a design overhaul, the result of which was said to be new pumps that offer up to a 20% overall reduction in power consumption compared to previous models, greater efficiency and increased capacity.

Rotation control

The WEDA+ range comprises five models: the WEDA 50, with normal- and high-head variants, and the WEDA 60+, available in normal-head, high-head and super high-head configuration. The top-of-the-range super high-head WEDA 60+ was said to be 15% smaller and 20% lighter than other pumps in its class. The latest pumps offer flow rate capabilities of 61 to 146m³/h, and a maximum head of up to 69m.

Rotation control and phase failure protection has been introduced across all WEDA+ models to prevent the risk of the impeller rotating in the wrong direction. In addition, the entry system can accommodate a wider range of cable configurations, with the motor design offering higher efficiency and reduced



The heavy-duty four-inch Mine Boss is built to handle Northern Kenya's tough African conditions

start current. The models are constructed with an aluminium alloy to provide high corrosion resistance.

“The new WEDA+ pumps are easy to move and install in a wide range of dewatering applications,” explained Wim Moors, vice-president of pumps, Atlas Copco Portable Energy. “We have taken our portable and powerful electric submersible offering to the next level by focusing on efficiency and new features that will simplify the customer experience and enhance their productivity.”

Pumps often need to be able to handle large solids such as those found in flooded excavations on a jobsite or in flooded roads and tunnels. It is for this reason that Hycon supplies a range of hydraulic submersible trash pump available in a two-, three- and four-inch discharge size. These pumps working on the vortex system can handle large solids

or flooded surfaces.

The two- and three- inch pumps are said by the company to be suited for use on construction job sites and for any mobile general pumping purpose where it is easy to dump it into the water or slurry. Requiring only 30 to 40litres per minute of hydraulic flow, it can be operated by petrol, diesel or by electric power packs.

Used by various utility contractors for pumping jobs with services on water systems, de-central heating, wastewater, drainage line or when just flooded from rain, it can be operated by compact portable powerpacks that can be used for breakers, cut-off saws or core drills. According to information supplied by the company, a contractor often has a package consisting of a powerpack, breaker, cut-off saw, core drill and then a two- or three-inch pump. All pumps can run dry as being



The Hycon HWP4 water pump has a capacity of up to 204,000 liters per hour

it up

a hydraulic motor/pump, it is cooled and lubricated from the hydraulic power supply.

Isolated areas

Pumps often have to work in the toughest of conditions in isolated areas, such as an oil and gas project Australian Pump Industries (Aussie Pumps) worked on in Northern Kenya. For the project, the firm supplied a number of their heavy-duty Mine Boss four-inch trash pumps for duties in the Tullows project.

The Tullows team needed pumps that would cope in a range of conditions, from flooding rains to sandstorms. Aussie Pumps developed the trash pump range for the Australian Outback.

The big four inch trash pumps are powered by Yanmar 7.3kW electric-start air-cooled diesel engines, and produce flows of up to 1,800 liters per minute. They are designed to handle solids in suspension of up to 1.5 inches without clogging or stalling.

The pumps are fitted with an e-stop and battery isolation as a standard safety feature demanded by Australian Mining safety requirements. The pumps are designed to be easy to prime and will suck water through a vertical lift of 7.6m – important when drawing water from wells or semi dried-out river beds.

The company supplies Tullows with Yanmar spare parts kits that allow easy service of the engines. “We developed Yanmar engine service kits in Australia because of the vast distances involved and the simple logistics of keeping equipment working”, said Aussie Pumps’ chief engineer John Hales. “The service kits provide sufficient parts and oil for regular services to be carried out. That prolongs the life of these hard-working single-cylinder engines.”

Specialist equipment

A challenging environment of a different kind is a mine, and there are specialist pumps used to dewater these environments. Netzsch Pumps produces mine dewatering pumps and pump skids that require a small and compact movable unit to address their dewatering challenges. Also available for mining applications are Nemo progressive cavity pumps and the self-priming, valve-less Tornado T2 positive displacement pump.

The base mine dewatering pump skid unit includes a tank, progressing cavity pump with right-angle gearmotor, inspection ladder, valves, and piping – mounted on a common galvanized steel >

“ The Tullows team needed pumps that would cope in a range of conditions, from flooding rains to sandstorms ”

A Netzsch Mine Dewatering Skid in action



Making the right choice

The Atlas Copco team on the main benefits of electric or diesel

Critical factors in this decision are: required volume, flow/head specifications, and the constitution of water and materials to be pumped. Pump capability has to encompass the variables of operational conditions, site access, project duration, environmental issues, equipment autonomy and more.

Built for endurance and reliability, diesel-powered centrifugal pumps are designed for handling high volumes of water discharge. The operating flow range is typically between 50 to 830m³ per hour with a head of up to 51m.

Capable of coping with a wide range of applications, fully-automatic self-priming centrifugal pumps are considered the ideal solution for transporting or raising water with abrasive solids in suspension, such as in construction and mine site dewatering. They can work with water that is clean or dirty, as well as handle trash and fibrous materials. Their solids handling capacity can reach up to 76mm in size thanks to features such as semi open impellers and abrasion-resistant pump casings.

They are the choice for delivering fast dewatering solutions to sites where an alternative power source, such as a mains feed or generator output, is not available. In addition, these pumps are able to operate in a high-variable speed range, enabling them to cover different applications and flow/head combinations.

Electric submersible dewatering pumps offer portability, easy handling and are generally available in a power rating and capacity range that make them well suited to mining, construction and ground water control. They are also useful for applications where diesel pumps cannot be used, such as underground where emissions are not allowed.

Providing hours, and even days, of unattended dewatering pump operation, submersible pumps can meet the demanding requirements of raising water from great depths or lowering water tables even in the toughest environments; some models are capable of running for up to 2,000 hours without attendance. Electric pumps can offer environmental compatibility, for instance when quiet running is an essential feature of their performance.

Extreme durability is also guaranteed as electric submersible pumps offer high-wear resistance. Meanwhile, the modular construction of these types of pump provides for simplified maintenance procedures.

Current manufacturers’ medium to large capacity ranges offer maximum power ratings in the region of 54kW and can typically manage flows from 225 to 16,500 litres per minute with a maximum head of 85m.

Diesel-powered centrifugal pumps are designed for handling high volumes of water discharge



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PUMPS

Industry expert

Gary Moore, from Metso's Pumps Business Area

Could you tell us about a project where Metso pumps have been used in a challenging environment?

Metso Pumps are offered to customers in many applications such as Ball Mill Discharge, Cyclone feed applications and Long Tailings Disposal lines. Our pumps are manufactured in high-chrome iron metal versions and interchangeable with natural rubber-lined pumps, and some models can also be supplied in polyurethane for certain applications. In certain models we also offer the pumps with stainless steel wear components. We recently installed some of our pumps into the Frac Sand applications. The pumps needed to be modified to fit into the Blending Trucks that are used for Frac Sand. This application is extremely aggressive and requires a pump that is dependable and easy to maintain.

How much have pumps evolved from ten years ago?

Pumps designed 25 years ago are still being used by many clients, however pump companies continually strive to set the bar higher; everyone is trying to generate higher-efficiency pumps as power consumption will become a major factor in the future. In some less economically developed countries, power is already a major factor. Ease of maintenance and the ability to change out wear components quickly will always give you an upper hand against the competition. New materials to offer clients a longer wear life is always demanded by customers and will be a defining point in the future.

How different, if at all, are the pump requirements in different parts of the world?

The pump products that we offer are a global design. The customer gets the same finished product no matter where they are located. Unfortunately, some customer sites are located in very remote areas and it is difficult to service them appropriately, so Metso does offer an LCS (Life Cycle Sales) contract to some of these customers. This means we set up a workshop on the customer's site and offer various sets of service levels to suit their needs.



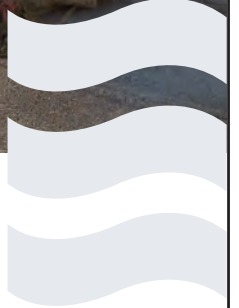
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skid. Also available are optional units with a control panel and instrumentation, including high/low level switches for the tank or dry-run protection for the pump. Individual pumps are available to retrofit existing skids.

The tank includes baffle/divider screens to filter out any solids too big to fit through the pump. The pump is located to the side of the tank, enabling easier access and maintenance. The right-angle gearmotor saves space and eliminates the need for a belt drive, but belt and pulley designs are also available. With operator safety key on all construction sites, the pump includes a removable inspection ladder with hand rails and a removable safety screen for the tank.

Available in a wide range of flow and pressure capabilities, the pump and tank can be constructed from different materials, such as carbon steel, stainless steel, galvanized steel, and Halar/rubber-lined steel, depending on the specific application. **iC**

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Andy Brown, editor of International Construction, with Will Zhu, general manager of Shantui

With Chinese company Shantui recently launching a new range of hydrostatic bulldozers, **Andy Brown** spoke to **Will Zhu**, general manager of Shantui, to find out more and to ask about the company's export plans

Broad horizons

For increasing numbers of China-based equipment manufacturers, the country's export market is a progressively important one. More and more firms are looking outwards towards the world and its many markets, certainly compared to a decade ago when the focus tended to be more internal. At the recent Intermat show in Paris, France, one firm that has been looking outwards for a number of years, Shantui, launched a new full range of hydrostatic bulldozers.

The company has traditionally been known for its bulldozers and the new range introduced consists of the C Series for China and developing markets, the G Series for developed markets, and the K Series, which is Stage 4 emissions-compliant and so aimed at the European market. The company has adopted this strategy to tap into the – often vastly – different customer expectations that exist in different markets.

Will Zhu, general manager of Shantui, said that in China last year the company had a market share of 65% for bulldozers, and that in 2018 they expect to sell at least 30% more products in this category in their domestic market.

While bulldozers are clearly a strength, the firm has long since taken steps to address what could have been seen as an over-reliance on one product category.

For example, in China Shantui has a partnership with Komatsu to produce excavators, which means that all excavators sold in China are produced by both companies, but they can both export their own products. Zhu comments that excavator sales almost doubled in 2017 for the company in China.

Sales of wheeled loaders jumped by approximately 30% domestically, while for export they are targeting wheeled loader sales to hit 1,500 in 2018. Export is a very real focus for the firm.

"In terms of exports, the company saw a 93% increase on what we had done in 2016," said Zhu. "Last year we exported 2,026 units and one of the most popular markets was actually Russia, which has seen a big increase in sales. The African market is also a strong one and has grown for us, as has North America over the last five years.

"Russia is actually our largest export market and we have number one market share for bulldozers. There is more of an emphasis placed on export than ever before, and we are especially looking to increase exports for excavators and wheeled loaders, and get better market share – that is one of our main targets."

While an increasing amount of China-based equipment manufacturers are looking overseas, Zhu is confident regarding the immediate future of construction in China. "I think that for the next five years at least, China will be a very strong market, a booming market, and there will be a new period of building and construction. Politically it is a very stable situation at the moment, which helps."

While the domestic market remains extremely strong and the company seeks to increase the units sold of wheeled loaders, excavators and road machinery, the conversation turned once more to bulldozers, the jewel in the company's crown.

Perhaps unsurprisingly, Shantui has ambitious plans for this product category, with Zhu commenting that, "For exports we want to increase the number of units of bulldozers; last year we exported 1,069 bulldozers, this year we want that to be 1,600."

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“ While an increasing amount of China-based equipment manufacturers are looking overseas, Zhu is confident regarding the immediate future of construction in China ”



The DH13K is Stage 4-compliant

Heavy demand

Sales of equipment to the mining and quarrying sector appear to be lagging the recovery in the global construction sector but, due to regional differences, it is a segment which is hard to quantify

The types of large equipment that are usually associated with mining and quarrying are niche machines. The excavators and loaders used in these industries tend to be at the heavier end of the scale. The difficulty in quantifying the size of the market for equipment in the mining and quarrying sector is that 'heavy' is a relative term, depending on where you are in the world.

For example, in developed markets where aggregate production is well-consolidated there is a tendency towards fewer, bigger quarries. For instance, the excavators being used to load haulers would tend to be at least above 50 tonnes operating weight, and are often much heavier.

There was a time when most excavator suppliers' ranges topped-out at around 50 tonnes, and the heavier classes of machine were the preserve of only a handful of manufacturers such as Caterpillar, Hitachi, Komatsu and Liebherr. However, the last decade or so has seen more manufacturers enter (or re-enter) this segment, with the

likes of Doosan, Hyundai and Volvo now also offering heavier excavators.

The same period has seen several of the larger Chinese OEMs enter the excavator sector with credible products and large machines. This class of excavator is now also available from the likes of Sany, XCMG and Zoomlion, among others, in territories where they have distribution.

Emerging markets

The same is true to some extent in the wheeled loader segment, with Chinese manufacturers in some cases offering large wheeled loaders for sale worldwide.

In emerging economies, it is often the case that smaller excavators are used for mining and quarrying. This may be because operations are smaller and more localised, or it may be because larger and more appropriate equipment is either unavailable or deemed to be too expensive. The types of excavator being used may often be nearer the 20- or 30-tonne mark in such cases.

So although it is difficult to isolate the size of the market for quarrying and mining excavators, it is possible to see the trends in the wider market. For example, the global market for crawler excavators above 30 tonnes has clearly fallen as a proportion of the total excavator market since 2011. In some respects, this is due to the fast-growing worldwide popularity of 'midi' excavators ranging from about 5 to 10 tonnes, but it is also thought to be indicative of the reduced global construction output of recent years and low commodity prices, which depressed demand in mining.

The depressed demand from mining has been particularly apparent in the rigid dump truck segment, which has fallen sharply since 2012 in response to weak global commodity prices. From global sales of more than 5,500 units that year,

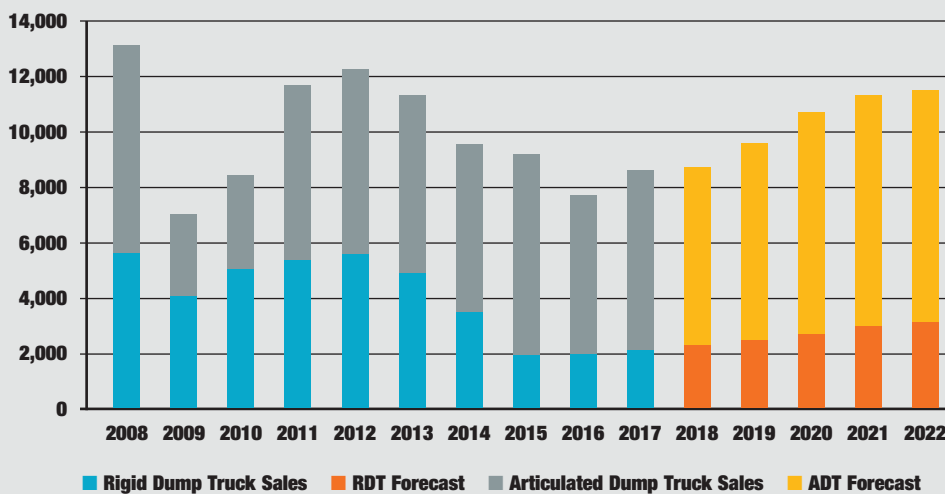
with a value in excess of US\$5 billion, the market fell to a shade over 2,000 machines a year between 2015 and 2017.

The articulated dump truck segment has held up much better, but these machines are used extensively in construction as well as mining and quarrying, and are also a little more limited in their geographic appeal, with about half of global demand limited to Europe and North America.

As the graph illustrates, the global off-road hauler market is expected to strengthen from next year onwards, but this will be driven by the articulated dumptruck segment. While rigid hauler sales are expected to grow, it is expected to be several years before the sector is back to something resembling good health. **IC**

“ There was a time when most excavator suppliers' ranges topped-out at around 50 tonnes ”

Global sales of off-highway dumptrucks (unit terms)



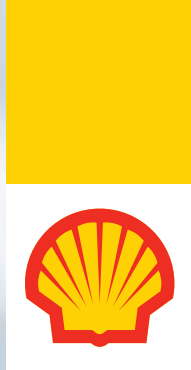
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